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(54) **ACTIVE IMITATIVE TARGET SYSTEM**

(57) The object of the invention is an active imitative target system, where the trainee can identify an invisible training tool (active imitative target) during training at night or in low-visibility environments. The system comprises at least one shooting device of the trainee equipped and combined with infrared, heat and light radiation and night observation devices, at least one inflated active training device (active imitative target) made of (covered by) various thermal heat-radiating and heat-conducting materials and the radiation connecting the sighting/shooting device and the training device. An active imitative target can be human-shaped or of another shape (e.g., an animal), and its position can be changed. The active imitative target is inflatable and preferably comprises battery-powered (or chemically heated) heating elements and timers.

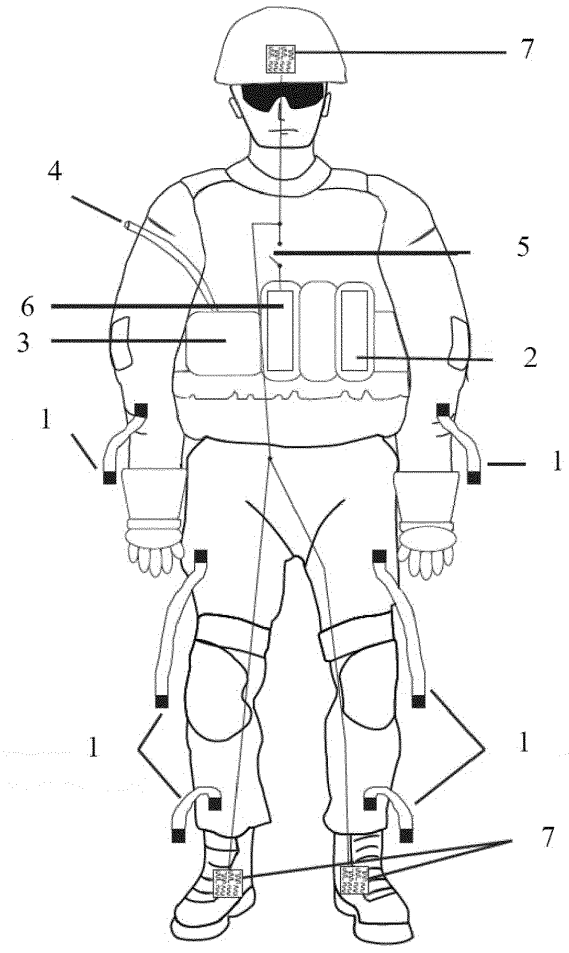

FIG 1

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Description

Field of technology

[0001] The present invention represents a training tool and target (active imitative target) for working with a night vision and thermal camera. The solution can be used both for training to improve physical skills, including military-related skills, and in real conflict situations, including military-related.

Prior Art

[0002] Inflatable or pumpable tools, including life-sized tools and tools used in the military field both in training and in military activities, are known. Inflatables can include handgun imitations, light vehicles, human models, as well as vehicles carrying heavy weapons, heavy weapons, airplanes, etc. The purpose of using these solutions is usually to replace expensive real objects with (including cheap) inflatable replicas thereof. Well-known solutions are produced, among others, by the company Inflatech (www.inflatechdecoy.com).

[0003] The patent application US2012208150 (published August 16, 2012) provides a solution for conducting military training in which the target is a human-shaped, rigid system attached to a base whose movements and activities can be remotely controlled. The main drawback of the solution is that it is a technologically complex and expensive system that only imitates the external shape of the human upper body and its movement without taking into account that the trainee may have infrared or other night vision devices to perform the tasks.

[0004] Means and methods for remote detection of objects based on various sensors, including night observation devices, which help to detect an object at a desired distance with the help of one or more sensors or a set of sensors, are well known. For example, in the patent application US2017270375 (published September 21, 2017), the reflection-based object detection solution was improved by using pulsed light.

[0005] One of the purposes of using different sensors or their combination in devices is to help detect objects in conditions where the human eye does not allow it (e.g., due to inclement weather (e.g., fog), due to a long distance, in military conditions, etc.).

[0006] Known is also the inflatable training target presented in patent application US3536232 (published October 27, 1970) for military exercises.

[0007] A problem with prior art solutions is the immunity of inflatables to some observation devices, where the observation devices can simply distinguish the real object from its inflated model. For example, if the engine of the real vehicle is hot during operation and a higher temperature can be detected from a distance with a thermal camera, then the inflatable model does not have a hot engine, and therefore, when tracking with a thermal camera, it also helps to distinguish the real vehicle from its inflatable model.

[0008] Patent application CN214148996 (published September 07, 2021) presents an inflatable air defense system camouflage that is also equipped with visible light, infrared radiation (heat emitting component), and radar scattering solution that imitates an actual air defense system. The disadvantage of the solution can be considered the necessity of using an expensive wired or wireless management computer, which determines the pressure and temperature of filling of the camouflage, and the temperatures and duty cycles of different parts of the camouflage cannot be changed independently of each other.

Summary of the invention

[0009] The aim of the invention is to develop an active imitative target system, wherein the trainee can identify an invisible training tool (active imitative target) during training at night or in low-visibility environments. The system comprises one or more trainees who perform observation or shooting for training, one or more firing devices of the trainee equipped and combined with infrared, thermal, and light radiation and night observation devices, one or more inflatable active training devices (active imitative targets) that are made of (coated with) various thermal heat-radiating and heat-conducting materials and radiation connecting the sighting/firing device and the training device.

[0010] In training at night or with poor visibility, an active imitative target is an invisible (to the human eye) training tool, which can be used in training and in real conflict situations (including combat), imitating the external shape, form, and infrared and heat radiation of a person (soldier) as a target. The active imitative target can also have a different shape (such as an animal), and its position can be changed. The active imitative target is inflatable and preferably comprises heating elements equipped with battery power (or chemical heaters).

[0011] For portability, the active imitative target is packed (rolled up, folded, vacuum-packed, etc.) in a separate packing bag or container, while the latter simplifies the delivery of the active imitative target to the target point for dropping it from an aircraft, such as a drone.

[0012] An active imitative target, equipped with fastening means and pockets, is installed or thrown to the required location for training or in combat, secured with straps if necessary, and if necessary, the pockets are filled with weights (e.g., soil). Active imitative targets with automatic opening, filling with air, and heating can be installed, among other things, from a moving transport, including an aircraft (e.g., a drone). The active imitative target is reusable and can be deflated and repackaged.

[0013] The entire object of the active imitative target is implemented as an inflated object, which is preferably filled with air, according to the alternative, either using an

automatic or manual valve from a compressed air balloon, a hand pump, or blowing from an inflation hose equipped with a closure.

[0014] The battery-powered heater inside the active imitative target is turned on manually, also, when using an automatic tap to fill with air, the heater can be turned on by an automatic switch or by remote control switching. When using a temperature controller, the temperature and the cycle time are also set in advance.

[0015] The infrared, heat, and light radiation and night observation devices used in the active imitative target system described in the invention, as well as the shooting device of the trainee, can be solutions known from the prior art.

[0016] When performing observations with technology equipped with observation devices, radars, night vision, and thermal cameras, an active target imitates the light or heat radiation, sensor, or radar trace of an object to be imitated (for example, a person). List of figures

Figure 1 shows an active target imitating a human figure;

Figure 2 shows the training system as a whole.

Preferred embodiments of the invention

[0017] One of the advantageous embodiments of the invention is an active imitative target system, wherein the trainee can identify an invisible training tool (active imitative target) during night training. The system comprises one or more trainees who fire for training, one or more firing devices of the trainee equipped and combined with infrared, thermal, and light radiation and night vision devices, one or more inflatable training devices (active imitation targets) made of (covered by) various thermal heat-radiating and heat-conducting materials and from the radiation connecting the shooting device and the training device.

[0018] The invisible training tool in the night training system is an active imitative target board, which can be used during training and in real conflict situations (including combat), imitating the external shape, form, and infrared and heat radiation of a person (soldier) as a target. The active imitative target can also have a different shape (for example, an animal), and its position can be changed (among others, lying down, shooting, or crouching position). The active imitative target is inflatable, including heating elements 7, preferably equipped with battery power 6. The active imitative target is reusable and can be deflated and repackaged.

[0019] The infrared, heat, and light radiation and night observation devices used in the active imitative target system described in the invention, as well as the shooting device of the trainee, can be solutions known from the prior art.

[0020] When observing with technology equipped with observation devices, radars, night vision, or thermal cameras, an active target imitates the light or heat radiation, sensor, or radar trace of an object to be imitated (for example, a person).

[0021] For portability, the active imitative target is packed (rolled up, folded, vacuum-packed, etc.) in a separate packing bag or container, while the latter simplifies the delivery of the active imitative target to the target point for dropping it from an aircraft, such as a drone.

[0022] An active imitation target, equipped with fastening means and pockets, is installed or thrown in the required location for training or in combat, secured with straps if necessary, and, if necessary, the pockets provided for this purpose are filled with weights, such as soil. The means of fastening may be belts 1.

[0023] Active imitative targets with automatic opening, filling with air, and heating can be installed, among other things, from a moving transport, including an aircraft (e.g., a drone).

[0024] Fully inflated, the entire object of the active imitative target is realized, which is preferably filled with air, according to the embodiment, either using an automatic or manual tap from a compressed air cylinder 2, a hand pump 3, or blowing from a filling hose 4 equipped with a closure.

[0025] The battery-powered heater 7 inside the active imitative target 6 is manually turned on with switch 5, and also, using an automatic tap when filling with air, the heater can be turned on with the automatic switch 5 or by remotely controlled switching. In yet another embodiment, where the active simulating target is equipped with a temperature controller, the temperature and the duty cycle time are also predetermined.

[0026] The purpose of the training is to improve the real skills of trainees equipped with infrared and/or night vision equipment to find a missing civilian, escaped criminal, enemy, etc., in the dark or in poor visibility.

[0027] The displayed emission-based image (infrared or thermal image, etc.) is often difficult to correctly interpret and understand, with even an experienced person taking a long time to distinguish between the content of the displayed thermal image and the real world.

[0028] By using combat weapons equipped with infrared and/or night vision devices by the trainees in the system training, it is possible to improve the quality of the practical skills of the trainees (in darkness, sunshine, poor visibility, fog, rain, snow, etc.) during searches, shootings, bombings, etc. By improving the quality and speed of the skills of the trainees, it is possible to save time and ammunition. The training system can be operated in different environmental conditions (e.g., different climate and weather) and light conditions (e.g., night or day). During the training, participants will also learn to look for unusual heat-emitting objects that do not fit into the surrounding environment. Technical solutions comprising artificial intelligence can be applied in training to learn relevant information from previous training sessions.

[0029] In real conflict situations (among other things in military operations), the invention can give the observers of the opponents false information about the number of people in the territory and their location. With the use of imitating active targets, it is possible to create images similar to the external resemblance of the human body and the thermal field of the human body to tracking devices and thereby mislead the opponent, increasing the number of objects that can be detected and determined by the opponents and their location. Time is one of the most important factors in searches for people and military operations.

[0030] In surveillance, reconnaissance, and combat, to force the opponent to use more expensive and more accurate technology, increase the amount of information processed by the opponents and the time required to distinguish or force them to fire at a target imitating a soldier emitting real heat.

[0031] In training and military operations, all kinds of imitation targets made of different materials and with different heat sources can be used. The specification of the thermal cameras or night vision devices used and the quality of the image processing determines the distance in meters of the imitative target used by the trainee. Modern thermal cameras and night vision devices are very advanced, which makes evading infrared cameras difficult, but using infrared thermal images or additional objects that provide a thermal image (including imitative active targets) makes the opponent's actions significantly more time-consuming.

[0032] The training system based on the active imitative target system can, in English, be called the NTCT system (NTCT: Night vision and Thermal imaging Camera Target). Figure 2 shows the training system as a whole: imitative active target; a surveillance device equipped with infrared, heat and light radiation, and night vision devices; trainee controlling the tracking device.

Claims

1. Active imitative target system that comprises at least one trainee who observes or fires for training, at least one trainee observation or shooting device equipped and combined with infrared, thermal, and light radiation or night vision devices, at least one inflatable active imitative target and radiation connecting the observation-firing device and the training device, which is **characterized in that**:

   - the active imitative target is made of or partially covered or fully covered with thermal heat-radiating and heat-conducting materials;
   - the solutions and arrangement of the heat-radiating elements of the active imitation target are changeable and selectable;
   - the active imitative target is additionally equipped with at least one thermostat and a timer;
   - the active imitative target is additionally equipped with at least one battery-powered (6) or chemically heated heater (7);
   - active imitative target is equipped with at least one means of fastening (1) intended to attach the active imitative target to existing immovable objects and/or to give different positions to the active imitative target;
   - the active imitative target is equipped with pockets designed to be filled with weights or soil;
   - the active imitative target is automatically opened and can be transported by means of transport.

2. Active imitative target system, according to claim 1, **characterized in that** the active imitative target can be inflated and deflated, whereby an automatic or manual tap is used for filling from a compressed air balloon (2) or a hand pump (3) or blowing from a filling hose equipped with a closure (4).

3. Active imitative target system, according to claim 1, **characterized by** the active imitative target having a different shape.

4. Active imitative target system, according to claim 1, **characterized in that** the active imitative target is human-shaped.

5. Active imitative target system, according to claim 1, **characterized in that** the active imitative target is in the shape of an animal.

6. Active imitative target system, according to claim 1, **characterized in that** the active imitative target is collapsible for transport.

7. Active imitative target system, according to claim 1, **characterized in that** the active imitative target for heat radiating parts (7) has a set operating temperature and operating cycle time before use.

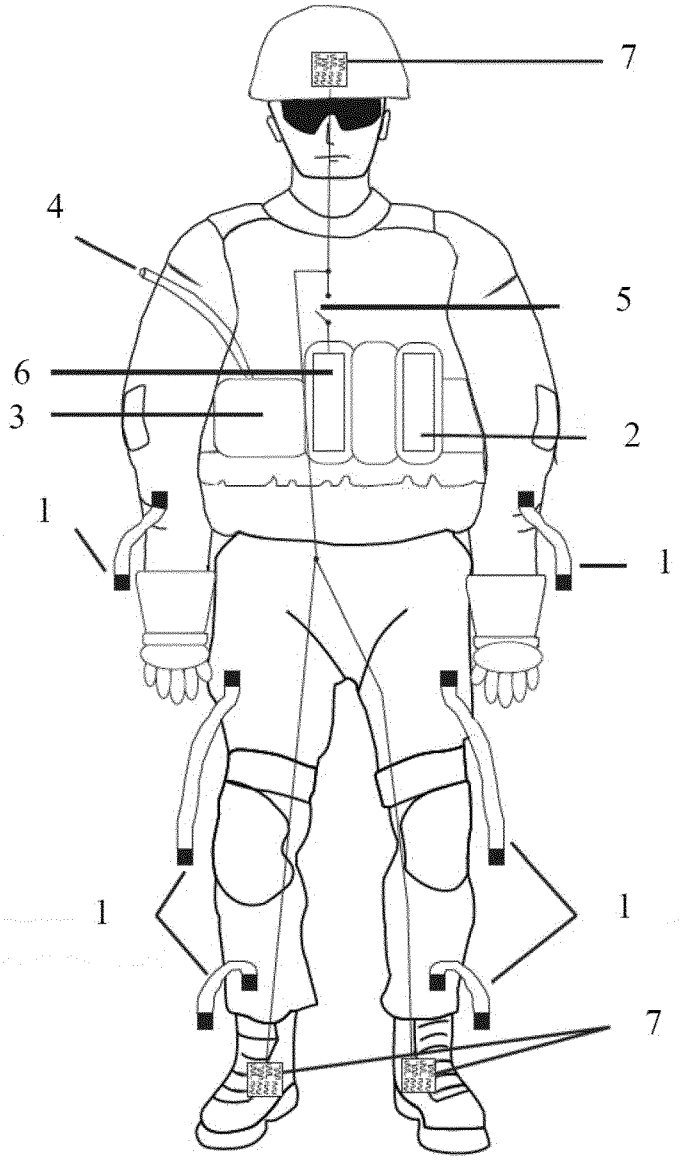

FIG 1

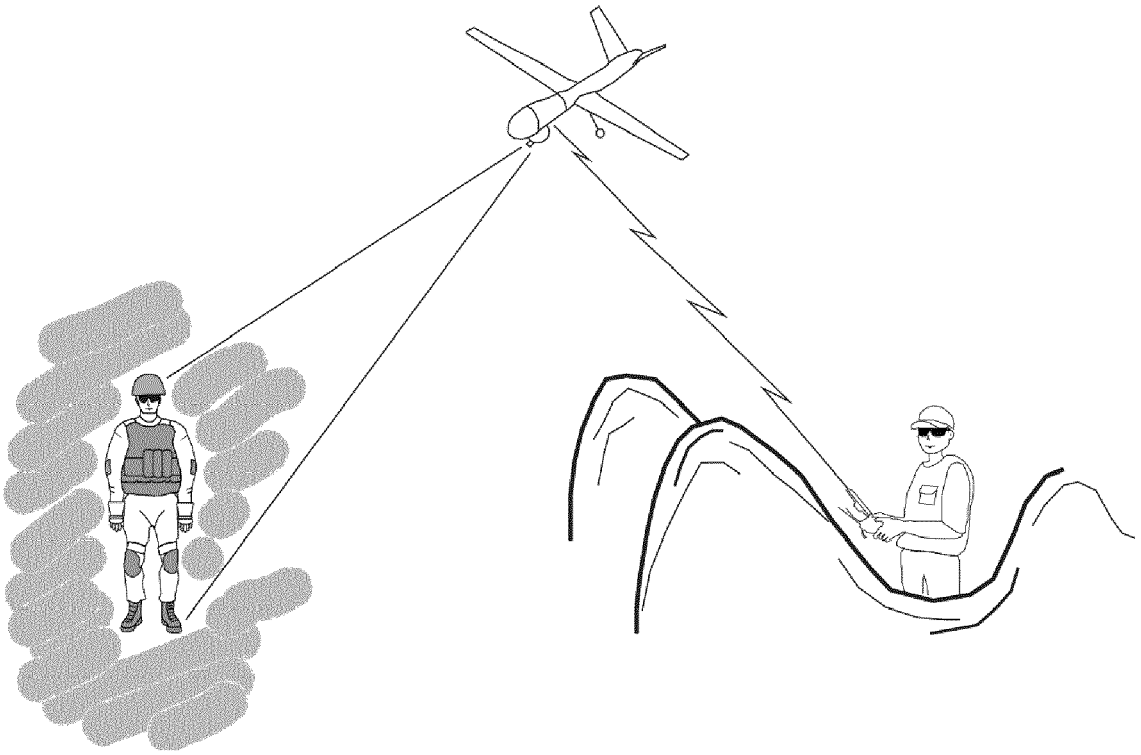

FIG 2

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EUROPEAN SEARCH REPORT

Application Number
EP 23 02 0529

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2022/018636 A1 (YEDAYA LIBI [IL]) 20 January 2022 (2022-01-20) * abstract; figures 1-4 * * paragraphs [0015] - [0030] * * paragraphs [0040], [0041] * * paragraphs [0051], [0059] *	1-7	INV. F41J2/02 ADD. F41J7/00
A	EP 0 146 649 B1 (AUSTRALASIAN TRAINING AIDS PTY [AU]) 7 September 1988 (1988-09-07) * figures 1,4,5 * * column 1, lines 3-7 * * column 4, line 2 - column 5, line 26 * * column 5, lines 58-62 * * column 8, lines 5-59 * * column 9, lines 30-35 * * column 9, lines 42-53 *	1-7	
A,D	CN 214 148 996 U (SHORE DEFENSE COLLEGE OF NAVAL AERONAUTICAL UNIV PLA) 7 September 2021 (2021-09-07) * the whole document *	1-7	
A	WO 98/30291 A1 (HUH YONG SEOK [KR]; CHOI BYUNG KOOK [KR]) 16 July 1998 (1998-07-16) * abstract; figure 1B * * page 4, lines 8-10 *	1	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	15 April 2024	Schwingel, Dirk

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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REFERENCES CITED IN THE DESCRIPTION

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- US 2017270375 A **[0004]**
- US 3536232 A **[0006]**
- CN 214148996 **[0008]**