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

(11) EP 2 131 139 A1

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**09.12.2009 Bulletin 2009/50**

(51) Int Cl.:
***F41J 7/06*** *(2006.01)*

(21) Application number: **08157586.2**

(22) Date of filing: **04.06.2008**

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

(71) Applicant: **SAAB AB**
**581 88 Linköping (SE)**

(72) Inventors:
- **Andrén, Robert**
  **561 92 Huskvarna (SE)**
- **Isoz, Peter**
  **561 39 Huskvarna (SE)**
- **Liljegren, Jan**
  **566 34 Habo (SE)**

(74) Representative: **Norberg, Charlotte et al**
**Albihns AB**
**P.O. Box 5581**
**114 85 Stockholm (SE)**

## (54) A target arrangement and a target retainer thereof

(57) A multi purpose target mechanism (10), comprising a portable drive unit (12) having a rotary output shaft (14), and a target retainer (16) for holding a target (22) and connectable to the output shaft (14) for rotating the retainer (16) and the target (22). The target retainer (16) comprises a base member (18) and a target frame (20) for detachably holding the target (22). The base member (18) is formed as an angled base member, preferably in a U-shape. The target frame (18) is formed as a separate member having at least one attachment element (26, 30, 36) configured for detachably connecting the target frame (20) to a leg (18a, 18b) of the base member in a desired lengthwise and rotary position of the target frame (20) relative to the respective leg (18a, 18b) of the base member.

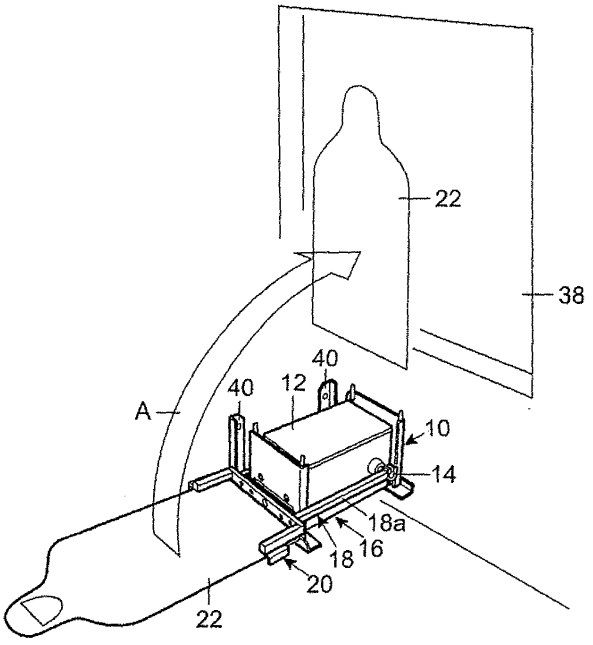


Fig. 1

EP 2 131 139 A1

## Description

### BACKGROUND OF THE INVENTION

**[0001]** The present invention relates to a target arrangement comprising a portable drive unit having a rotary output shaft, and a target retainer for holding a target and operatively connected to the output shaft for rotating the retainer and the target from a first, hidden position of the target to a second position of the target visible to a trainee, said target retainer comprising a base member attached to the rotary output shaft and a target frame for detachably holding the target.

**[0002]** Various target mechanisms for target practice have been developed for improving the close combat qualities of soldiers, for example, in domestic areas. For this purpose the target mechanism should be able to suddenly display a target in various positions and in different configurations in front of a trainee. For example, the mechanism should be able to make the target visible by a so-called pop-up, a swing-out, a scissors-like, and a rotary movement of the target. E.g. US 5 934 678 A, US 4 288 080 A, FR 2 547 651 A1 and SE 0103462 A disclose various target mechanisms which are able to obtain one or more of the above-mentioned positions of the target. However, none of these prior art target mechanisms is configured to obtain all said positions by means of a compact universal assembly comprising one single drive unit and one single target retainer.

### SUMMARY OF THE INVENTION

**[0003]** Thus, it is an object of the invention to provide a multi purpose target mechanism which with a minimum of required components and modifications can obtain a pop-up, a swing-out, a scissors-like and a rotary movement of the target. To this end the target arrangement of the present invention includes the features of claim 1. By placing the drive unit and the rotary output shaft thereof in a suitable position on a floor (or ceiling) or a wall and attaching the target frame in a suitable position on either leg of an angled base member of the retainer all four pop-up, swing-out, rotary and scissor-like configurations or movements of the target could easily and quickly be obtained.

**[0004]** The invention also relates to a target retainer for the above-mentioned arrangement, as set forth in independent claim 9.

**[0005]** Further details and features of the target arrangement and retainer of the present invention are defined in the respective dependent claims and will be described in the following detailed description with reference to the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]**

Fig. 1 is a schematic perspective view of a target arrangement of the present invention in a pop-up configuration;

Fig. 2 is a schematic perspective view of a target arrangement of the present invention in a swing-out configuration;

Fig. 3 is a schematic perspective view of a target arrangement of the present invention in a scissors-like configuration;

Fig. 4 is a schematic perspective view of a target arrangement of the present invention in a rotary configuration:

Fig. 5 is an exploded perspective view of the target retainer of the target arrangement of the invention;

Fig. 6 is a detail view from below of a supporting guide plate attached to the target frame;

Fig. 7 is a perspective view of the target retainer in a down position of a pop-up configuration;

Fig. 8 is a perspective view of the target retainer in a swing-out configuration;

Fig. 9 is a perspective view of the target retainer in a scissors-like configuration;

Fig. 10 is a perspective view of the target retainer in a rotary configuration; and

Fig. 11 is a perspective view from below of a target frame having an alternative single member for attaching the frame to the base member.

### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

**[0007]** Figs. 1-4 illustrate a universal target arrangement 10 of the present invention in four different positions of a respective pop-up, a swing-out, a scissors-like and a rotary configuration. The target arrangement 10 comprises a portable drive unit 12 housing an electric motor (not shown) for rotating an output shaft 14 to which is attached a target retainer 16. The target retainer 16 includes a base member 18, which can be attached to the rotary output shaft 14 of the drive unit 12, and a target frame 20 for detachably holding a target 22 therein. The base member 18 is preferably configured as a U-shaped element having first legs 18a connectable to portions of the rotary shaft 14 protruding from opposite sides of the drive unit 12, and a second leg 18b which connects the distal ends of the first legs 18a in a form-stable manner. Alternately, the base member 18 could be configured as a form-stable angled or L-shaped element having a single

first leg attached to one end of the rotary shaft, and a second leg positioned in a substantially right angle to the first leg (not shown).

**[0008]** As shown in Fig. 5, the legs 18a and 18b of the base member 18 have a respective longitudinally extending guide track 24 for slidably adjusting the position of the target frame 20 therein. For this purpose the frame 20 has connecting plates 26 on its side facing the base member 18. Each connecting plate 26 has a centre hole 28 (Fig. 6) for a fastening element 30, such as a screw, and opposite guide pins 32, which may slidably fit into the slot of the guide track 24 when adjusting the position of the frame 20 relative to the base member 18. The fastening element 30 extends through a hole of a bar element 34 of the frame 20 and through the centre hole 28 of the connecting plate 26 and engages a nut member 36 which is slidable in the guide track 24. By loosening the fastening element 30 the position of the target frame 20 relative to the base member 18 may be changed on the respective legs 18a and 18b into many different configurations, as should be explained below.

**[0009]** Figs. 1 and 7 illustrate the so called pop-up configuration of the target arrangement 10 of the invention, where the target 22 in Fig. 1 is located in a hidden or down-folded position. Here, the drive unit 12 is placed on the floor behind a wall opening 38 with the rotary output shaft 14 oriented in parallel to the floor and the wall, and the target frame 20 is attached to the middle portion of the second leg 18b of the base member 18 and oriented in the same plane as the base member 18. Alternately, the drive unit 12 may be mounted to the wall below or above the opening 38, or in the ceiling behind the opening 38. For this purpose brackets 40 may be used for the mounting the unit 12 properly to the supporting structure. The legs 18a and 18b of the U-shaped base member 18 are mounted to the rotary shaft 14 so that the base member 18 straddles the drive unit 12. For simulating a threatening target situation the electric motor of the drive unit 12 is actuated to rotate the shaft 14 clockwise 90° so as to swing the target 22 from its hidden position to a visible position in the wall opening 38, as is shown with the arrow A in Fig. 1.

Fig. 2 and 8 illustrate the so called swing-out configuration of the target arrangement 10 of the invention, where the target 22 in Fig. 2 is located in a hidden or side-folded position. Here, the drive unit 12 is suspended by means of brackets 40 on a wall 42 beside a door opening 44 with the rotary output shaft 14 oriented vertically and parallel to the wall 42, and the target frame 20 is attached to a distal or outer end portion of the upper first leg 18a of the base member 18 and oriented in the same plane as the base member 18. The frame 20 may be attached to the leg 18a either at a centre portion of the frame 20 or at an end portion thereof. Of course, the drive unit 12 may also be mounted to the floor on either side of the door opening 44. For simulating a threatening target situation the electric motor of the drive unit 12 is actuated to rotate the shaft 14 clockwise 180° so as to swing the target 22 from its hidden position to a visible position in the door opening 44, as is shown with the arrow B in Fig. 2.

**[0010]** Figs. 3 and 9 illustrate the so called scissors-like configuration of the target arrangement 10 of the invention, where the target 22 in Fig. 3 is located in a hidden down-folded position relative to a wall opening 38. The drive unit 12 is suspended by means of brackets 40 on a wall 46 below a wall opening 38 with the rotary output shaft 14 oriented horizontally and normal to the wall 42, and the target frame 20 is fixated to a central portion of the second leg 18b of the base member 18 and oriented in a plane normal to that of the base member 18. Although in Figs. 3 and 9 the middle one of three connecting plates 26 of the frame 20 is fixated to the second leg 18b of the base member 18, anyone of the two other connecting plates 26, preferably the lower one, may be used to fixate the frame 20 to the second leg 18b. For simulating a threatening target situation the electric motor of the drive unit 12 is actuated to rotate the shaft 14 clockwise 180° either continuously or in steps of 90° so as to swing the target 22 from its hidden position to a visible position in the wall opening 38 and to a further hidden position, as is shown with the arrow C in Fig. 3. Alternately, the target frame 20 may as well be rotated 90° clockwise from the hidden position and then 90° anticlockwise back to the same hidden position.

Finally, Figs. 4 and 10 illustrate the so called rotary configuration of the target arrangement 10 of the invention, where the flat target 22 in Fig. 4 is located behind a wall opening 38 and usually oriented in a plane normal to the wall opening 38 to make the target hard to discover. The drive unit 12 is suspended by means of brackets 40 on the floor with the rotary output shaft 14 oriented vertically, and the target frame 20 is fixated to a proximal or inner end of the upper first leg 18a of the base member 18 and oriented in substantially in the same plane as the base member 18. As shown in Fig. 10, the central connecting plate 26 of the frame 20 is fixated to the first leg 18a at a position substantially coinciding with the rotary shaft 14 of the drive unit 12 so as to accomplish a rotation of the target 22 about a centre axis thereof. For simulating a threatening target situation the electric motor of the drive unit 12 is actuated to rotate the shaft 14 either clockwise or anticlockwise 90° so as to rotate the target 22 from a "hard-to-discover" position to a fully visible position in the wall opening 38, as is indicated with the arrows D in Fig. 4. Again, anyone of the two other connecting plates 26 of the frame 20 may be used to fixate the frame 20 to the first leg 18a at or close to the shaft 14 to rotate the target frame 20 about an asymmetrical axis thereof.

**[0011]** Although in the four above-described configurations of the target arrangement 10 of the present invention the target frame 20 has three separate connecting plates 26 for attaching the frame 20 in various suitable positions to the base member 18, it is conceivable to replace them with one single connecting plate 48 (Fig. 11) which is configured to be slidable along a track 50 on the side of the frame 20 facing the base member 18

and lockable by means of suitable fastening element (not shown).

**[0012]** Thus, according to the invention, a target mechanism is provided which can obtain a pop-up, a swing-out, a scissors-like and a rotary movement of the target with a minimum number of components.

## Claims

1. A target arrangement comprising a portable drive unit (12) having a rotary output shaft (14), and a target retainer (16) for holding a target (22) and operatively connected to the output shaft (14) for rotating the retainer (16) and the target (22) from a first, hidden position of the target to a second position of the target visible to a trainee, said target retainer (16) comprising a base member (18) attached to the rotary shaft (14) and a target frame (20) for detachably holding the target (22), **characterized in that** the base member (18) is formed as an angled base member having at least a first leg (18a) connectable to the rotary output shaft (14) for rotating the first leg (18a) of the base member in a plane substantially orthogonal to the longitudinal axis of the rotary shaft (14), and a second leg (18b) disposed in a substantially right angle to the first leg (18a), said target frame (20) being formed as a separate member having at least one attachment element (26, 30, 36; 48) configured for detachably connecting the target frame (20) to either leg (18a, 18b) of the angled base member (18) in a desired lengthwise and rotary position of the target frame (20) relative to the respective leg (18a, 18b) of the base member.

2. The target arrangement of claim 1, **characterized in that** the target frame (20) has at least two fixed attachment elements (26, 30, 36), one at a central portion and one at an end portion of a side (34) of the target frame (20) facing the base member (18).

3. The target arrangement of claim 1, **characterized in that** one single attachment element (48) is displaceable in a track (50) along the target frame (20) on a side (34) thereof facing the base member (18).

4. The target arrangement of any one of claim 1-3, **characterized in that** each leg (18a, 18b) of the base member has an attachment means (24) complementary with and receiving the attachment element (26, 30, 36; 48) of the target frame (20) so as to enable the target frame (20) to be fixated to a respective leg (18a, 18b) of the base member in various desired lengthwise and rotary positions relative to the leg (18a, 18b) of the base member (18).

5. The target arrangement of claim 4, **characterized in that** the complementary attachment means includes a track (24) enabling a linear displacement of the target frame (20) along the respective leg (18a, 18b) of the base member.

6. The target arrangement of claim 5, **characterized in that** the attachment element (26, 30, 36; 48) is configured to fixate the target frame (20) to the base member (18) in conjunction with the complementary attachment means (24) by a clamping action.

7. The target arrangement of any one of claims 1-6, **characterized in that** the base member (18) is provided with a third leg (18a) so as to form a substantially U-shaped base member (18).

8. The target arrangement of claim 7, **characterized in that** a free end portion of the first legs (18a) are connectable to a common rotary shaft (14) of the drive unit (12).

9. A target retainer (16) for holding a target (22) and connectable to a rotary output shaft (14) of a drive unit (12), comprising a base member (18) configured to be connected to the rotary shaft (14), and a target frame (20) for detachably holding the target (22), **characterized in that** the base member (18) is formed as an angled base member having at least a first leg (18a) connectable to the rotary output shaft (14) for rotating the first leg (18a) of the base member in a plane substantially orthogonal to the longitudinal axis of the rotary shaft (14), and a second leg (18b) disposed in a substantially right angle to the first leg (18a), said target frame (20) being formed as a separate member having at least one attachment element (26, 30, 36; 48) configured for detachably connecting the target frame (20) to either leg (18a, 18b) of the angled base member (18) in a desired lengthwise and rotary position of the target frame (20) relative to the respective leg (18a, 18b) of the base member.

10. The target retainer of claim 9, **characterized in that** the target frame (20) has at least two fixed attachment elements (26, 30, 36), one at a central portion and one at an end portion of a side (34) of the target frame (20) facing the base member (18).

11. The target retainer of claim 9, **characterized in that** one single attachment element (48) is displaceable in a track (50) along the target frame (20) on a side (34) thereof facing the base member (18).

12. The target retainer of any one of claims 9-11, **characterized in that** each leg (18a, 18b) of the base member is provided with an attachment means (24) complementary with the attachment element (26, 30, 36; 48) of the target frame so as to enable the target frame (20) to be fixated to a respective leg (18a, 18b)

of the base member in various desired lengthwise and rotary positions relative to the leg of the base member.

**13.** The target retainer of claim 12, **characterized in that** the complementary attachment means includes a track (24) enabling a linear displacement of the target frame (20) along the respective leg (18a, 18b) of the base member.

**14.** The target retainer of claim 13, **characterized in that** the attachment element (26, 30, 36; 48) is configured to be fixated to the base member (18) in conjunction with the complementary attachment means (24) by a clamping action.

**15.** The target retainer of claim 14, **characterized in that** the base member (18) is provided with a third leg (18a) so as to form a substantially U-shaped base member (18).

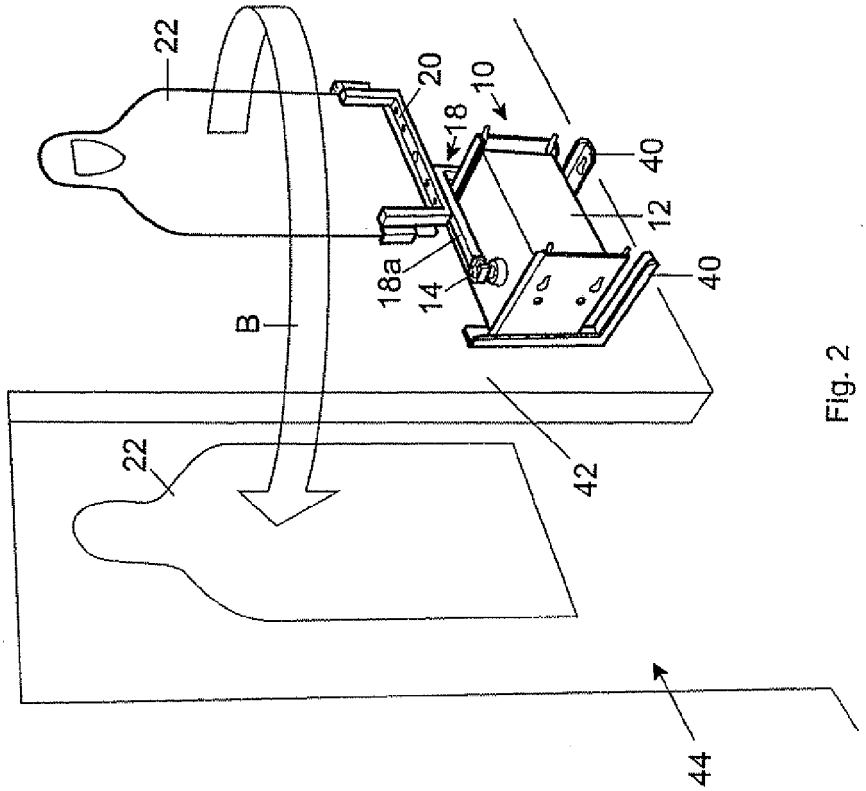
22
20
10
18
40
12
40
18a
14
B
42
22
44

Fig. 2

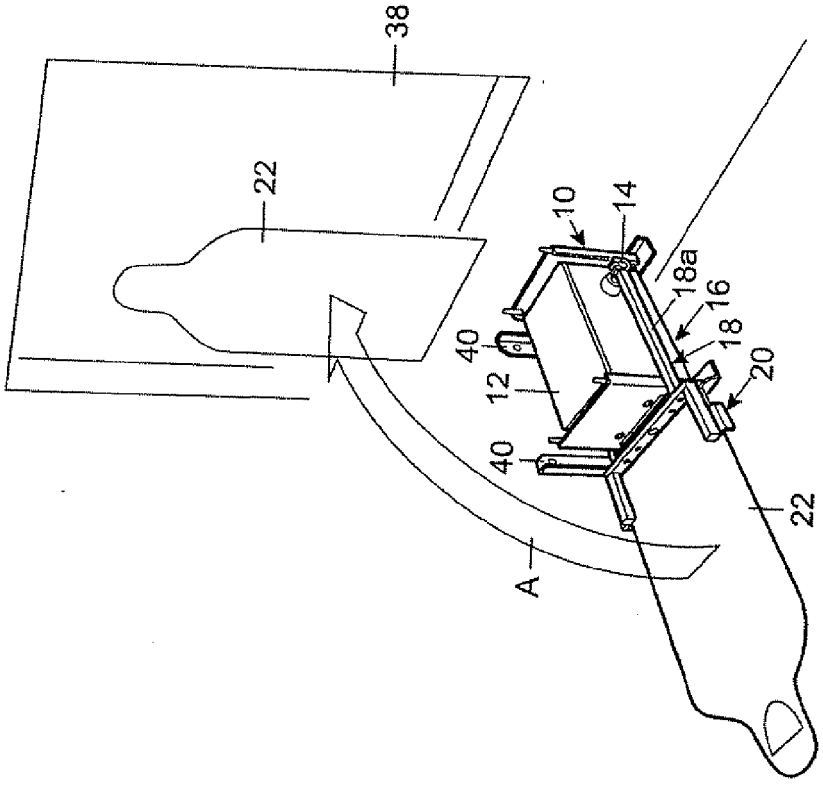
38
22
10
14
18a
16
18
20
40
12
40
22
A

Fig. 1

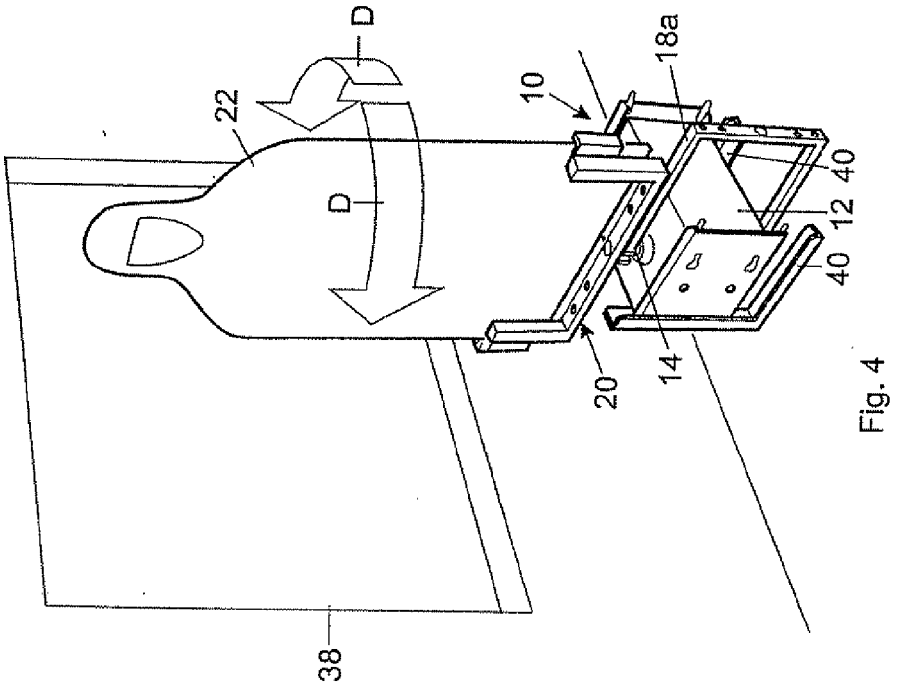
D
22
D
10
18a
40
12
40
14
20
38

Fig. 4

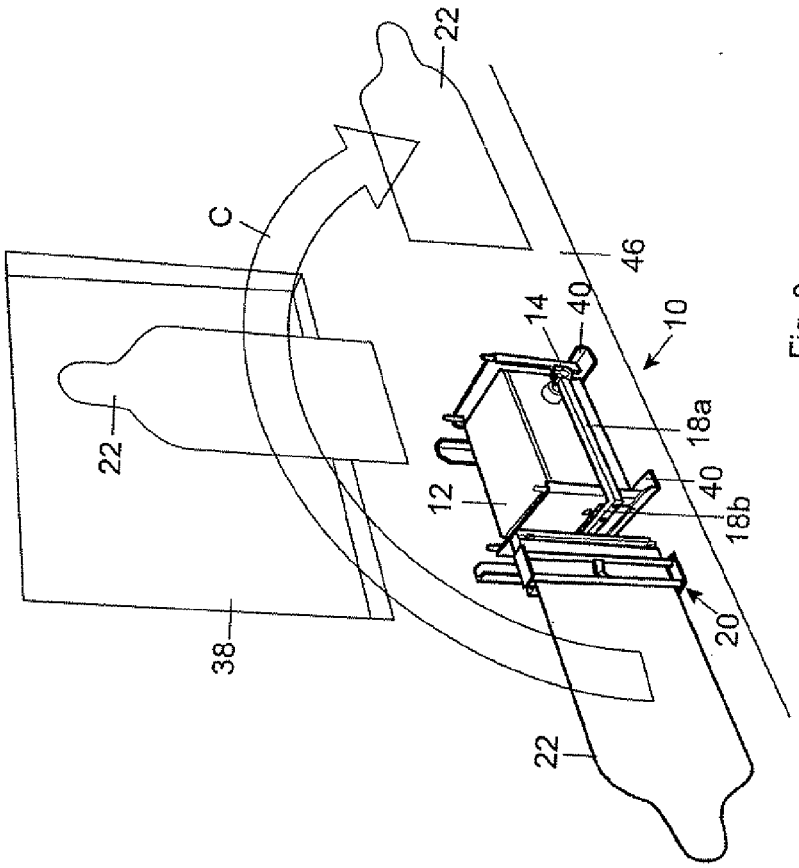
22
C
46
14
40
10
18a
22
12
40
18b
20
38
22

Fig. 3

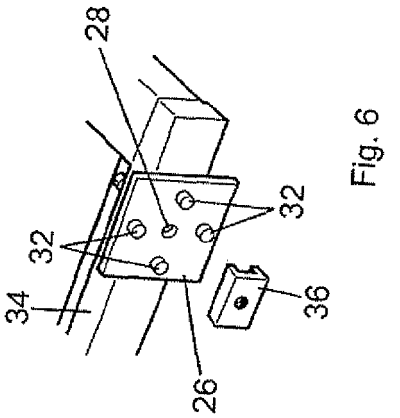


Fig. 6

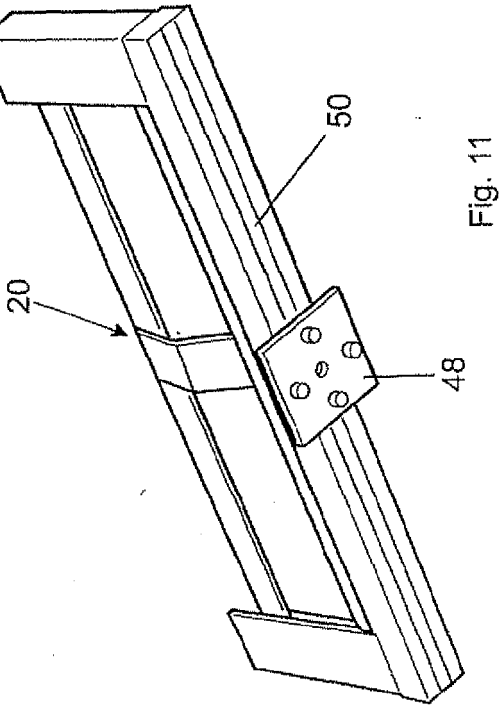


Fig. 11

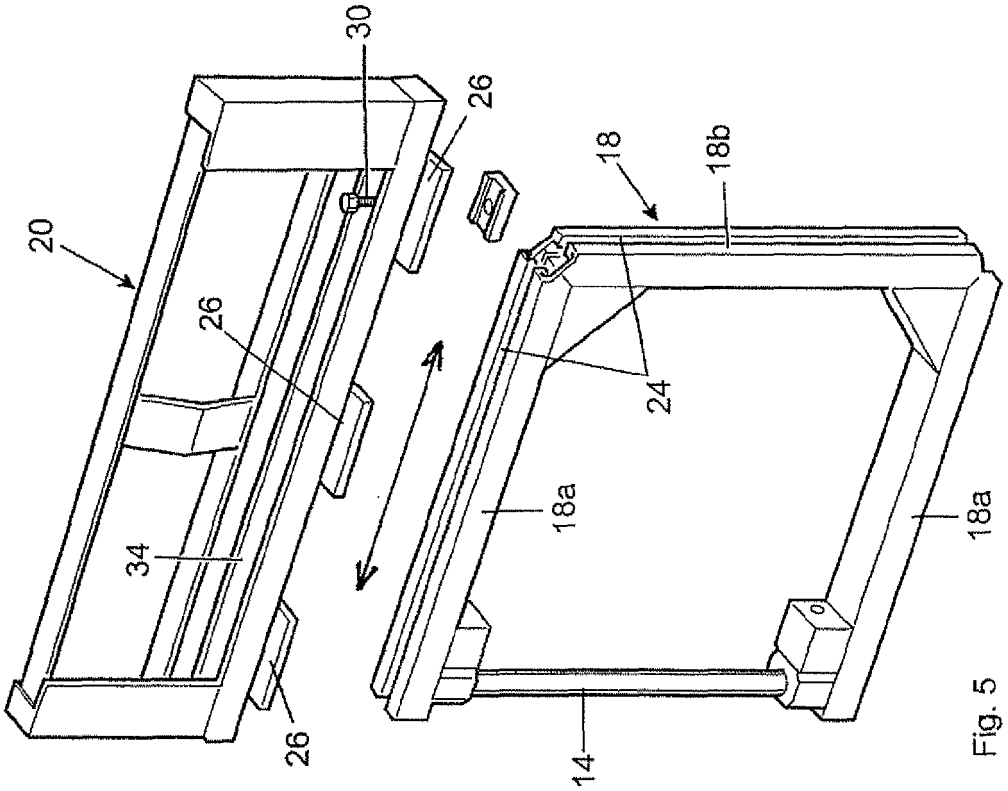


Fig. 5

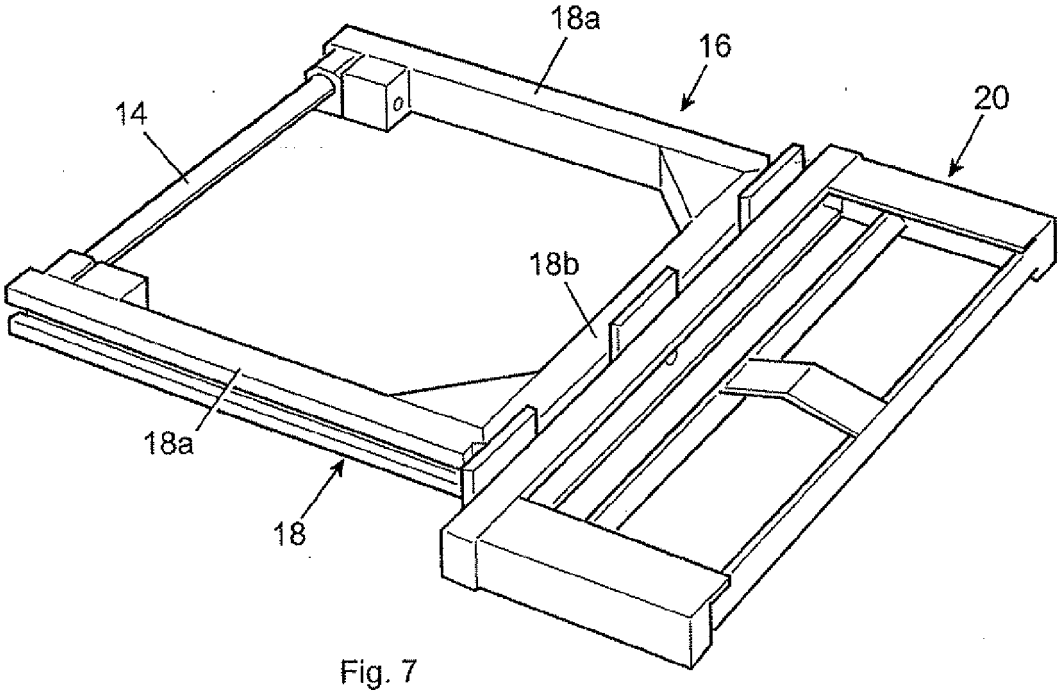


Fig. 7

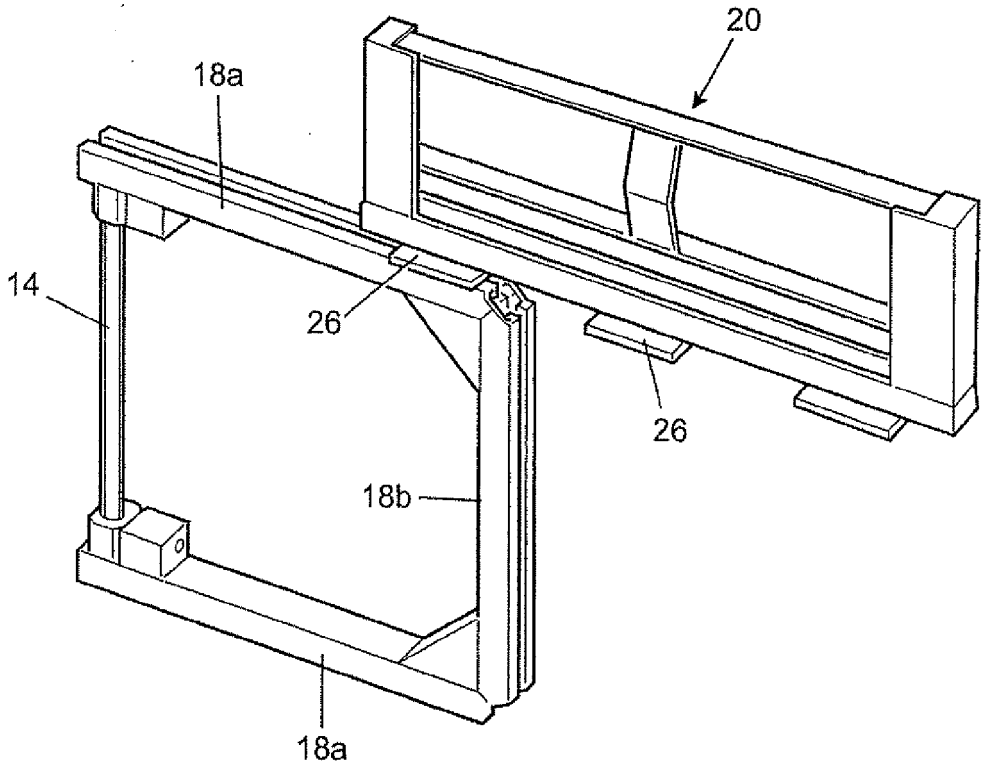


Fig. 8

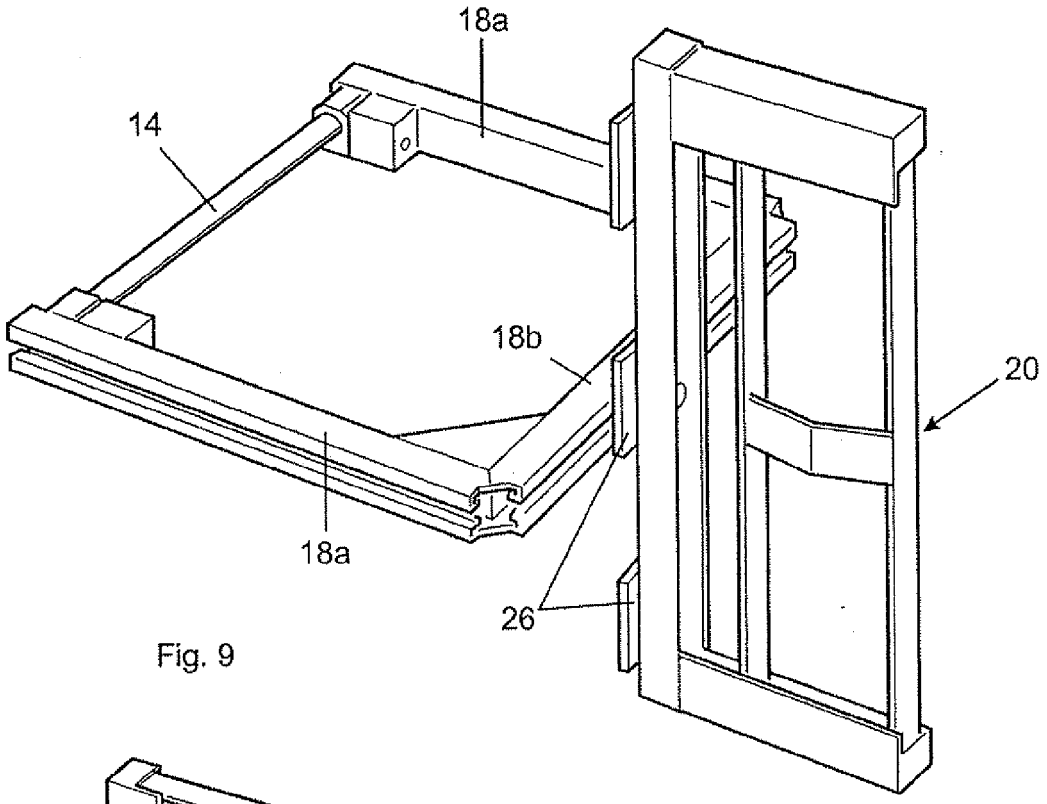


Fig. 9

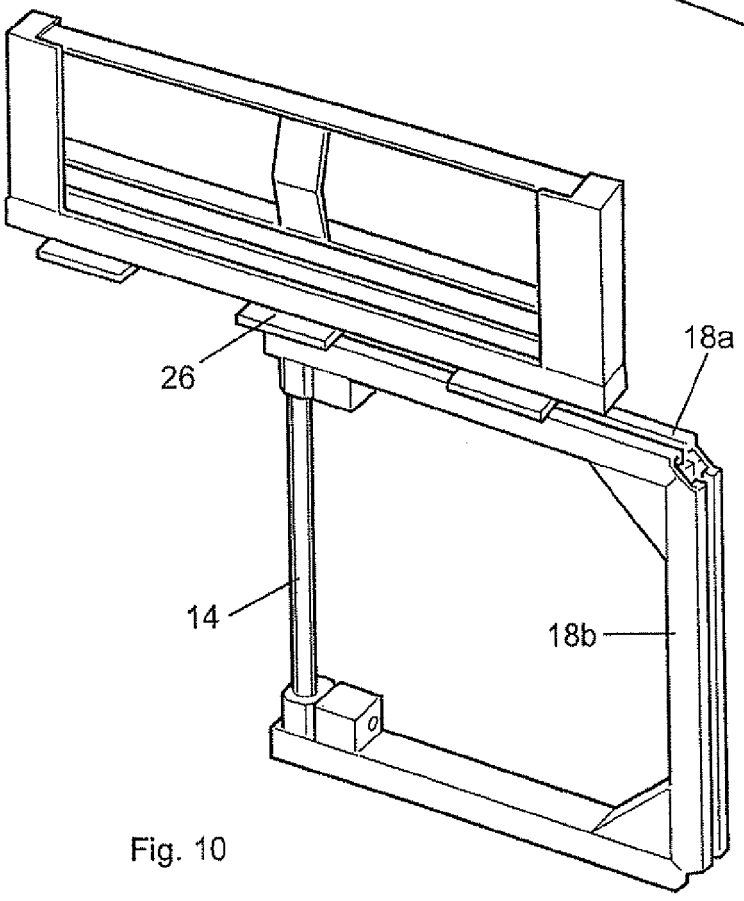


Fig. 10

Europäisches Patentamt
European Patent Office
Office européen des brevets

# EUROPEAN SEARCH REPORT

Application Number
EP 08 15 7586

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| Y,D | US 4 288 080 A (LAPORTE JEAN C ET AL) 8 September 1981 (1981-09-08) * figures 1,3,5 * * column 2, line 14 - line 38 * ----- | 1,4,7-9, 12 | INV. F41J7/06 |
| Y | WO 91/07594 A (DEVENISH DONALD MATHIESON [AU]) 30 May 1991 (1991-05-30) * abstract; figures 1,6,10 * * page 5, line 19 - line 28 * * page 14, line 23 - line 27 * ----- | 1,4,7-9, 12 | |
| A,D | US 5 934 678 A (THEISSEN PETER-PAUL [DE] ET AL) 10 August 1999 (1999-08-10) * figures 1-3 * * column 2, line 36 - line 38 * * column 2, line 60 - column 3, line 20 * ----- | 1,9 | |
| A | US 4 119 317 A (OHLUND INGVAR ET AL) 10 October 1978 (1978-10-10) * figures 4,5 * * column 2, line 1 - line 7 * ----- | 1,7-9,15 | |

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 | 13 November 2008 | Schwingel, Dirk |

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

1 EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 15 7586

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.

13-11-2008

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 4288080 A | 08-09-1981 | NONE | |
| WO 9107594 A | 30-05-1991 | AT 137567 T | 15-05-1996 |
| | | BG 60690 B1 | 29-12-1995 |
| | | BR 9007823 A | 01-09-1992 |
| | | CA 2068315 A1 | 11-05-1991 |
| | | CN 1053826 A | 14-08-1991 |
| | | DE 69026833 D1 | 05-06-1996 |
| | | DE 69026833 T2 | 28-11-1996 |
| | | EP 0506671 A1 | 07-10-1992 |
| | | FI 922103 A | 08-05-1992 |
| | | HU 65407 A2 | 28-06-1994 |
| | | IN 176044 A1 | 30-12-1995 |
| | | JP 5505013 T | 29-07-1993 |
| | | MC 2213 A | 26-11-1992 |
| | | NO 921802 A | 07-05-1992 |
| | | NZ 236039 A | 25-02-1993 |
| | | US 5317956 A | 07-06-1994 |
| US 5934678 A | 10-08-1999 | DE 19601380 A1 | 24-07-1997 |
| | | EP 0785407 A2 | 23-07-1997 |
| US 4119317 A | 10-10-1978 | AU 501547 B2 | 21-06-1979 |
| | | AU 2258877 A | 31-08-1978 |
| | | CA 1092177 A1 | 23-12-1980 |
| | | CH 606975 A5 | 30-11-1978 |
| | | DE 2706961 A1 | 25-08-1977 |
| | | DK 76277 A | 25-08-1977 |
| | | FR 2342479 A1 | 23-09-1977 |
| | | GB 1516966 A | 05-07-1978 |
| | | NL 7701992 A | 26-08-1977 |
| | | NO 770603 A | 25-08-1977 |
| | | SE 406804 B | 26-02-1979 |
| | | SE 7602192 A | 25-08-1977 |

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 5934678 A **[0002]**
- US 4288080 A **[0002]**
- FR 2547651 A1 **[0002]**
- SE 0103462 A **[0002]**