

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 0 523 801 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**19.06.1996 Bulletin 1996/25**

(51) Int Cl.6: **F41J 1/12**

(21) Application number: **92202116.7**

(22) Date of filing: **10.07.1992**

(54) **Bullet catcher**

Kugelfang

Collecteur de balles

(84) Designated Contracting States:  
**AT BE CH DE DK ES FR GB GR IT LI LU MC NL  
PT SE**

(30) Priority: **12.07.1991 NL 9101229**

(43) Date of publication of application:  
**20.01.1993 Bulletin 1993/03**

(73) Proprietors:  
• **STRUKTON STAALBOUW B.V.**  
**NL-3606 AL Maarssen (NL)**  
• **AUTRON B.V.**  
**NL-3011 WV Rotterdam (NL)**

(72) Inventor: **Hartog, Jacobus**  
**NL-2923 GL Krimpen a/d IJssel (NL)**

(74) Representative: **Vollebregt, Cornelis Jacobus, Ir.**  
**Algemeen Octrooibureau**  
**World Trade Center**  
**P.O. Box 645**  
**5600 AP Eindhoven (NL)**

(56) References cited:  
**BE-A- 681 425**                      **DE-C- 316 195**  
**FR-A- 1 288 152**                  **US-A- 2 420 304**  
**US-A- 2 772 092**                  **US-A- 3 701 532**

**EP 0 523 801 B1**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

The invention relates to a device for catching bullets.

On shooting ranges it has so far been customary to catch bullets fired by means of rifles, submachine guns, pistols and the like in a stop butt formed by a heap of sand, which is disposed near one end of the shooting range in question. Said sand is strongly contaminated by the bullet rests, which usually contain lead and/or copper, so that this contaminated sand must be considered to be chemical waste, the discharge, storage and possible purification of which involves rather a great deal of expense.

The object of the invention is therefore to obtain a device for catching bullets, by means of which an efficient catching of the bullets or the like can be effected, whilst avoiding as much as possible the production of contaminants which are difficult to process.

According to the invention this can be achieved in a device provided with a guiding surface consisting of an impact-resistant material, which slopes downwards at an angle of less than  $30^\circ$  to the horizontal, when seen in the direction of movement of the projectile to be caught, whilst behind the guiding surface means are provided for catching the bullet rests and the guiding surface is formed by the flanges of track rails arranged side by side.

Track rails are generally made of a very high-grade steel and are very resistant to weather influences. Since use is thereby made of the flanges to form the actual guiding surface, it is possible to use rails which have been declared unfit for railway use, i.e. of comparatively inexpensive scrap material.

In practice it has appeared that when using such a guiding surface consisting of an impact-resistant material, which includes only a comparatively small angle with the horizontal, an effective catching of bullets or the like projectiles can be achieved without undesirable damage being done to the guiding surface as a result of the bullets being caught, whilst the bullets caught in this manner can be caught in an effective manner in a space of limited dimensions, which is located behind the guiding surface.

Preferably a second impact-resistant guiding surface is disposed opposite the guiding surface, said second guiding surface sloping upwards at an angle of less than  $30^\circ$  to the horizontal, when seen in the direction of movement of the bullet to be caught.

By using two opposite guiding surfaces a shorter construction of the device, when seen in the direction of movement of the bullet to be caught, can be obtained than when only single guiding surface is used.

It is noted that from BE-A-681425 forming the base for the preamble of independent claim 1, there is known a device for catching bullets having a single downward sloping guiding surface made from superimposed layers of various materials.

From US-A-2,772,092 there is known a device for catching bullets having plate shaped guiding surfaces which are arranged opposite each other, one said guiding surface sloping downwards and the other sloping upwards.

The invention will be explained in more detail hereafter with reference to a few possible embodiments of a device according to the invention illustrated in the accompanying figures.

Figure 1 diagrammatically shows a section of a first embodiment of a device according to the invention.

Figure 2 diagrammatically shows the construction of an upper guiding surface of a plurality of rails arranged side by side.

Figure 3 diagrammatically shows the construction of an lower guiding surface built up of rails.

Figure 4 diagrammatically shows a section of a second embodiment of a device according to the invention.

The device shown in figure 1 comprises a first guiding surface 1 and a guiding surface 2 disposed thereabove. The guiding surface 1 slopes upwards from the left towards the right, when seen in figure 1, at an angle of  $\pm 20^\circ$  to the horizontal, whilst the guiding surface 2 slopes downwards from the right towards the left, when seen in figure 1, likewise at an angle of  $\pm 20^\circ$  to the horizontal.

At its right-hand end the guiding surface 1 is supported by a foundation beam 3 and at its left-hand end by columns 5 disposed on a foundation beam 4.

The upper guiding surface 2 is suspended, by means of a truss 6, from a covering 7 housing the device.

Further horizontally extending guiding surfaces 8 and 9 join the ends located near and directly above each other of the guiding surfaces 1 and 2 respectively, whereby the construction is such that at its side remote from the guiding surface 2 the upper guiding surface 9 extends beyond the lower guiding surface 8.

The end remote from the guiding surface 1 of the guiding surface 8 joining the guiding surface 1 is supported on an upright wall of a trough 11, e.g. made of concrete, said trough in turn being placed in a trough 12, e.g. made of concrete, which trough 12 has a larger ground surface than the trough 11 and which at one side is bounded by the foundation beam 4 in the illustrated embodiment.

A further guiding surface 13 joins the end of the guiding surface 9 remote from the guiding surface 2, said guiding surface 13 sloping downwards from the guiding surface 9, thereby including an angle of  $\pm 20^\circ$  with the horizontal.

The end of the guiding surface 13 is disposed at some distance from the most left-hand wall of the trough 11, when seen in Figure 1.

As is illustrated in more detail in Figures 2 and 3 the guiding surfaces are preferably built up of rails located side by side. As is shown in Figure 2 the upper guiding surface 2 is thereby built up of rails 14 disposed side by

side, said rails extending from the right towards the left, parallel to the plane of drawing, when seen in Figure 1. The rails are subdivided into groups of interconnected rails located side by side, so that such groups of rails can be easily exchanged, if desired. In the illustrated embodiment such a group consists of four rails extending parallel to each other, which are interconnected by means of bolts 15 extending perpendicularly to the rails. The bolts 15 are surrounded by sleeves 16, to which arms 17 are secured for suspending the upper guiding surface. As will be apparent the flanges 18 of the rails thereby form the actual guiding surface located opposite the guiding surface 1.

As is furthermore illustrated in Figure 2 the slits between the abutting ends of the flanges 18 of the rails may be closed by means of bars 19 provided near said slits, which are welded to only one of the respective flanges.

The guiding surfaces 8, 9 and 13 may be built up of rails in a similar manner.

Generally the bullets or the like projectiles will mostly hit the lower guiding surface 1 during normal operation of the device. In connection therewith the construction shown in Figure 3 will be preferred for the guiding surface 1, wherein rails 20 and 21 are arranged side by side, alternately being turned through 180° with respect to each other.

The abutting flanges 22 of the rails 20 will thereby form the actual guiding surface co-operating with the projectiles. Said flanges 22 are furthermore supported in an effective manner, in points spaced from the webs of the rails, by the heads of the rails 21. In this manner a solid, heavy construction of the lower guiding surface is obtained, which, as a result of the double arrangement of the rails, will be practically impenetrable to bullets or the like projectiles, whilst as a result of the heavy construction it will also be prevented that undesirable noise effects are produced.

During use of the device the trough 11 will be filled with water or a similar liquid.

Bullets or the like projectiles are fired at the device in the direction indicated by the arrow A and generally caught by the lower guiding surface 1 or possibly by the upper guiding surface 2 thereby. It has become apparent that as a result of the selected inclination at which the two guiding surfaces extend, undesirable damage to the two guiding surfaces can at least substantially be avoided.

The bullets or bullet rests caught move on through the small passage between the guiding surfaces 8 and 9, after which they are deflected by the guiding surface 13 and land into the liquid present in the trough 11, where they are decelerated by said liquid.

A partition 11' in the trough 11 may be provided with holes, so that said partition acts as a wash plate, so as to prevent undesirable oscillation of the liquid. It is also possible to use an entirely closed partition 11' and to use the space to the right of said partition for catching water

splashing over, which may then be pumped back, by means of a pump not shown, into the space located to the left of the partition 11', when seen in Figure 1.

The trough 12 is provided to catch any water splashing from the trough 11.

At set intervals the metal parts caught in the water can be removed in a simple manner by means of screening techniques or the like. In comparison with the usual stop butts, which are built up of sand, a relatively small amount of waste material is obtained hereby, which, in the form of scrap metal, lends itself very well for further environmentally sound removal *casu quo* processing.

Figure 4 shows a somewhat simpler embodiment of a device for catching bullets according to the invention. This device is provided with two guiding surfaces 23 and 24 corresponding to the guiding surfaces 1 and 2 of the above-described device. A horizontally extending guiding surface 25 abuts the upper guiding surface 24. A further guiding surface 27 is disposed between the end of the guiding surface 25 remote from the guiding surface 24 and a sandbox disposed thereunder.

It will be apparent that bullets or the like projectiles may be caught by means of this device in a similar manner as described above. Objects moving through the slit between the ends of the guiding surfaces 23, 24 located near each other will be caught by the guiding surface 27 and eventually land in the sandbox 26.

Also here only a comparatively small amount of material containing metal rests will have to be removed at set intervals.

### Claims

1. A device for catching bullets provided with a guiding surface (2) consisting of an impact-resistant material, which slopes downwards at an angle of less than 30° to the horizontal, when seen in the direction of movement (A) of the projectile to be caught, whilst behind the guiding surface (2) means (11) are provided for catching the bullet rests, characterized in that said guiding surface is formed by the flanges of railway rails (14, 20), which are arranged side by side.
2. A device according to claim 1, characterized in that a second impact-resistant guiding surface (2) is made from track rails, disposed opposite said guiding surface, said second guiding surface (2) sloping upwards at an angle of less than 30° to the horizontal, when seen in the direction of movement (A) of the bullet to be caught.
3. A device according to claims 1 and 2, characterized in that a guiding surface (1, 2) includes an angle of  $\pm 20^\circ$  with the horizontal.
4. A device according to claims 2 or 3, characterized

in that further guiding surfaces (8, 9) made from track rails, extending parallel and at least substantially horizontally join the ends of the sloping guiding surface (1, 2) located near each other, the upper one (9) of said further guiding surfaces extending beyond the lower guiding surface (8), when seen in the intended direction of movement (A) of the bullet to be caught, and blending into a downwardly sloping guiding surface (13) made from track rails, whose end is located above the means (11) for catching the bullet rests.

5. A device according to any one of the preceding claims, characterized in that said means (11) for catching the bullets are formed by a liquid-containing trough.
6. A device according to claim 5, characterized in that the liquid-containing trough (11) is disposed in a further trough (12), which has a larger base area than said liquid-containing trough.
7. A device according to any preceding claim, characterized in that said track rails are combined into groups, whereby each group of track rails can be mounted or dismounted, as the case may be, independently of the other track rails.
8. A device according to any preceding claim, characterized in that a guiding surface (1) is built up of track rails (20, 21) arranged side by side and alternately being turned through 180° with respect to each other, in such a manner that the abutting flanges (22) of track rails located side by side, which form a guiding surface, are supported by the heads of rails (21) disposed therebetween.

#### Patentansprüche

1. Vorrichtung zum Auffangen von Geschossen, mit einer Führungsfläche (2), die aus einem schlagfesten Material besteht und in der Bewegungsrichtung (A) des aufzufangenden Projektils gesehen in einem Winkel von weniger als 30° zur Horizontalen nach unten geneigt ist, wobei hinter der Führungsfläche (2) Mittel (11) zum Auffangen von Geschosßresten vorgesehen sind, dadurch gekennzeichnet, daß die Führungsfläche durch die Füße von Eisenbahnschienen (14, 12) gebildet ist, die nebeneinanderliegend angeordnet sind.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß eine zweite schlagfeste Führungsfläche (2) aus Eisenbahnschienen gebildet ist, die gegenüber der Führungsfläche angeordnet ist, wobei die zweite Führungsfläche (2) in der Bewegungsrichtung (A) des aufzufangenden Geschosses ge-

sehen in einem Winkel von weniger als 30° zur Horizontalen nach oben geneigt ist.

3. Vorrichtung nach den Ansprüchen 1 und 2, dadurch gekennzeichnet, daß eine Führungsfläche (1, 2) einen Winkel von  $\pm 20^\circ$  mit der Horizontalen einschließt.
4. Vorrichtung nach Anspruch 2 oder Anspruch 3, dadurch gekennzeichnet, daß weitere Führungsflächen (8, 9), die aus Eisenbahnschienen gebildet sind und sich parallel und wenigstens im wesentlichen horizontal erstrecken, mit den nahe beieinanderliegenden Enden der geneigten Führungsfläche (1, 2) zusammenstoßen, wobei sich die obere (9) der weiteren Führungsflächen in der vorgesehenen Bewegungsrichtung (A) des aufzufangenden Geschosses gesehen über die untere Führungsfläche (8) hinaus erstreckt und in eine aus Eisenbahnschienen gebildete, nach unten geneigte Führungsfläche (13) übergeht, deren Ende oberhalb des Mittels (11) zum Auffangen der Geschosßreste angeordnet ist.
5. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Mittel (11) zum Auffangen der Geschosse durch eine Flüssigkeit enthaltende Mulde gebildet sind.
6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Flüssigkeit enthaltende Mulde (11) in einer weiteren Mulde (12) angeordnet ist, deren Basisfläche größer als diejenige der Flüssigkeit enthaltenden Mulde ist.
7. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Eisenbahnschienen zu Gruppen zusammengefaßt sind, wodurch jede Gruppe aus Eisenbahnschienen je nach Bedarf unabhängig von den anderen Eisenbahnschienen montiert oder demontiert werden kann.
8. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß eine Führungsfläche (1) durch Eisenbahnschienen (20, 21) gebildet ist, die nebeneinanderliegend angeordnet und abwechselnd relativ zueinander um 180° gedreht sind, so daß die aneinander anliegenden Füße (22) von nebeneinander angeordneten Eisenbahnschienen, die eine Führungsfläche bilden, von den dazwischen angeordneten Köpfen von Schienen (21) gestützt sind.

#### Revendications

1. Ensemble de retenue de balles ayant une surface

- de guidage (2) constituée d'un matériau résistant à l'impact, inclinée vers le bas avec une inclinaison inférieure à 30° par rapport au plan horizontal, vue dans la direction de déplacement (A) du projectile à retenir, et comprenant, derrière la surface de guidage (2), un dispositif (11) de retenue des restes de balles, caractérisé en ce que la surface de guidage est formée par les patins de rails (14, 20) de chemin de fer qui sont placés côte à côte.
- 5
- 10
2. Ensemble selon la revendication 1, caractérisé en ce qu'une seconde surface (2) de guidage, résistant à l'impact, est formée de rails pour voie, et est placée en face de la première surface de guidage, la seconde surface de guidage (2) étant inclinée vers le haut avec un angle inférieur à 30° par rapport au plan horizontal, vue dans la direction (A) de déplacement de la balle à retenir.
- 15
3. Ensemble selon les revendications 1 et 2, caractérisé en ce qu'une surface de guidage (1, 2) forme un angle de  $\pm 20^\circ$  avec un plan horizontal.
- 20
4. Ensemble selon la revendication 2 ou 3, caractérisé en ce que des surfaces supplémentaires de guidage (8, 9) formées de rails pour voie, placées parallèlement et au moins pratiquement en direction horizontale, raccordent les extrémités des surfaces inclinées (1, 2) placées l'une près de l'autre, la surface supérieure (9) parmi les surfaces supplémentaires de guidage allant au-delà de la surface inférieure de guidage (8) dans la direction prévue de déplacement (A) de la balle à retenir, et se raccordant à une surface (13) de guidage qui est inclinée vers le bas et est formée de rails pour voie dont l'extrémité est placée au-dessus du dispositif (11) de retenue des restes de balles.
- 25
- 30
- 35
5. Ensemble selon l'une quelconque des revendications précédentes, caractérisé en ce que le dispositif (11) de retenue de balles est formé par une rigole contenant un liquide.
- 40
6. Ensemble selon la revendication 5, caractérisé en ce que la rigole contenant un liquide (11) est placée dans une rigole supplémentaire (12) ayant une surface de base plus grande que la rigole contenant un liquide.
- 45
7. Ensemble selon l'une quelconque des revendications précédentes, caractérisé en ce que les rails pour voie sont combinés en groupes tels que chaque groupe de rails pour voie peut être monté ou démonté, selon le cas, indépendamment des autres rails pour voie.
- 50
- 55
8. Ensemble selon l'une quelconque des revendications précédentes, caractérisé en ce qu'une surface

de guidage (1) est construite à partir de rails pour voie (20, 21) placés côte à côte et retournés de 180° en alternance les uns par rapport aux autres, afin que les patins (22) en butée des rails pour voie placés côte à côte, qui forment une surface de guidage, soient supportés par les champignons des rails (21) placés entre eux.

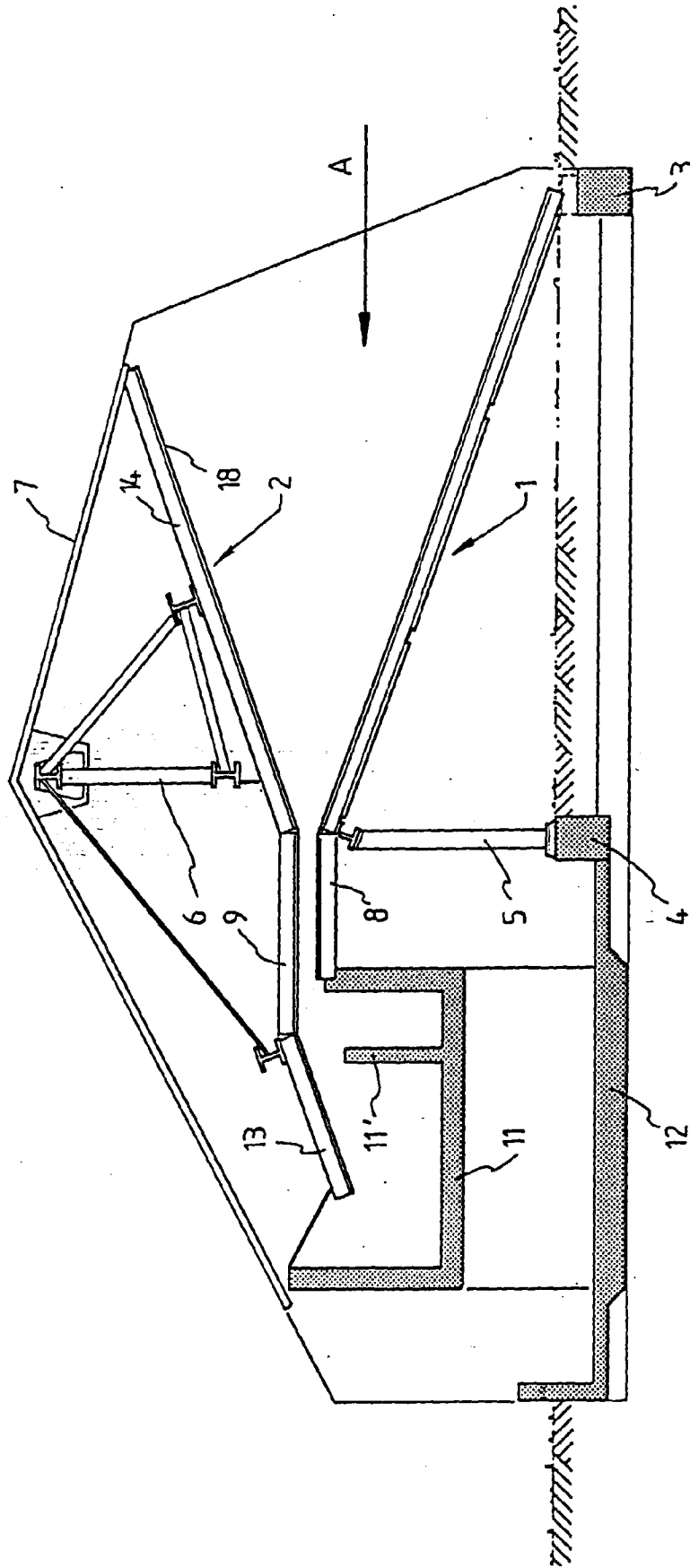


Fig 1

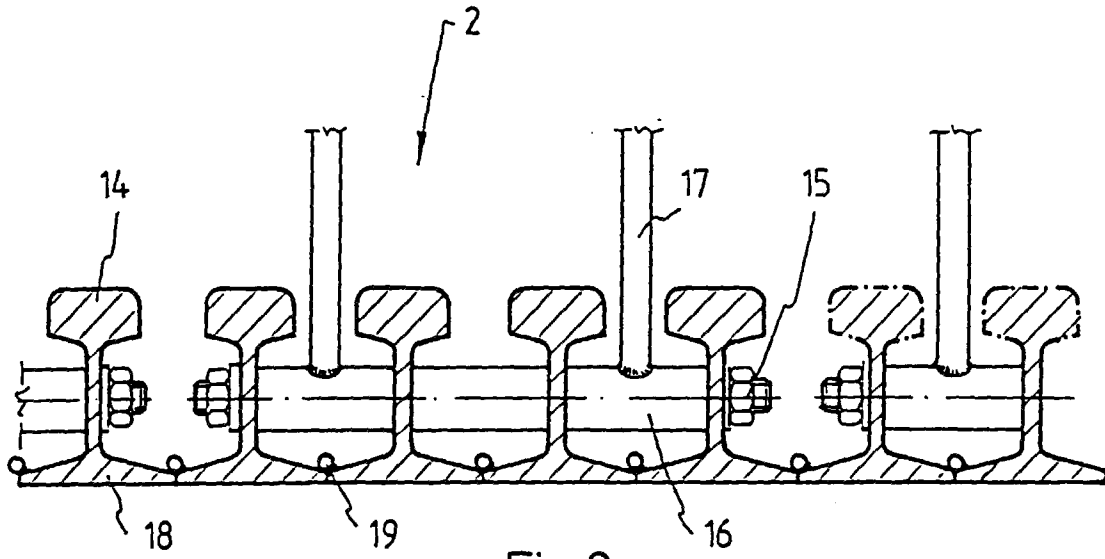


Fig 2

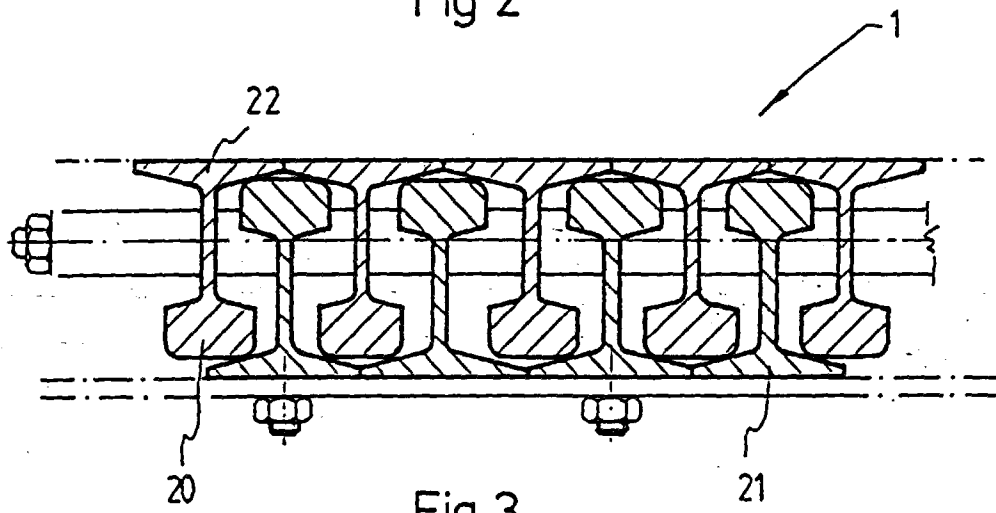


Fig 3

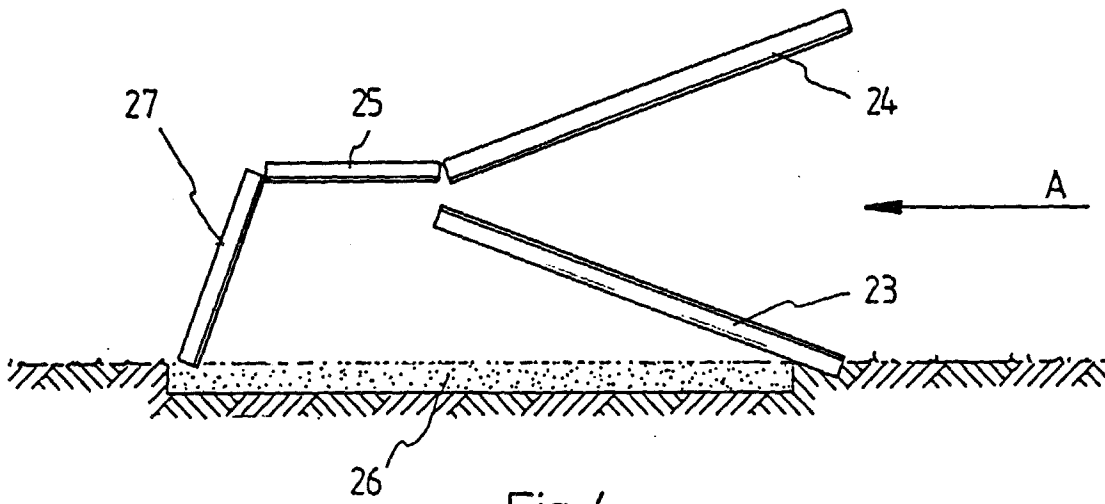


Fig 4