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㊴ **Classifier of shots fired by light weapons.**

�57 Classifier of shots fired by light weapons such as pistols, rifles, sub-machine-guns, etc. which fire single shots or bursts, the classifier being associated with a target (16) and the position thereof when fired at and comprising in cooperation a telecamera (11) to scan the target (16) and at least one sensor (12) to detect the shots which is associated with the working of the weapon (18), the telecamera (11) and sensor (12) sending their respective signals to a data processing, classification and storage assembly (13) that comprises at least one display monitor (19).
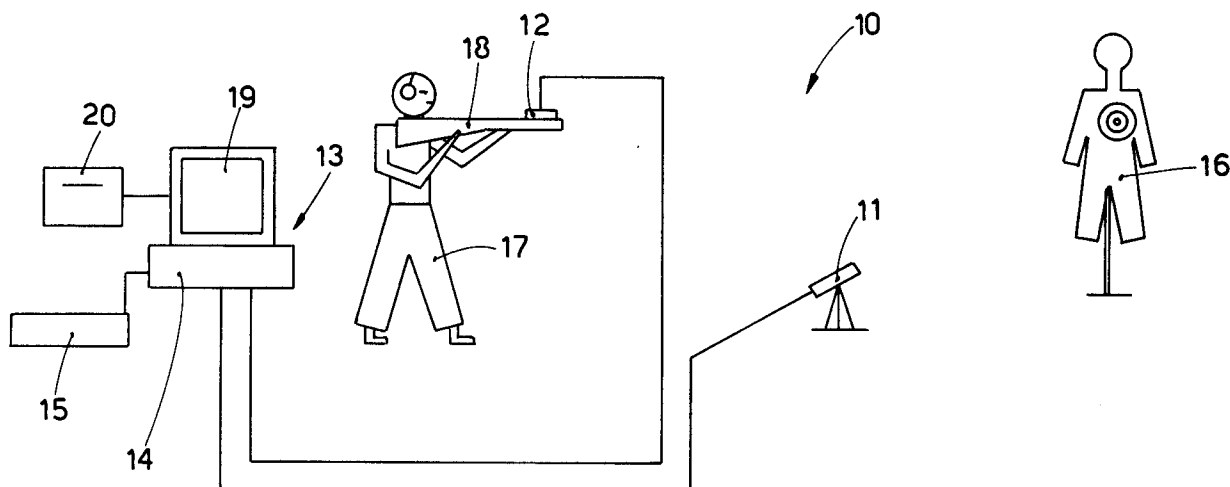
This invention concerns a classifier of shots fired by light weapons as set forth in the main claim.

To be more exact, the classifier of this invention enables the performance to be classified of one or more persons firing single shots or bursts from light weapons at a stationary target.

The classifier of shots is applied mainly to the field of training military and non-military personnel in the firing of light weapons.

On ranges for the firing of light weapons such as pistols, rifles, sub-machine-guns, etc. with the employment of bullets fired at stationary targets located at a given distance it is necessary to classify the performance of the person firing.

Classification of the performance enables the ability of the person firing to be tested both as regards aiming at the target and as regards use of the sights.

This classification is carried out now by a direct inspection of the target by examining the position of the hole made by the bullet.

This direct inspection is effected by using field-glasses or by fetching and delivering the target to the person firing.

Firing ranges are normally equipped with automatic devices to engage, bring and deliver the target to the person firing. These automatic devices consist of conveyor chains capable of traversing movement and able to convey the targets from their positions as targets to the position of the person firing.

Other devices exist which enable the target to be brought to the person firing along conveyor wires by means of gravity.

But these known devices of the state of the art do not enable information to be obtained regarding the order in time of the shots fired by the person in question. Moreover, these devices of the state of the art do not make possible an immediate and effective trial of the capability of the person firing.

Furthermore, these known devices do not permit a quick performance of the firing tests and lead to wastes of time due to the movements and replacements of the targets.

To overcome these shortcomings and achieve further advantages the present applicants have studied, tested and obtained the present invention.

This invention is set forth and characterized in the main claim, while the dependent claims describe variants of the idea of the main lay-out.

The purpose of this invention is to provide a classifier of shots fired by light weapons which enables an immediate classification to be made of the performance of the person firing.

The classifier of shots according to this invention provides an almost instantaneous record and processing of the data relating to each shot fired.

In the event of single shots the classifier according to the invention enables information to be obtained also regarding the sequence in time of the shots fired.

In the event of the firing of bursts, instead, the classifier enables an overall evaluation to be made which does not take that sequence into account.

The classifier according of this invention makes possible a quick performance of the firing tests and an immediate, efficient test of the capability of the person firing.

Moreover, the classifier of shots permits a simple logistical organisation of the firing range.

The classifier of shots according to this invention consists essentially of a telecamera and a sensor to detect shots, the telecamera and sensor being connected by suitable cables to a data processor located in the firing station of the person firing.

This data processor consists advantageously of a personal computer provided with a monitor, a keyboard and possibly a printer.

The computer is equipped with means to store and process in digital form the image in real time.

The sensor to detect firing is fixed to the weapon or is placed in the immediate vicinity and the telecamera scans continuously the stationary target of the shots.

When a shot is fired and is signalled by the sensor with a small delay to allow the bullet to reach the target, the image being registered by the telecamera is stored by the computer.

By comparing successive images the computer identifies any difference, which is the hole made by the bullet fired at the target.

With the classifier of shots according to the invention each shooter can observe the stored image displayed on his monitor immediately after having fired a shot. This ability to observe enables him also to correct his next shot if necessary.

When the planned sequence of shots has ended, the data processor proceeds to classify the performance of one or more shooters.

For this purpose the data processor stores information which associates suitable values with given areas of the target. This is achieved by storing a typical target in the computer and by proceeding in such a way that at the moment of aiming the telecamera at the target the image of the target corresponds to the typical stored target as regards dimensions and position.

This is accomplished by acting on the aiming and on the enlargement of the image with the help of the data processor.

The final data can be presented in the form of dots or of an image of the target with an indication of the points hit, even in a sequence of times.

Therefore, a personal computer is included in

each firing position and the shooter actuates by means of the keyboard the display of the final data and possibly the printing.

According to a variant one single printer is included and is connected to all the personal computers in the various firing positions so as to restrict the space taken up in the firing positions.

The attached figure, which is given as a non-restrictive example, shows a preferred lay-out of the invention and illustrates with a diagram a classifier of shots fired by light weapons according to the invention.

In the figure the reference number 10 indicates a classifier of shots fired by light weapons according to the invention.

The classifier 10 of shots consists essentially of a telecamera 11 and of a sensor 12 to detect firing which are connected to a data processor 13.

In this example the data processor 13 consists of a computer 14 of a known type equipped with a monitor 19 and a keyboard 15.

The telecamera 11 is located in a stationary position and scans continuously a target 16 of the shots fired by a shooter 17 and provides the data processor 13 with a basic image.

The sensor 12 may be connected and associated with a badge reader or another means suitable to identify the person firing a shot and to actuate the system. The sensor 12 is secured to a light weapon 18, for instance by magnet means.

The sensor 12 emits a signal in correspondence with the impact, for instance, of the firing-pin of the weapon at the moment of the firing of a shot.

The signal emitted by the sensor 12 and the images provided by the telecamera 11 are transmitted through suitable cables to the data processor 13.

Immediately after the first shot signalled by the sensor 12 the telecamera 11 sends to the data processor 13 the image of the target 16 hit, and the data processor 13 stores that image and, if necessary, processes it.

When a second shot is fired, the data processor 13 stores a second image of the target 16 and, if necessary, processes it.

By comparing after the respective shots the basic image and the images relating to the target 16, the data processor 13 identifies any difference, namely the positions in sequence of the holes made by the bullets in the target 16 and stores the relative positions of the holes and, if necessary, associates those positions with the processing and/or evaluation of the case.

The procedure can be repeated several times in the same way.

The data processor 13 stores also the sequence of the images in time so as to establish the exact succession of the shots.
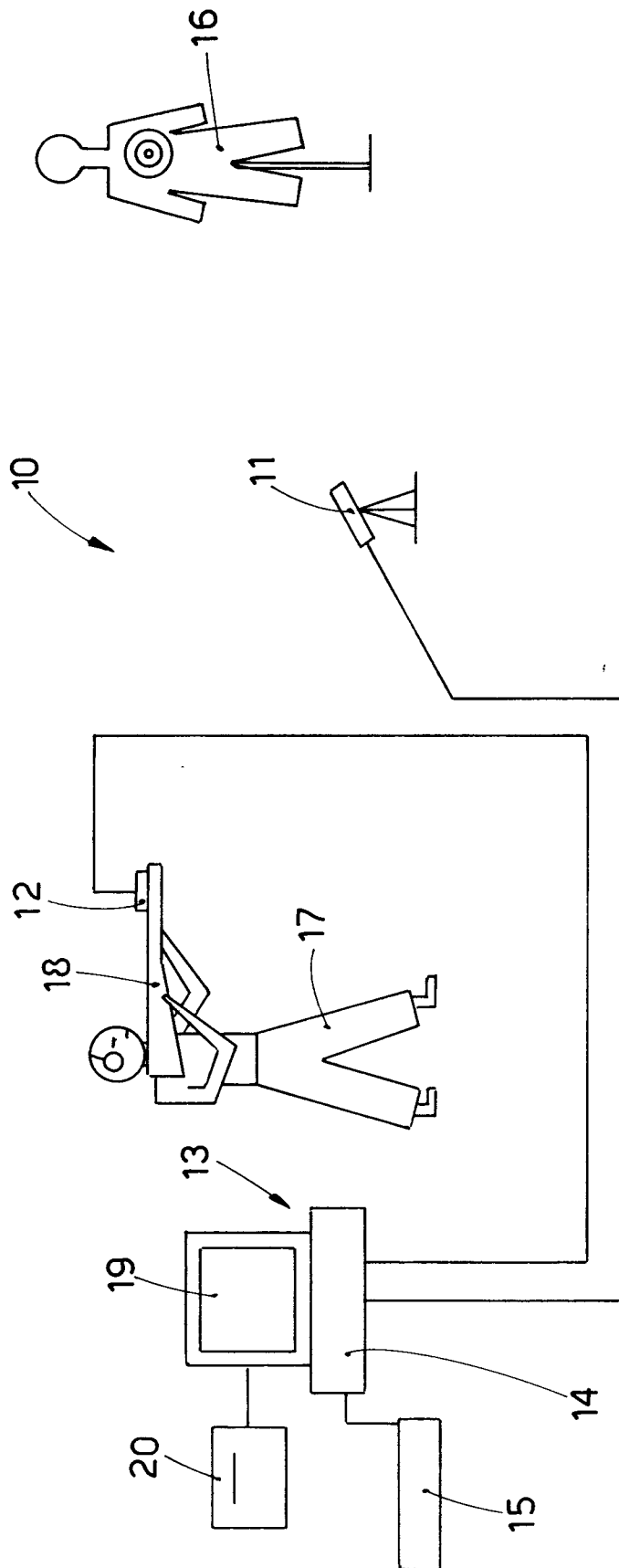
When the planned series of shots has ended, the data processor 13 carries out the classification, taking into account the positions of the holes made by the shots in the target 16.

The image of the target 16, which is updated whenever the target is hit by a bullet, is sent to the monitor 19, so that the person firing 17 himself can see at once the point hit by the bullet and can, if necessary, correct his aim for the next shot.

According to a variant a printer 20 cooperates with the monitor 19 and provides the shooter 17 with a print-out representing the target 16 and indicating in sequence the points hit, with which is possibly associated a number defining the value of the shot fired.

Claims

1. Classifier of shots fired by light weapons such as pistols, rifles, sub-machine-guns, etc. which fire single shots or bursts, the classifier being associated with a target (16) and the position thereof when fired at and being characterized in that it comprises in cooperation a telecamera (11) to scan the target (16) and at least one sensor (12) to detect the shots which is associated with the working of the weapon (18), the telecamera (11) and sensor (12) sending their respective signals to a data processing, classification and storage assembly (13) that comprises at least one display monitor (19).

2. Classifier of shots as claimed in Claim 1, which is associated with means which at least identify the person firing.

3. Classifier of shots as claimed in Claim 1 or 2, whereby after each single shot or burst of shots the data processor (13) provides at least one image of the target (16) with the positions of the holes made by the shots and with an indication of the order in which the holes have been made.

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	DE-A-2 625 500 (HANS RAMKE) * page 3, line 11 - page 8, line 17; figure * ---	1	F41J5/10
Y	EP-A-0 330 886 (MICROFOX) * abstract * * column 1, line 1 - column 5, line 32; figures 1,2 * ---	1	
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 591 (M-913)26 December 1989 & JP-A-1 248 000 (KYOSAN ELECTRIC) 3 October 1989 * abstract * ---	1,3	
A	US-A-2 968 877 (H. BECHER) * column 1, line 15 - column 4, line 9; figures 1-6 * ---	1	
A	DE-A-2 701 042 (FILIPPINI ET AL.) * page 2, line 15 - page 5, line 4; figure * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5) F41J F41G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 AUGUST 1992	BLONDEL F.

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