(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 924 387 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.09.2015 Bulletin 2015/40

(51) Int Cl.:
F41J 9/14 *(2006.01)* ***F41J 13/02*** *(2009.01)*

(21) Application number: **14461518.4**

(22) Date of filing: **28.03.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Patents Factory Ltd. Sp. z o.o.**
65-043 Zielona Gora (PL)

(72) Inventors:
- **Paczpowski, Jacek**
  65-043 Zielona Gora (PL)
- **Kramek, Krzysztof**
  65-043 Zielona Gora (PL)
- **Nalewa, Tomasz**
  65-043 Zielona Gora (PL)

(74) Representative: **Pawlowski, Adam et al**
Eupatent.PL
ul. Zeligowskiego 3/5
90-752 Lodz (PL)

Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) A shooting target

(57) A shooting target, comprising: a bouncing plate (121) to be shot at; a shot point detector (133) configured to detect the point of impact of a bullet at the bouncing plate (121); an image projector (131) configured to project a target image (141, 151) on the bouncing plate (121); and a processor (134) configured to receive the point of impact from the shot point detector (133) and to generate a modified target image (142, 152) to be displayed by the image projector (131).

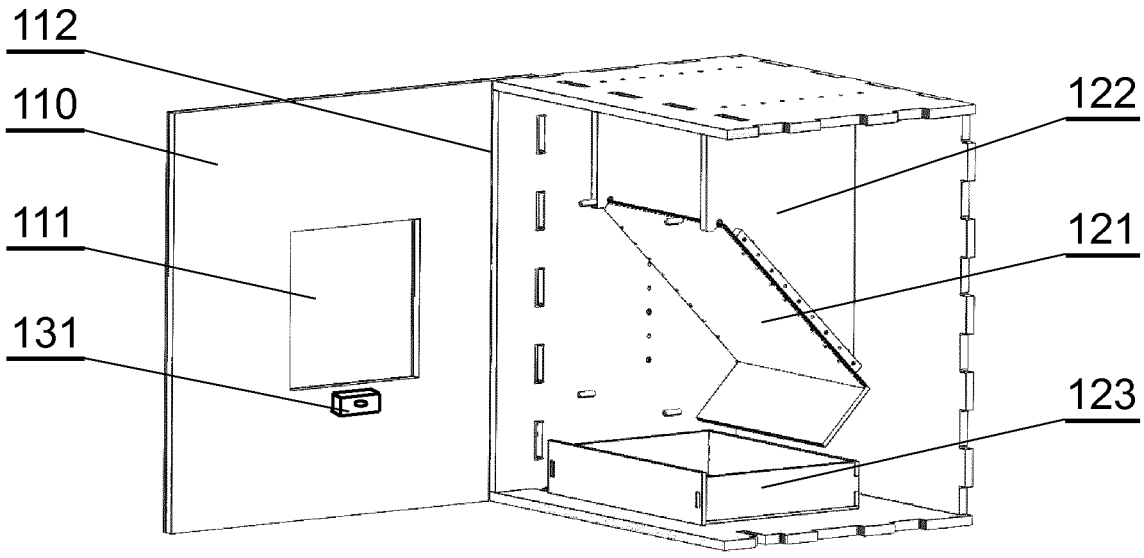

Fig. 1

EP 2 924 387 A1

Description

[0001] The present invention relates to shooting targets.

[0002] Shooting ranges are used by individuals, manufacturer's, law enforcement agencies, and others to check shot patterns of weapons such as rifles or pistols and the shot pattern of ammunition. They are also used for training or shooting accuracy contests.

[0003] The targets are generally of a heavy paper or similar material and most often have a pattern or image imprinted on them. The image may be a square, a circle, a triangle or other shape such as a profile of an animal. The pattern or image provides a reference position on the target.

[0004] The shooter aims a weapon, such as a rifle, pistol, bow or crossbow at the image on the target and fires the weapon. By firing several rounds, a pattern commonly referred to as the shot pattern, is created on the target by the bullets or arrows piercing the target.

[0005] Most, except for the manufacturer's, are interested in the shot pattern on the target to check the skill of the shooter, to sight in a scope equipped weapon or for practice. Manufacturer's on the other hand, are interested in a weapon's accuracy or the repetitive pattern of ammunition.

[0006] A US patent US5031920 presents a shooting range that has a target chamber position at the target end. A camera on the chamber transmits an image of the target to the shooting end where it is displayed on a screen of a video micrometer. The video micrometer has cross hair reticles that measure a shot pattern generated on the target.

[0007] It would be desirable to further improve the known shooting target.

[0008] The object of the invention is a shooting target, comprising: a bouncing plate to be shot at; a shot point detector configured to detect the point of impact of a bullet at the bouncing plate; an image projector configured to project a target image on the bouncing plate; and a processor configured to receive the point of impact from the shot point detector and to generate a modified target image to be displayed by the image projector.

[0009] Preferably, the bouncing plate is bullet-proof.

[0010] Preferably, the bouncing plate has a matt white surface.

[0011] Preferably, the shooting target has a box casing inside which the components are mounted.

[0012] Preferably, the bouncing plate is mounted at an angle, preferably 45 degrees, to the shooting line.

[0013] Preferably, it further comprises a bottom drawer 123 for collecting bullets bounced off from the bouncing plate.

[0014] Preferably, the target image is selected from a plurality of images stored in a target images database.

[0015] Preferably, the target image is a static image.

[0016] Preferably, the target image is a moving image.

[0017] Preferably, the modified target image comprises indication of the point of impact.

[0018] The shooting target has been presented by means of exemplary embodiment on a drawing, wherein:

Fig. 1 presents an embodiment of the shooting target;
Fig. 2 presents a functional diagram of the shooting target;
Fig. 3A, 3B, 4A, 4B present exemplary shooting target views.

[0019] Fig. 1 presents an example embodiment of the shooting target, which has a form of a box casing 100 with a front door 110 which is mounted on hinges 112 and is shown in the drawing in open position to clearly show the inside of the shooting target (when the shooting target is in use, the front door 110 is closed). Further, to clearly show the inside of the shooting target, one side wall is removed on fig. 1.

[0020] Inside the box, there is mounted, on supports 122, a bullets bouncing plate 121. The bouncing plate can be mounted at an angle, preferably 45 degrees, to the shooting line, so that the incoming bullets bounce off from the plate 121 and are collected at a bottom drawer 123. The bouncing plate 121 has a uniform surface, preferably matt white, which is bullet-proof, i.e. the bullets hitting the plate 121 do not cause damage to the plate 121.

[0021] A projector 131, such as a laser projector, projects a target image on the plate 121. The projector 131 is preferably mounted inside the box, in front of the plate 121, for example on the front door 110, on one of the side walls or on an arm attached to one of the side walls.

[0022] Fig. 2 presents a functional diagram of the device. The projector 131 projects a target image on the plate 121. The image is provided to the projector 131 from a processor 134, which obtains the image from a target images database 135, depending on user selection. When a user shoots at the plate 121, a shoot point detector 133 detects the point of impact of the bullet. The point of impact is input to the processor 134, which modifies the target image and inputs the modified image to the projector 131.

[0023] Fig. 3A presents one example of a typical shooting target image 141 displayed on the plate 121 comprising concentric circles, as viewed from the shooter's perspective through the opening 111 in the front door 110. This is the initial image as defined in the target images database 135. After the user shoots the target and the shoot point detector 133 inputs the point of impact to the processor 134, the processor 134 may determine how to modify the target image. As shown in Fig. 3B, the modified target image 142 is modified by marking the points of impact. In the present example, the marking is by means of large circles, with a score inside the circle. In this manner, the user may see more clearly the points of impact (as compared to typical shooting targets where

the bullet hit point is typically small) and may be provided with additional information. Furthermore, the points of impact may be coloured, e.g. points closer to the centre may be in red, while points closer to the edge may be in green. Furthermore, the individual points of impact may be numbered to indicate the sequence in which the points were hit. Other types of static target images can be used, such as image of an animal, human or any other object.

[0024] Fig. 4A presents another example of a shooting target image 151 displayed on the plate 121 comprising concentric circles, as viewed from the shooter's perspective through the opening 111 in the front door 110. The image 151 comprises a plurality of moving objects. The image of a single object is collected from the database 135. The trajectory of movement may be random or may follow a predefined path, e.g. a parabola. The user may select the speed of movement and the number of objects. When the user shoots the target and the shoot point corresponds to a position of an object on the image, the object may be stopped at this point and marked as shot on the modified image 152, while the other objects are still moving.

Claims

1. A shooting target, comprising:

   - a bouncing plate (121) to be shot at;
   - a shot point detector (133) configured to detect the point of impact of a bullet at the bouncing plate (121);
   - an image projector (131) configured to project a target image (141, 151) on the bouncing plate (121); and
   - a processor (134) configured to receive the point of impact from the shot point detector (133) and to generate a modified target image (142, 152) to be displayed by the image projector (131).

2. The shooting target according to claim 1, wherein the bouncing plate (121) is bullet-proof.

3. The shooting target according to any of previous claims, wherein the bouncing plate (121) has a matt white surface.

4. The shooting target according to any of previous claims, having a box casing (100) inside which the components are mounted.

5. The shooting target according to any of previous claims, wherein the bouncing plate (121) is mounted at an angle, preferably 45 degrees, to the shooting line.

6. The shooting target according to claim 5, further comprising a bottom drawer 123 for collecting bullets bounced off from the bouncing plate (121).

7. The shooting target according to any of previous claims, wherein the target image (141, 151) is selected from a plurality of images stored in a target images database (135).

8. The shooting target according to any of previous claims, wherein the target image (141) is a static image.

9. The shooting target according to any of previous claims, wherein the target image (141) is a moving image.

10. The shooting target according to any of previous claims, wherein the modified target image (142, 152) comprises indication of the point of impact.

Amended claims in accordance with Rule 137(2) EPC.

1. A shooting target, comprising:

   - a bouncing plate (121) to be shot at;
   - a shot point detector (133) configured to detect the point of impact of a bullet at the bouncing plate (121);
   - an image projector (131) configured to project a target image (141, 151) on the bouncing plate (121);
   - a processor (134) configured to receive the point of impact from the shot point detector (133) and to generate a modified target image (142, 152) to be displayed by the image projector (131)

   the shooting target being **characterized in that**
   - the bouncing plate (121) has a surface of a uniform color and is bullet-proof; and
   - wherein the bouncing plate (121) is mounted at an angle to the shooting line.

2. The shooting target according to any of previous claims, wherein the bouncing plate (121) has a matt white surface.

3. The shooting target according to any of previous claims, having a box casing (100) inside which the components are mounted.

4. The shooting target according to any of previous claims, wherein the bouncing plate (121) is mounted at an angleof 45 degrees with respect to the shooting line.

5. The shooting target according to claim 4, further

comprising a bottom drawer 123 for collecting bullets bounced off from the bouncing plate (121).

6. The shooting target according to any of previous claims, wherein the target image (141, 151) is selected from a plurality of images stored in a target images database (135).

7. The shooting target according to any of previous claims, wherein the target image (141) is a static image.

8. The shooting target according to any of previous claims, wherein the target image (141) is a moving image.

9. The shooting target according to any of previous claims, wherein the modified target image (142, 152) comprises indication of the point of impact.

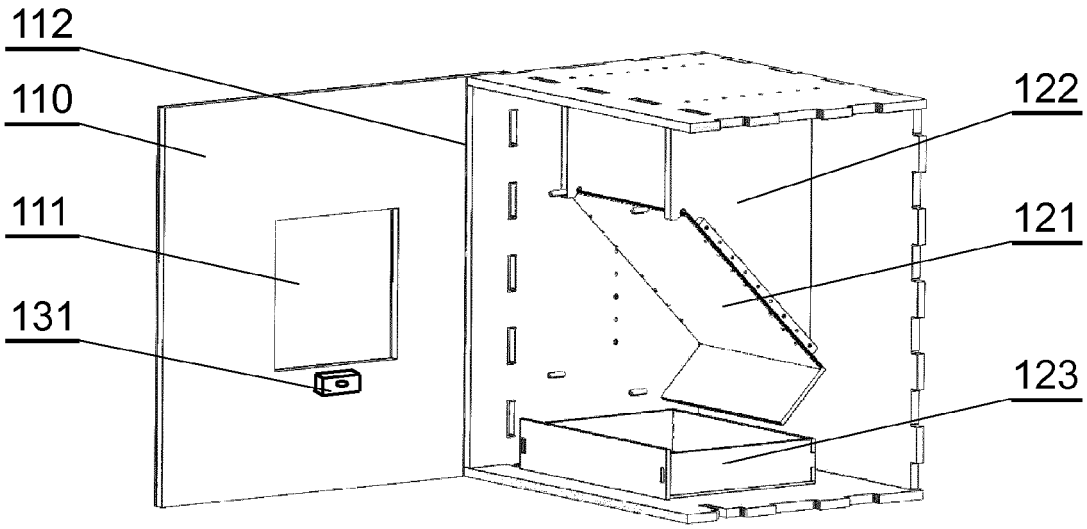
112
110
111
131
122
121
123

Fig. 1

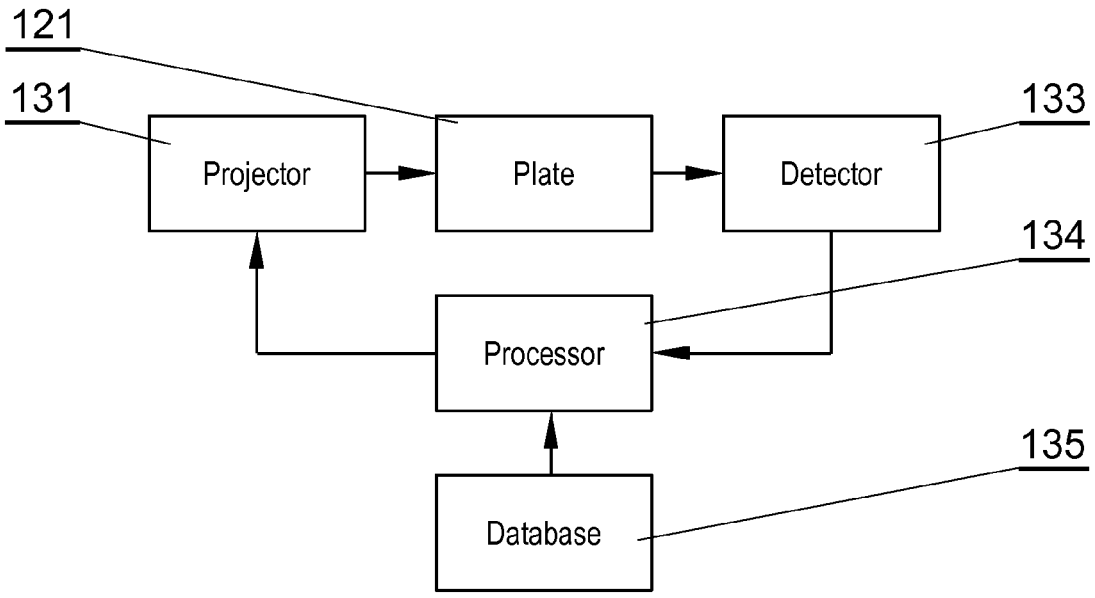
121
131
Projector
Plate
Detector
133
134
Processor
135
Database

Fig. 2

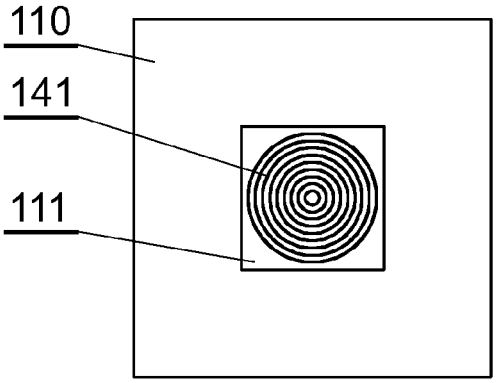

Fig. 3A

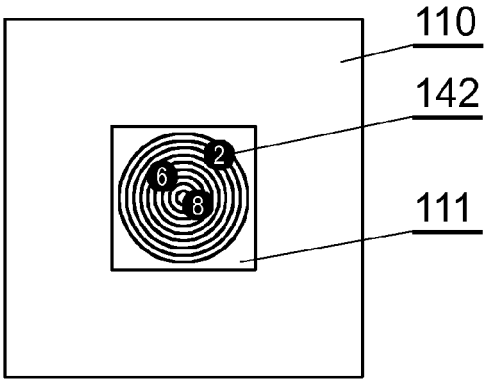

Fig. 3B

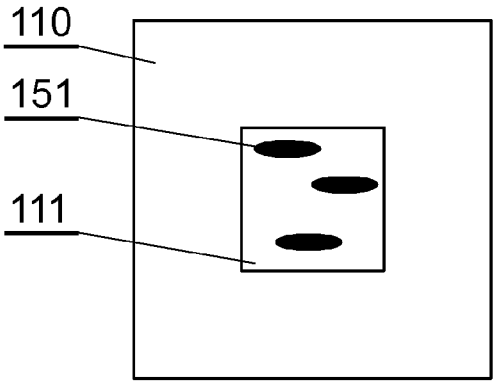

Fig. 4A

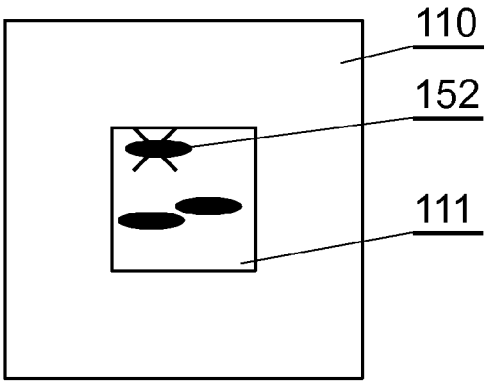

Fig. 4B

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 14 46 1518

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 Y	US 2008/213732 A1 (MANARD PAIGE [US] ET AL) 4 September 2008 (2008-09-04) * paragraph [0010]; figures 1-4 * * paragraph [0018] - paragraph [0024] *	1-4,7-10 5,6	INV. F41J9/14 F41J13/02
Y	GB 2 078 353 A (POLYTRONIC AG) 6 January 1982 (1982-01-06) * page 1, line 123 - page 2, line 8; figure 1 *	5,6	
X	US 5 980 254 A (MUEHLE ERIC G [US] ET AL) 9 November 1999 (1999-11-09) * column 3, line 5 - line 33; figures 1,2,5 * * column 4, line 22 - line 42 * * column 6, line 15 - column 8, line 15 *	1-3,7-10	

TECHNICAL FIELDS SEARCHED (IPC)
F41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	2 October 2014	Beaufumé, Cédric

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 46 1518

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-10-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008213732 A1	04-09-2008	NONE	
GB 2078353 A	06-01-1982	AT 368632 B	25-10-1982
		AU 539054 B2	06-09-1984
		AU 7131381 A	24-12-1981
		CH 647861 A5	15-02-1985
		DE 3122287 A1	06-05-1982
		FR 2485181 A1	24-12-1981
		GB 2078353 A	06-01-1982
		SE 8103668 A	19-12-1981
US 5980254 A	09-11-1999	AU 3115997 A	19-11-1997
		CA 2253378 A1	06-11-1997
		EP 0806621 A1	12-11-1997
		EP 1174674 A1	23-01-2002
		US 5823779 A	20-10-1998
		US 5980254 A	09-11-1999
		WO 9741402 A1	06-11-1997

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

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5031920 A **[0006]**