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(54) **Target mechanism and a base unit in such a target mechanism**

(57) The invention relates to a target mechanism (1) for shooting, comprising a base unit (2) and a target body (4) which is movable connected to the base unit (2), said base unit (2) is provided with means (6) for moving the target body (4) from a first position (8) to a second position (10). The second position (10) is an optional position based on at least a signal (26) to the said means (6). The

invention also relates to a base unit (2) in a target mechanism (1) comprising means (6) for moving a target body (4) from a first position (8) to a second position (10). The base unit (2) comprising a control unit (38) arranged to generate at least a signal (26) to the said means for moving the target body (4) to the second position (10) based on the at least said signal (26).

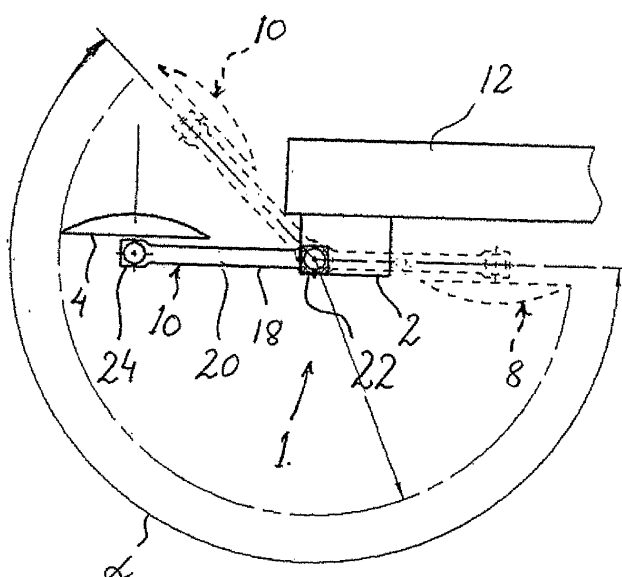


Fig. 3

Description

[0001] This invention relates to a training system for shooting at targets and more particularly to a target mechanism with a target body which is arranged to move between different positions. The invention also relates to a base unit in such a target mechanism.

[0002] Training systems with a movable target body is used by police and military to give experience in different situations occurring in buildings and airplanes, for example. The target body shall appear quickly and unexpectedly, so that the trainee must make a quick decision whether the target is a threat or not. If the trainee makes a decision that the target is a threat the target may be attacked by shooting. When the target body is hit by shoots an indication is expected.

[0003] Document US-A-4553757 discloses a combat simulator in which a target body moves from side to side. The combat simulator comprises a rigid, straight track which is movable between first and second inclined positions by reciprocating means. The target body is slidably engaged to the track. The track and the target may be placed behind a shield so that the target in one of the positions can appear from behind the shield.

[0004] One drawback with this combat simulator is that it is predictable for the trainee where the target may appear. Since the target only has two positions, one end position in which the target is hidden by a shield and a second end position in which the target is visible for the trainee, the trainee will predict where the target may appear. Also, since the target is movable between only two end positions the simulator lacks a realistic movement when the target is hit. Another drawback with the known simulator is the need of the rigid, straight track. Such track needs space when installed in a training environment.

[0005] The objective problem to be solved by the present invention is to improve the realism of a training system with a movable target body.

[0006] Another objective problem to be solved by the present invention is to achieve a training system which is easy to install in a natural training environment.

[0007] This is achieved by a target mechanism according to claim 1 and a base unit according to claim 10.

[0008] Since the target body is movable to a second position which is optional the trainee cannot expect where the target body may appear. Also, when the second position is optional the target body can move to any suitable position in relation to the first position. Therefore, it is impossible for the trainee to predict where the target body will appear.

[0009] The second position may be a position where the target body moves to when the target body is hit by the trainee. This position may be so arranged that it indicates that the threat is eliminated.

[0010] In a preferred embodiment the target body is pivotally arranged on the base unit. This embodiment provides a compact target mechanism which is possible

to install in an environment which is natural for training, such as indoor training in a building or in an airplane.

[0011] Other advantages and features of the invention can be derived from the following detailed description of exemplary embodiments of the invention, with reference to the drawings.

Fig. 1 shows a target mechanism in perspective according to a first embodiment in a first position,

fig. 2 shows the target mechanism in perspective according to the first embodiment in a second position,

fig. 3 shows the target mechanism from above according to the first embodiment indicating different positions of the target body,

fig. 4 shows a target mechanism from above according to a second embodiment indicating different positions of the target body,

fig. 5 shows a side view of a base unit according to the invention,

fig. 6 shows a side view of a target mechanism according to a third embodiment in a first position, and

fig. 7 shows a side view of a target mechanism according to the third embodiment in a second position.

[0012] Fig. 1 shows a target mechanism 1 according to a first embodiment of the invention. The target mechanism 1 comprises a base unit 2 and a target body 4 which is movable connected to the base unit 2. The base unit 2 is provided with means, such as a motor 6 for moving the target body 4 from a first position 8, disclosed in fig. 1, to a second position 10 disclosed in fig. 2.

[0013] In fig. 1 the base unit 2 is mounted on a wall 12 in a building 14, adjacent a door opening 16 in the wall 12. In the first position 8 the target body 4 is positioned against the wall 12, so that the target body 4 is not visible through the door opening 16.

[0014] The target body 4 is pivotally arranged on the base unit 2 through a linkage arrangement 18. The linkage arrangement 18 comprises a lever arm 20, which in a first end 22 is connected to the motor 6 and in a second end 24 is connected to the target body 4.

[0015] In fig. 2 the target body 4 has been moved to the second position 10 by the motor 6. In this position 10 the target body 4 is visible in the door opening 16 and may be attacked by a trainee (not shown) by shooting. When moving the target body 4 from the first position 8 to the second position 10 the lever arm 20 is swung by the motor 6 at an angle about 180 ° in fig. 2. According to the invention the second position 10 is an optional position based on at least a signal 26 to the motor 6. Therefore, the second position 10 may be an optional

angle between 0 ° to 360 ° in relation to the first position 8, depending on how the base unit 2 is mounted. Depending on how the base unit 2 is mounted, it is also possible to rotate the lever arm 20 more than 360°.

[0016] When the target body 4, in its second position 10, is hit by shooting the motor 6 and the linkage arrangement 18 deflects the target body 4 to the first position 8 or another suitable position (not disclosed). The target body 4 is provided with suitable target detectors 28, which detects bullets, training bullets and laser simulated bullets. When the target detectors 28 detects one or more of said bullets the target body 4 deflects to the first position 8 or another suitable position, which indicates a hit on the target body 4.

[0017] Fig. 3 shows the target mechanism 1 from above according to the first embodiment indicating three different positions of the target body 4. The first position 8 where the target body 4 is positioned against the wall 12 and two optional second positions 10 based on the signal 26 received by the motor 6. In fig. 3 the target body 4 is moved to a second position 10 at 180 ° relative to the first position 8 or to a second position 10, indicated with dashed lines, at an angle α .

[0018] Fig. 4 shows a target mechanism 1' from above according to a second embodiment indicating different positions of the target body 4'. In this embodiment the linkage arrangement 18' is provided with an adjustable angular joint 30', which results in that the target mechanism 1' will be even more flexible in positioning of the target body 4'. The adjustable angular joint 30' is arranged at approximately half the length of the lever arm 20'. In the second position 10' the target body 4' may protrude out of the door opening 16'.

[0019] Fig. 5 shows a side view of a base unit 2. In the figure a side cover of a housing 32 of the base unit 2 is removed, so that the components 34 inside the base unit 2 are visible.

[0020] The motor 6 is provided with a shaft 36 for connection to the first end 22 of the lever arm 20. The motor 6 may be an electrical motor. The base unit 2 is provided with a control unit 38 arranged to generate the at least said signal 26 to the motor 6 for moving the target body 4 from the first position 8 to the second position 10 based on the signal 26. The base unit 2 is also provided with a sensor 40 which is arranged to detect the position of the target body 4.

[0021] The base unit 2 is provided with a control panel 42 on which an operator may input information about the first and second positions 8, 10 and when the target body shall move from the first position 8 to the second position 10, and vice versa. It may also be possible to monitor the base unit 2 via a remote control. In this case the base unit 2 is provided with a receiver 44.

[0022] Fig. 6 shows a side view of a target mechanism 1" according to a third embodiment in a first position 8". In this embodiment the base unit 2" is mounted on a bracket 46", which is positioned on the seat 48" of a chair 50". A linkage arrangement 18" in form of first and second

lever arms 20", 52" are connected to the base unit 2". Only the first lever arm 20" is connected to the shaft 36" of the motor 6". The second lever arm 52" is connected to a bearing 54" in the base unit 2" for stabilisation reasons. In the opposite ends of the lever arms 20", 52" a target body 4" is pivotally arranged.

[0023] The target body 4" is provided with suitable target detectors 28", which detects bullets, training bullets and laser simulated bullets. The target detectors 28" may be connected to the base unit 2" by a wireless connection (not disclosed) or by wires (not disclosed). The target body 4" may also be provided with an accessory body 56" which has the form of a human body. The accessory body 56" is provided with arms 58" and legs 60". In fig. 6 the target body 4" and accessory body 56" are in a first position 8". In this position 8" the accessory body 56" simulates a human body sitting in the chair 50".

[0024] Fig. 7 shows a side view of the target mechanism 1" according to the third embodiment in a second position 10". To reach this second position 10" the target body 4" and accessory body 56" have been moved from the first position 8" by a pivoting movement of the lever arms 20", 52". In this second position 10" the accessory body 56" simulates a human body standing in front of the chair 50". The legs 60", of the accessory body 56" are provided with an articulated joint 62", so that the legs will stretch in the second position 10".

[0025] When the target detectors 28" detects one or more of said bullets the target body 4" deflects to the first position 8" or another suitable optional position, such as a shrunken position of the accessory body 56", which indicates a hit on the target body 4" and the accessory body 56".

[0026] Above, only a pivotal movement of the target body 2; 2'; 2" has been described. However, it is also possible to arrange the target mechanism 1; 1'; 1" so that a substantial straight movement of the target body 2; 2'; 2" is achieved. This may be achieved by using a pulley for winding up a rope, which is connected to the target body. The pulley is arranged on the shaft instead of the lever arm. Other possible solutions to achieve a substantial straight movement of the target body are the use of an eccentric disc or a gear rack (not disclosed). The target body may also be a window or a door which is connected to the base unit via the lever arm, rope, eccentric disc, or the gear rack. Said means 6; 6'; 6" may also be a pneumatic cylinder or an electrical linear motor (not disclosed).

Claims

1. A target mechanism for shooting, comprising a base unit (2) and a target body (4) which is movable connected to the base unit (2), said base unit (2) is provided with means (6) for moving the target body (4) from a first position (8) to a second position (10), **characterized in that** the second position (10) is an

optional position based on at least a signal (26) to the said means (6).

2. A target mechanism according to claim 1, **characterized in that** the base unit (2) is provided with a control unit (38) arranged to generate the at least said signal (26) to the said means (6) for moving the target body (4) to the second position (10) based on the at least said signal (26). 5
3. A target mechanism according to any of the preceding claims, **characterized in that** the base unit (2) is provided with a sensor (40) which is arranged to detect the position of the target body (4). 10
4. A target mechanism according to any of the preceding claims, **characterized in that** the target body (4) is pivotally arranged on the base unit (2). 15
5. A target mechanism according to claim 4, **characterized in that** second position (10) is an optional angle between 0 ° to 360 ° in relation to the first position (8). 20
6. A target mechanism according to any of the preceding claims, **characterized in that** the target body (4) is connected to the said means (6) with a linkage arrangement (18). 25
7. A target mechanism according to claim 6, **characterized in that** the linkage arrangement (18) is provided with an adjustable angular joint (30). 30
8. A target mechanism according to claim 6 or 7, **characterized in that** the linkage arrangement (18) deflects when the target body (4) is hit by shooting. 35
9. A target mechanism according to any of the preceding claims, **characterized in that** the said means (6) is a motor. 40
10. A base unit in a target mechanism comprising means (6) for moving a target body (4) from a first position (8) to a second position (10), **characterized in that** the base unit (2) comprising a control unit (38) arranged to generate at least a signal (26) to the said means (6) for moving the target body (4) to the second position (10) based on the at least said signal (26). 45
11. A base unit according to claim 10, **characterized in that** the base unit (2) is provided with a sensor (40) which is arranged to detect the position of the target body (4). 50
12. A base unit according to claim 10 or 11, **characterized in that** the said means (6) is a motor. 55

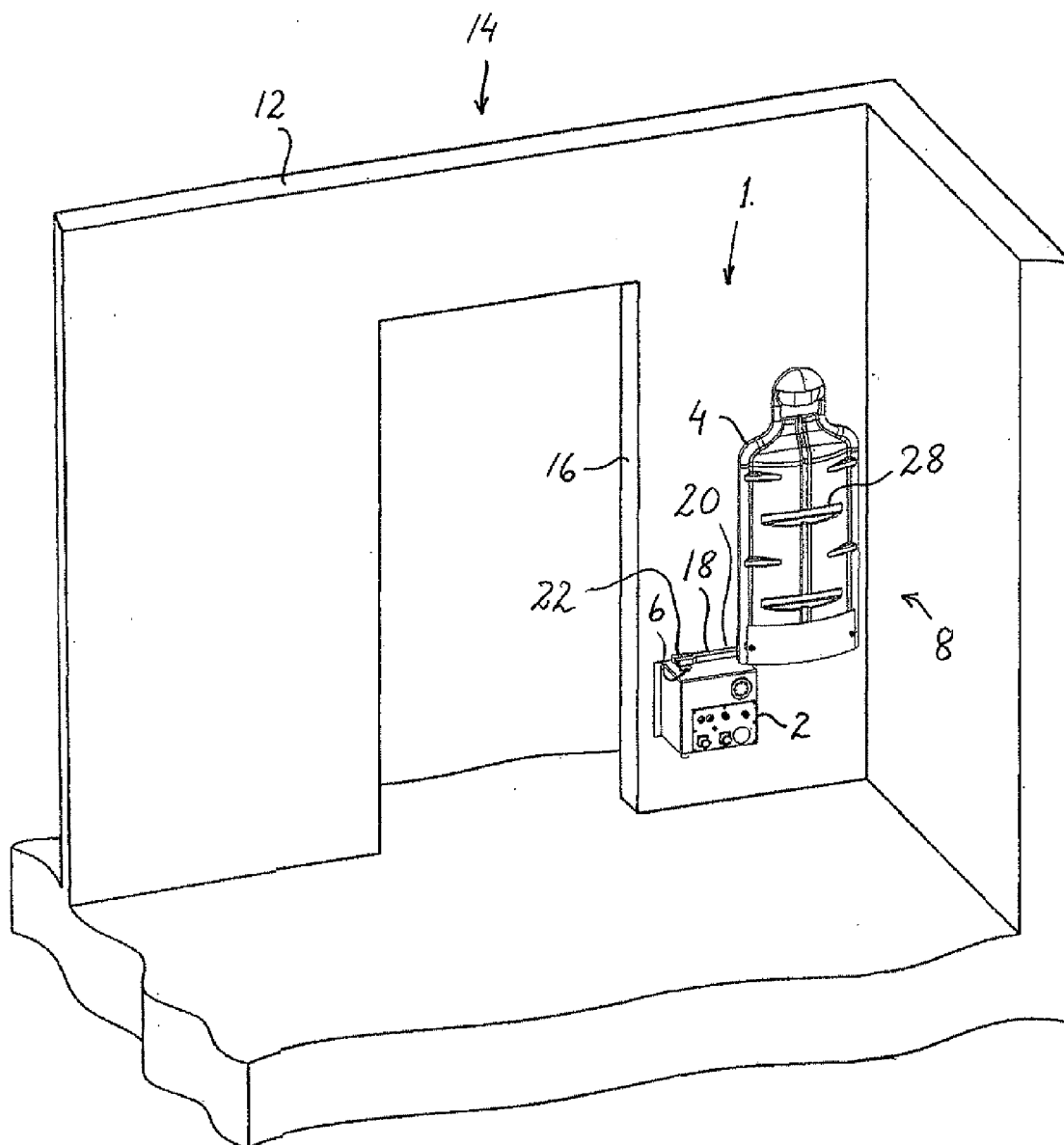


Fig. 1

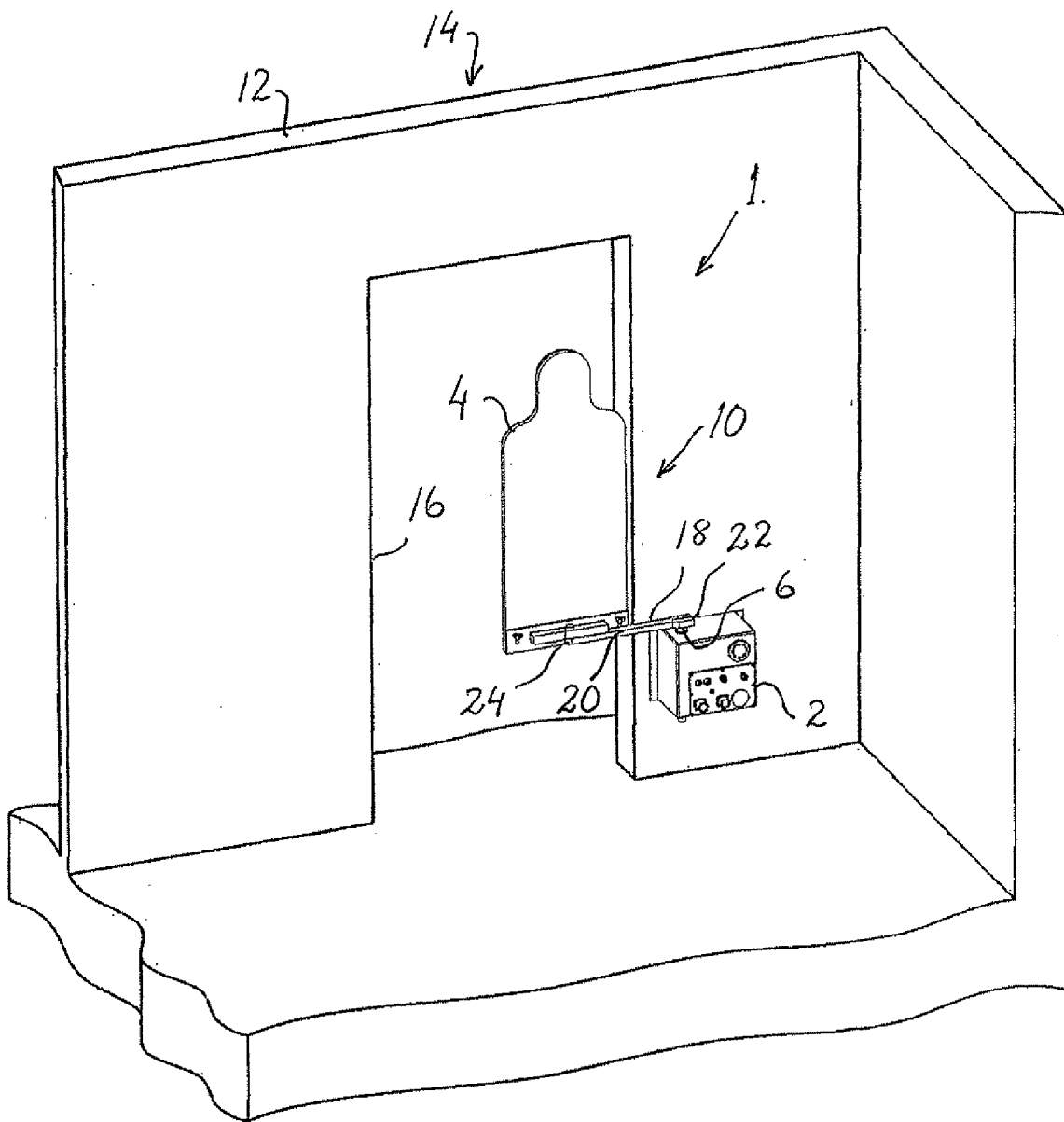


Fig. 2

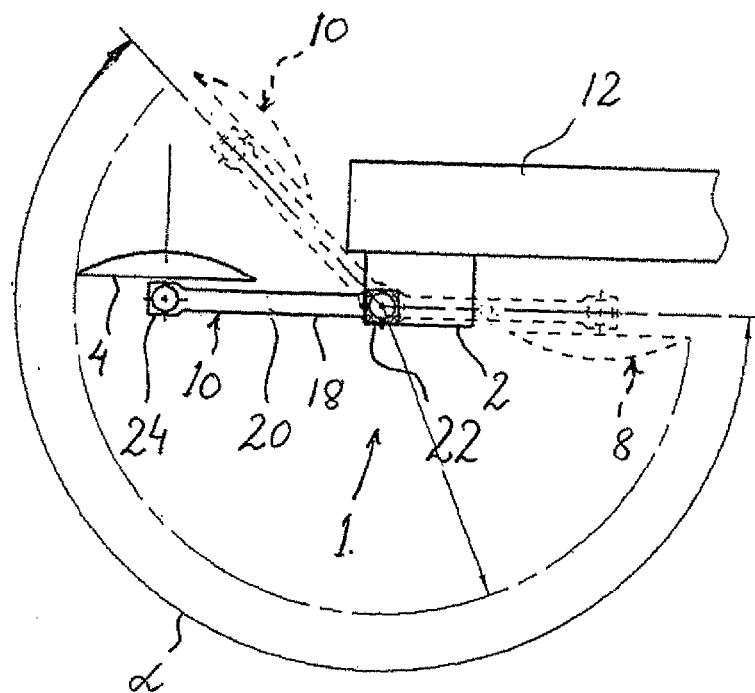


Fig. 3

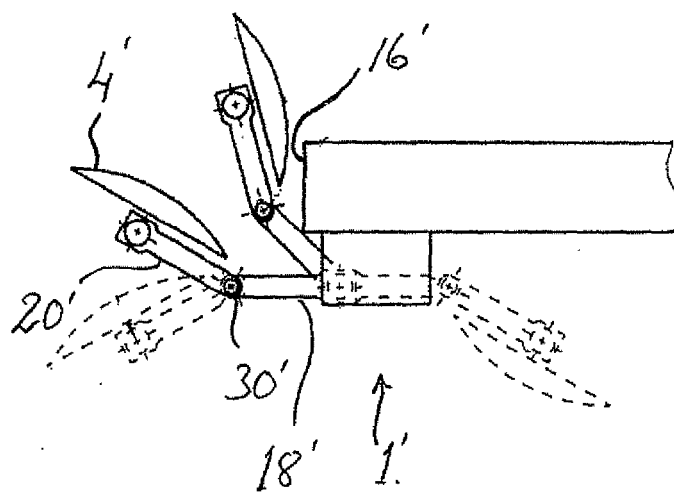


Fig. 4

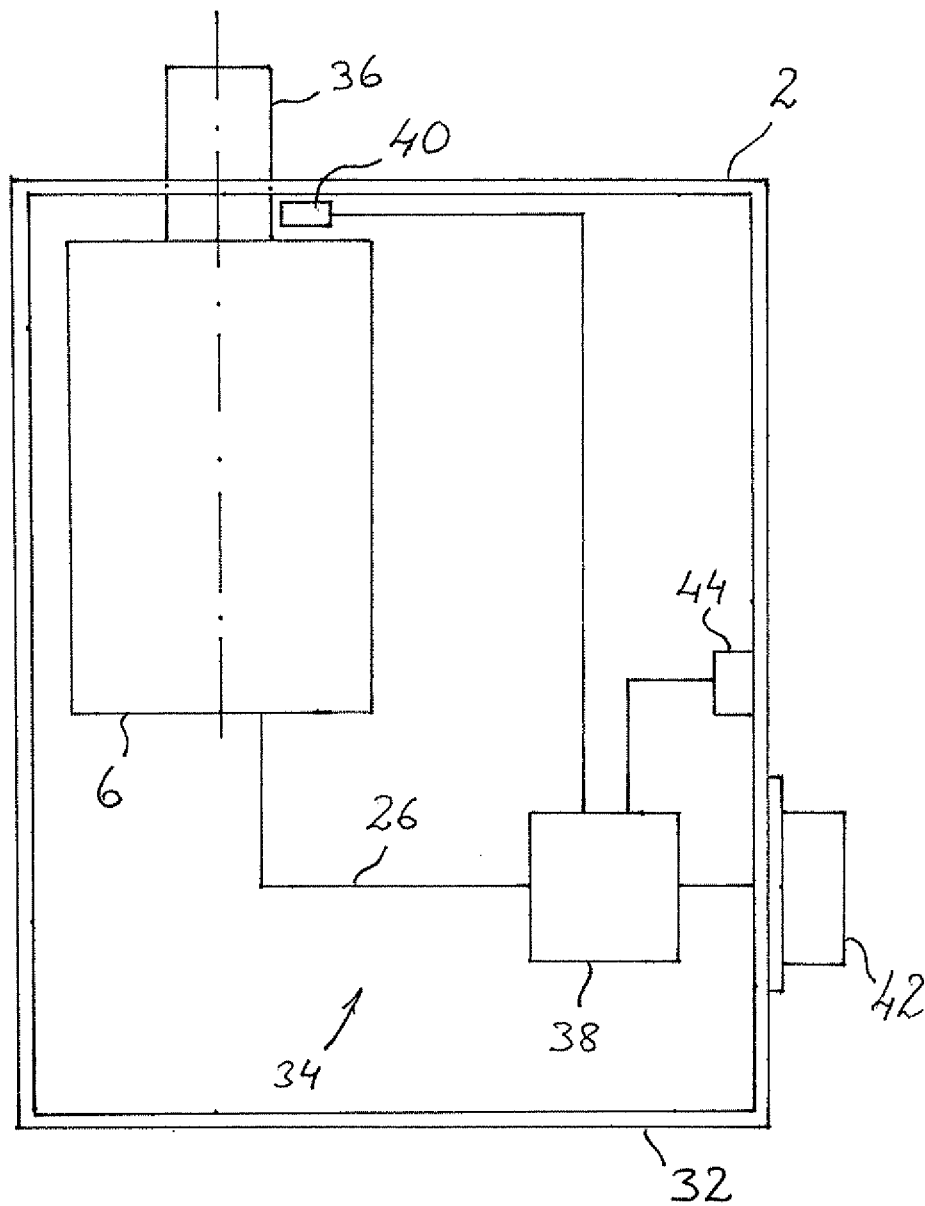


Fig. 5

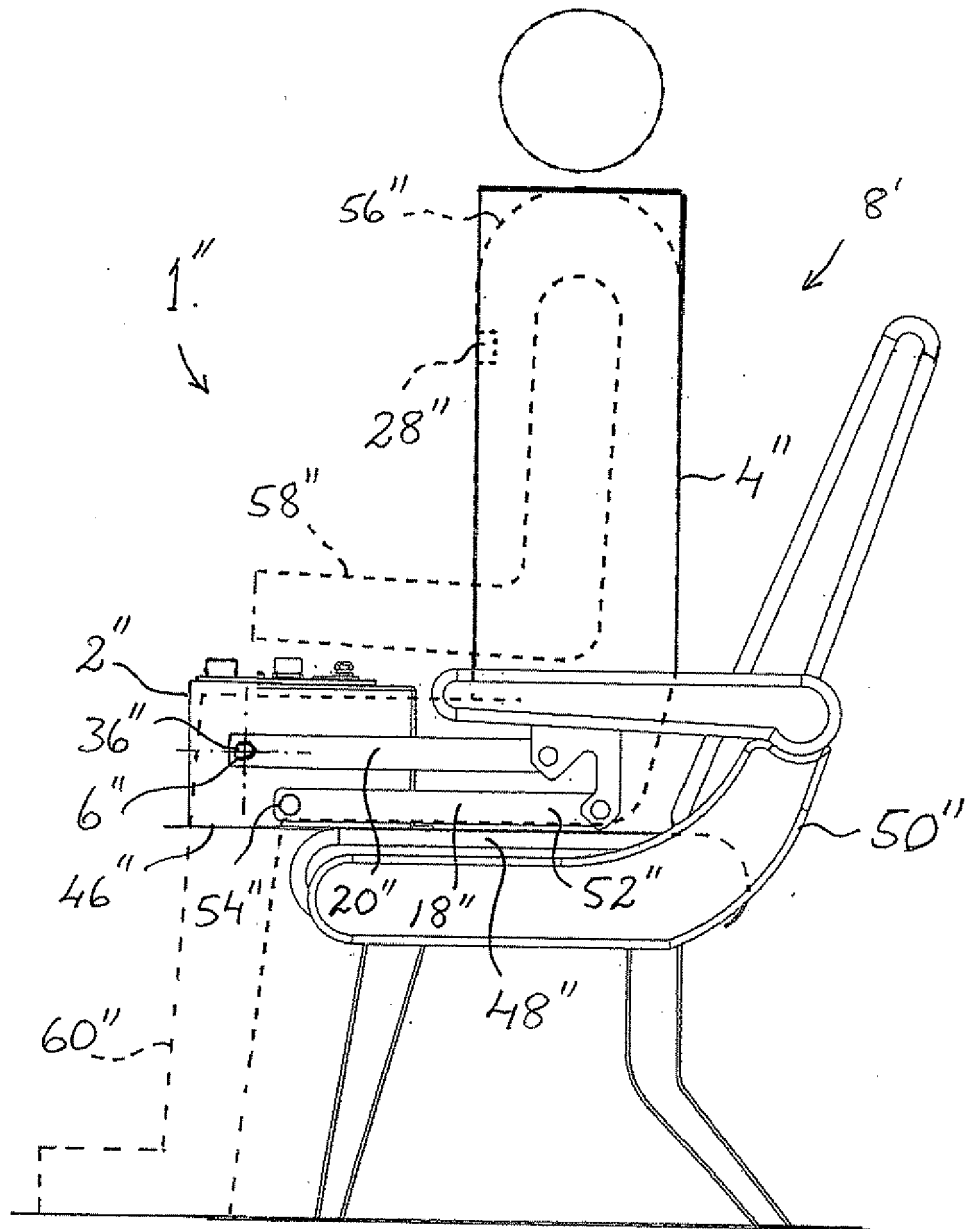


Fig. 6

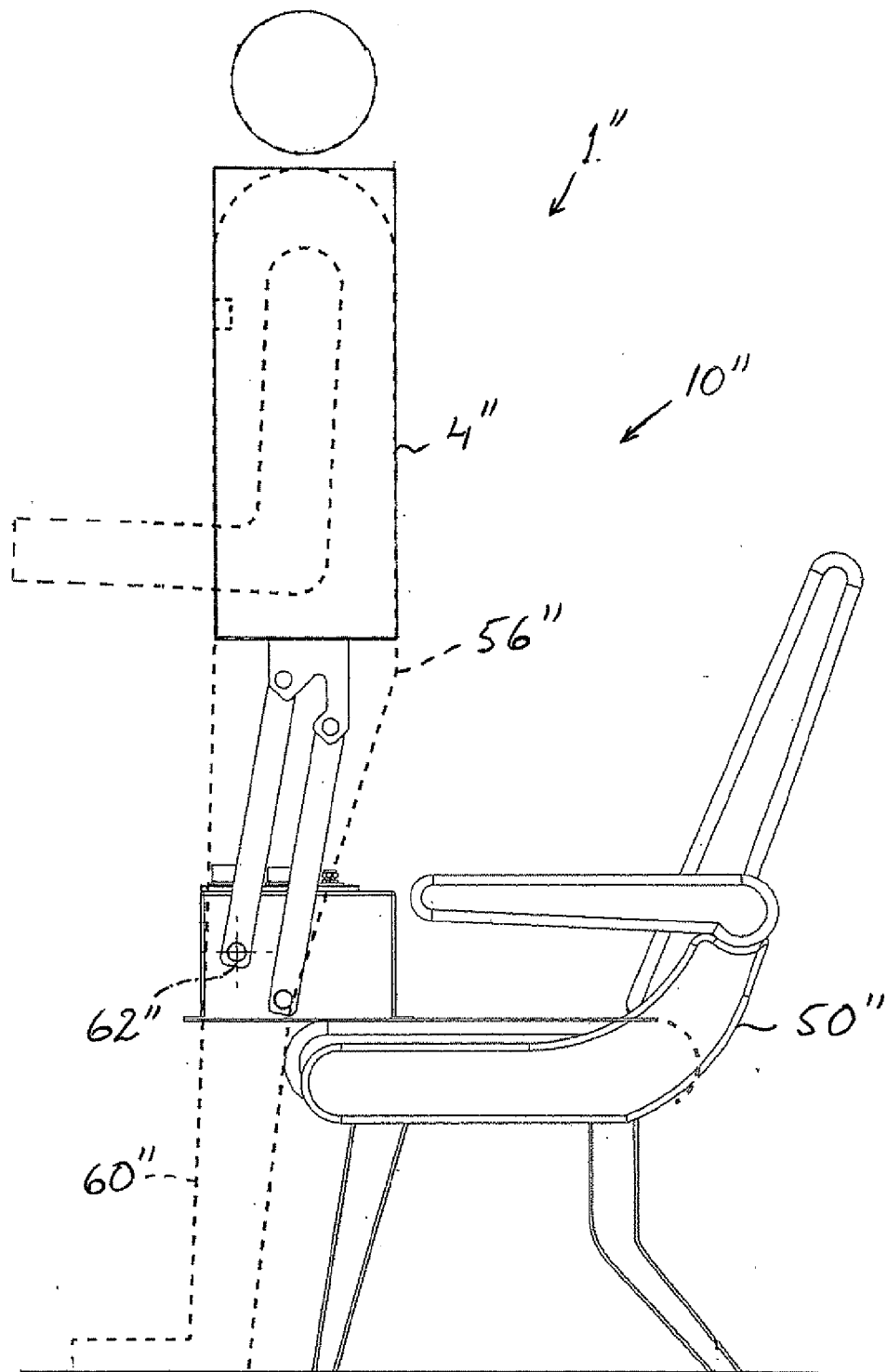


Fig. 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 06 12 5241

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	EP 0 785 407 A2 (TTS THEISSEN TRAINING SYSTEMS [DE]) 23 July 1997 (1997-07-23) * column 2, line 28 - line 37 * * column 3, line 21 - line 44 * * figure 1 * * figure 2 *	1-12	INV. F41J7/04 F41J7/06
A	----- US 3 515 388 A (ZACHMEIER AUGUST A) 2 June 1970 (1970-06-02) * column 2, line 54 - column 3, line 7 * * figure 1 *	5	
A	----- GB 11478 A A.D. 1911 (NORRIS JOHN; HYDE SIDNEY ALPHAEUS) 1 February 1912 (1912-02-01) * page 3, line 27 - page 4, line 7 * * figures 7,8 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F41J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 May 2007	Examiner GEX-COLLET, A
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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EPO FORM 1503 03/82 (P04C01)

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

EP 06 12 5241

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09-05-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0785407	A2	23-07-1997	DE 19601380 A1
		US 5934678 A	24-07-1997
			10-08-1999
US 3515388	A	02-06-1970	NONE
GB 191111478	A	01-02-1912	NONE

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Patent documents cited in the description

- US 4553757 A [0003]