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(54) Target superstructure.

(57) A superstructure for live H.E.A.T. missile target practice, the superstructure comprising a plurality of panels (1) mounted on a underframe (12) in staggered and preferably overlapping relationship such that, when the superstructure is viewed face on, the panels visually present together a substantially continuous target area. A metal panel member may be provided in front on the panels just mentioned, which panel member is arranged to drop down when actuated to reveal the target area behind it. The panels (1) can comprise a comparatively thick layer of polyurethane foam material sandwiched between two layers of a softer fibreglass, the consistency of both the fibreglass material and the polyurethane foam material being such that the live H.E.A.T. missiles are intended to pass through the material without detonation.

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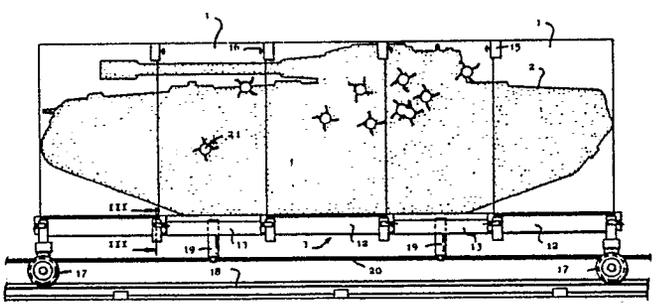


FIG. 1

TARGET SUPERSTRUCTURE

This invention relates to superstructures for live H.E.A.T. (High Explosive Anti-Tank) missile target practice.

Known superstructures for missile target practice are usually constructed as a single panel of plywood or having a framework supporting a mesh of chicken wire over which hessian is laid or hessian cloth on its own is laid. The image of a military tank is painted on one face of the panel or the hessian cloth or chicken wire forming the panel and the superstructure is generally movable along a track so as to simulate movement of an actual tank, thereby constituting a weaponry target. Such a construction has two disadvantages. Firstly, the surface area of the panel is such that it can easily be damaged and/or blown over by side winds. Secondly, the material of the panel is such that a fair proportion of the live missiles is detonated as they hit the material or supporting structure of the panel.

According to one aspect of the present invention, there is provided a superstructure for live H.E.A.T. missile target practice, the superstructure comprising a plurality of panels mounted in staggered relationship in substantially parallel planes on an underframe such that, when the superstructure is viewed face on, the panels visually present together a substantially continuous target area.

According to a second aspect of the present invention, there is provided a superstructure for live H.E.A.T. missile target practice, the superstructure comprising a plurality of panels and an underframe upon which the panels can be mounted in staggered relationship in substantially parallel planes and the superstructure being such that, when viewed face on with the panels mounted on the underframe, the panels visually present together a substantially continuous target area.

Each panel can be formed of a material through which a live H.E.A.T. missile can pass without detonation.

According to a third aspect of the present invention, there is provided a superstructure for live H.E.A.T. missile target practice, the superstructure comprising at least one upright target panel mounted on an underframe, the panel comprising a metal panel member normally covering a softer panel member and there being means to cause said metal panel member to move to reveal said softer panel member, through which softer panel member a live H.E.A.T. missile is intended to pass without detonation.

Preferably, the front panel member is arranged to move downwardly away from the rear panel member.

Another metal panel member can be provided behind the softer panel member, this metal panel member being the same as or similar to the first-mentioned panel member and being provided with means to cause it to move in synchronism with movement of the firstmentioned panel member.

The panels of the superstructure according to the first and second aspects of the invention and the softer panel member of the superstructure according to the third aspect of the invention can comprise a comparatively thick layer of polyurethane foam material sandwiched between two layers of a soft fibreglass. The comparatively thick layer can instead of the polyurethane foam material be formed of isocyanurate. An open weave cloth can be laid on top of the polyurethane foam material, the fibreglass holding the cloth in place. The consistency of both the fibreglass material and the polyurethane foam material is such that the live H.E.A.T. missiles are intended to pass through the material without detonation. For example, the density of the polyurethane foam material is 30 Kg/m^3.

The substantially continuous target area mentioned above can be constituted by a military vehicle such as the side of a tank painted on the panels, each panel depicting part of the tank. Such a military vehicle can also be painted on the rear panel member of the superstructure according to the third aspect of the invention, at least duplicating that part of the vehicle painted on the or each metal panel member. The or each metal panel member need not cover the whole of the softer panel member.

The underframe in the superstructure according to the first, second and third aspects of the invention can be mounted on a trolley itself mounted on rails to enable the superstructure to be mobile in the field.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is a diagrammatic front view of a superstructure for live H.E.A.T. missile target practice, the superstructure being mounted on means to make it mobile,

Figure 2 is a diagrammatic plan view of the superstructure and associated parts shown in Figure 1,

Figure 3 is a cross-sectional view taken along the line III-III in Figure 1, and

Figure 4 is a diagrammatic end view of the superstructure on its own.

Referring to the drawings, the illustrated superstructure for live H.E.A.T. missile target practice

comprises a plurality of upright panels 1, one face of each panel having the image or silhouette of part of a military vehicle such as the side of a tank 2 painted on it. The total number of panels 1 make up a complete military vehicle silhouette constituting a target area for weaponry practice.

Each panel 1 is mounted on an underframe 3 comprising a central longitudinally-extending bar 4 supporting cross members 5 at equally-spaced intervals along the bar 4. Each cross member 5 has elongate, generally L-section members 6 secured to it and extending parallel to the bar 4. From Figure 2 it will be seen that each cross member 5 traverses the bar 4 and they can extend equidistantly from either side of the bar 4. The cross bar 5 has one L-section member 6 extending from it in one direction and at its opposite end another L-section member 6 extending from it in the opposite direction parallel to the bar 4. An end bar 7 forming part of the underframe is fixed at each end of the central bar 4 and the outermost extremities of the two respective outermost L-section members 6 are fixed to the respective end bars 7.

Each panel 1 comprises a central comparatively thick layer 8, preferably of polyurethane foam material which is covered on both sides by an open weave glassfibre cloth 9 (scrim) which itself is held in place by respective layers 10 of a soft fibreglass resin containing a hardener and colouring agent.

Each panel 1 is impaled on spikes 11, which extend from face plates 12 through apertures in the L-section members 6, sit on the lower flanges of the L-section members 6 and nestle in the internal section of the members 6. Back plates 13 are provided which co-operate with a bolt and threaded bar arrangement 14A, 14B which, when tightened, tightens the back plates 13 onto the respective panels 1 thereby holding them securely in place against the respective L-section members 6. The construction described provides a staggered relationship of panels 1 in substantially parallel planes so that the panels visually present together a substantially continuous target area when the superstructure is viewed face on. Preferably, to limit the possibility of personnel in the field gaining sight through the gaps between the panels, the panels are arranged in overlapping relationship. The tops of adjacent panels 1 can be linked together as shown by upper cross members 15 which are tightened on the panels 1 by means of plastics corkscrew-like bolts 16. The members 15 could be attached on the top edges of the panels 1, for example, rather than as shown.

To make the superstructure mobile in the field, the end bars 7 are mounted on wheels 17 which run on tracks 18. Two spigots 19 depend from the longitudinal bar 4 between its ends and are attached to a ropeway 20 by which the superstructure can be drawn along the rails 18.

In an alternative form (not shown) the wheels 17 need not be provided so that the whole superstructure can be supported by means of its spigots 19 which sit in a trolley which itself is drawn/pushed along a track.

A number of missile holes 21 have been illustrated to demonstrate how the material is such as to prevent the missile detonating upon impacting the panels 1, the live missiles passing through the material of the panels and then landing beyond and detonating there. Therefore, the target has a much greater life than conventional targets which are damaged and/or destroyed by detonation of the missile upon impact.

The gaps produced by the staggered relationship of the panels 1 are such that wind can pass between the panels 1 thereby reducing the possibility of the superstructure being blown over or otherwise damaged.

Instead of the cable propulsion means shown, the superstructure could be pushed and pulled along the track by a separate rail-mounted tractor. Indeed, the superstructure could itself be mounted on a railless, remotely-controlled vehicle. It is also envisaged that the superstructure could be statically/stationarily mounted, perhaps as a pop-up target.

Although only five panels have been illustrated, the superstructure can comprise any desired number of panels. Each panel can be 4′ (1.23 metres) wide and 6′6″ (1.98 metres) tall. Of course, the dimensions would relate to the dimensions of the vehicle which the target is intended to represent. The polyurethane layer 8 is preferably about 50 mm thick. The thickness of the fibreglass scrim can be of the order of 0.24 mm. The weave of the scrim can be of the order of 18 threads by 12 threads per square inch (71 threads by 47 threads by per decimetre). The weight of the scrim can be 80 g/m^2 and its thickness 0.24 mm. An overlap between adjacent panels 1 is preferably provided, the overlap being at least 2″ (5 cm). The spacing between two adjacent panels 1, which is governed by the lengths of the transverse bars 15, can be from anything between 6″ (15 cm) and 2″ (60 cm) or more.

The panels 1 can be provided with an aluminium foil in areas which are to be heated to enable the target to be detected by infra-red detectors.

In an embodiment not shown, the superstructure can comprise a single panel made up of a hinged metal front panel member which normally covers a softer rear panel member, the latter having the same construction as one of the illustrated panels 1. Alternatively, several panel members can be provided each mounted to form a superstructure

as illustrated in the drawings. Means such as a hydraulic ram system is provided to cause the front panel member(s) to hinge downwardly and away from the rear panel member(s) to reveal the rear panel member(s), through which rear panel member(s) a live H.E.A.T. missile can pass without detonation.

Both the metal front panel member and the softer rear panel member would have the identical silhouette of a target painted thereof. Alternatively, the front panel member need not cover the whole area of the rear panel member. Also, the front panel member could be caused to fall towards the rear panel member or could be moved up and over the rear panel member to go behind it. Detection means to actuate the front panel member could include transducer means and radio-controlled means can be provided to reset the front panel member in front of the rear panel member. Preferably, the metal front panel member is made of mild steel plate 3 mm thick ± 1 mm.

It is also envisaged that the softer panel member can be sandwiched between two such metal panel members, the means such as the hydraulic ram system acting to cause both metal panel members to move in synchronism away from the softer panel member between them to reveal it.

The constructions just described enable spotting rounds to be used using tracer bullets. When a tracer bullet hits the metal panel (or either one of them where there are two metal panels), the bullet detonates and this is detected by means of a transducer for example, this actuating the mechanism to drop the (or both) metal panel(s) forwards or rearwards to reveal the softer rear panel through which the live missiles can pass in the same way as in the embodiment illustrated.

With the present invention, it will be appreciated that the material of the panels 1 is not so hard as to allow some of the missiles to be detonated which, of course, would destroy the target. Instead, the material of the panels 1 allows the missiles to pass through without detonation so that those in the field can see how many direct hits have been made on the target.

Claims

1. A superstructure for live H.E.A.T. missile target practice, the superstructure comprising a plurality of panels mounted in staggered relationship in substantially parallel planes on an underframe such that, when the superstructure is viewed face on, the panels visually present together a substantially continuous target area.

2. A superstructure for live H.E.A.T. missile target practice, the superstructure comprising a plurality of panels and an underframe upon which the panels can be mounted in staggered relationship in substantially parallel planes and the superstructure being such that, when viewed face on with the panels mounted on the underframe, the panels visually present together a substantially continuous target area.

3. A superstructure according to claim 1 or 2, wherein each panel is formed of a material through which a live H.E.A.T. missile is intended to pass without detonation.

4. A superstructure according to claim 1, 2 or 3, wherein each said panel is made of a comparatively thick layer of polyurethane foam material sandwiched between two layers of a soft fibreglass.

5. A superstructure according to claim 4, wherein an open weave cloth is laid on top of the polyurethane foam material, the fibreglass holding the cloth in place.

6. A superstructure according to any one of the preceding claims, wherein the panels are arranged in overlapping relationship.

7. A superstructure according to any one of the preceding claims, wherein the tops of adjacent panels are linked.

8. A superstructure for live H.E.A.T. missile target practice, the superstructure comprising at least one upright target panel mounted on an underframe, the panel comprising a metal panel member normally covering a softer panel member and there being means to cause said metal panel member to move to reveal said softer panel member, through which softer panel member a live H.E.A.T. missile is intended to pass without detonation.

9. A superstructure according to claim 8, wherein said front panel member is arranged to move downwardly away from said rear panel member.

10. A superstructure according to claim 8 or 9, wherein another metal panel member is provided behind said softer panel member, this latter metal panel member being the same as or similar to the firstmentioned panel member and being provided with means to cause it to move in synchronism with movement of said firstmentioned panel member.

11. A superstructure according to claim 8, 9 or 10, wherein said softer panel member comprises a comparatively thick layer of polyurethane foam material sandwiched between two layers of a soft fibreglass.

12. A superstructure according to claim 11, wherein an open weave cloth is laid on top of the polyurethane foam material, the fibreglass holding the cloth in place.

13. A superstructure according to any one of claims 8 to 12, wherein the or each said metal

panel member does not cover the whole of said softer panel member.

14. A superstructure according to any one of the preceding claims, wherein said underframe has wheels which can run on tracks.

15. A superstructure according to any one of claims 1 to 13, wherein said underframe is mounted on a trolley itself mountable on rails to enable the superstructure to be mobile in the field.

16. A superstructure according to any one of the preceding claims, wherein said underframe is linked to a ropeway to draw the superstructure along.

17. A superstructure according to any one of claims 1 to 13, and being mounted on a railless, remotely-controlled vehicle.

18. A superstructure according to any one of claims 1 to 13, and being in the form of a stationarily mounted target.

19. A superstructure according to any one of the preceding claims, wherein the panels are provided with an aluminium foil in areas which are to be heated to enable a target on the superstructure to be detected by infra-red detectors.

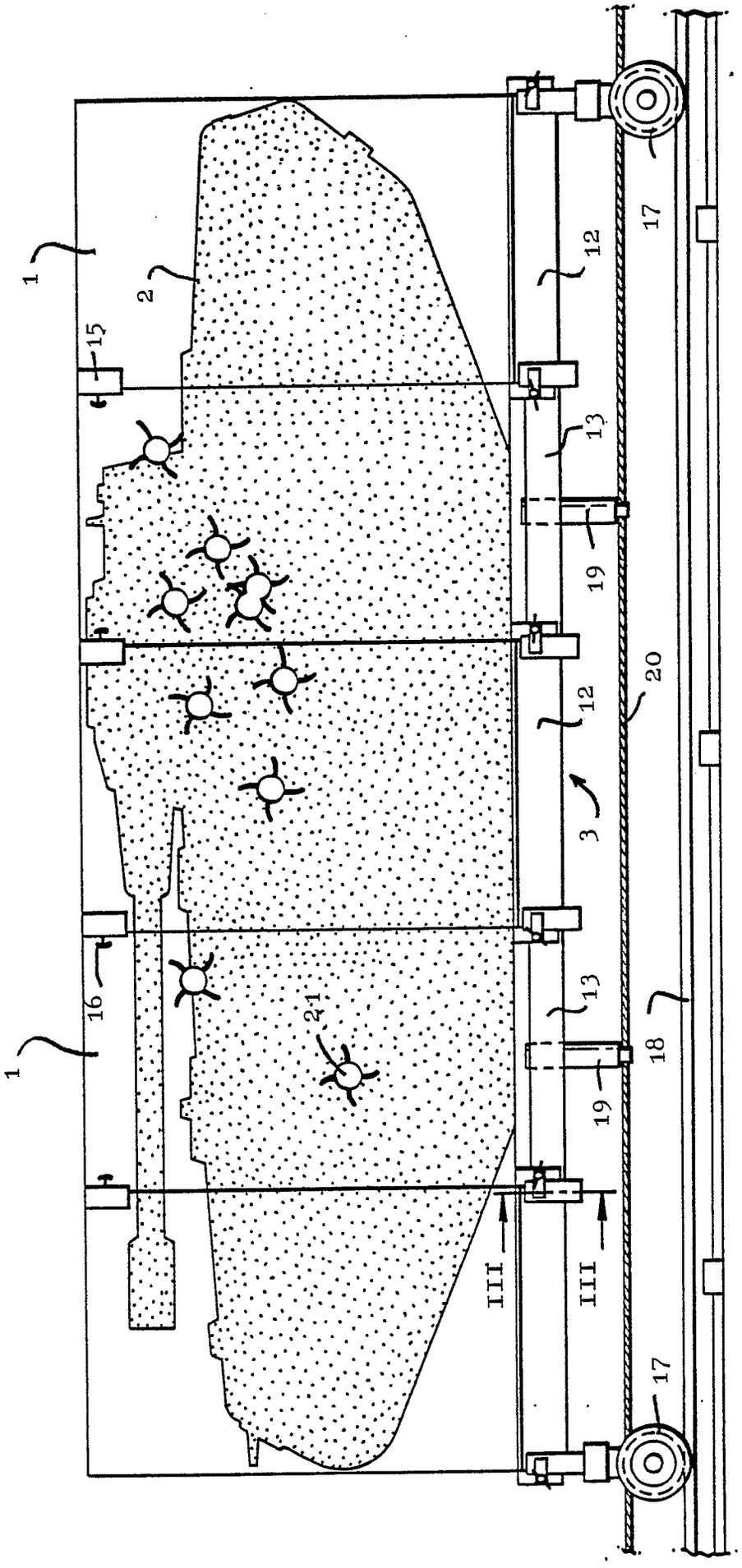


FIG. 1

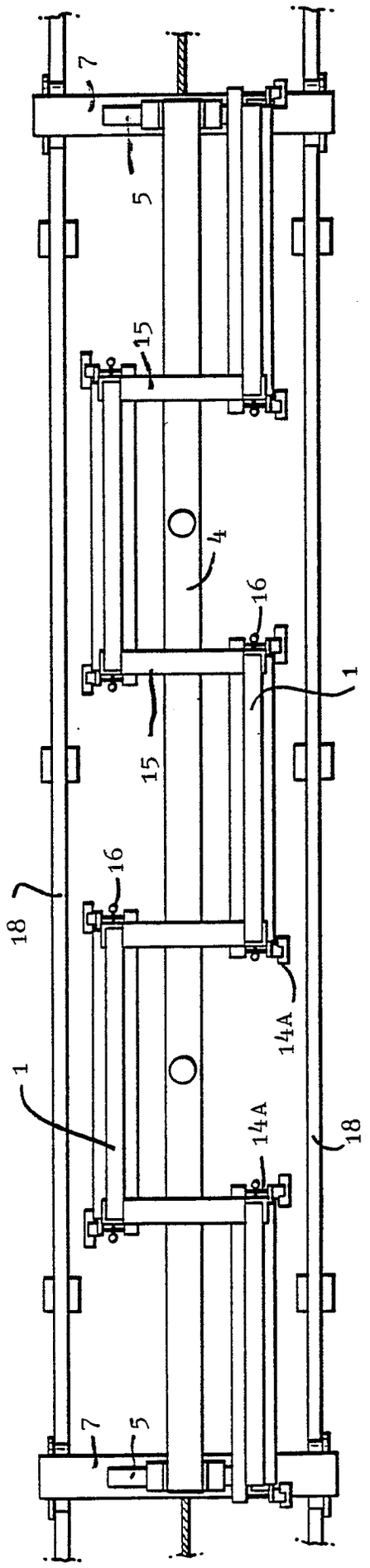


FIG. 2

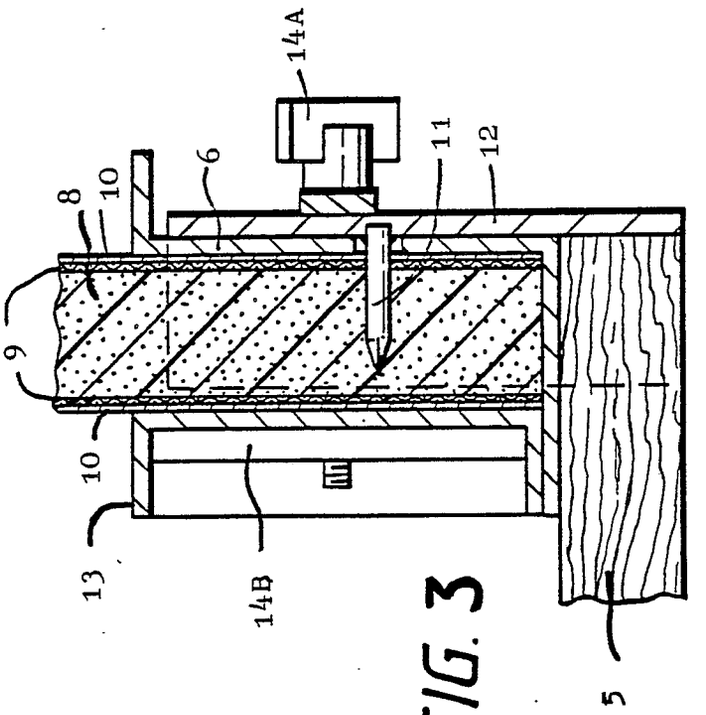
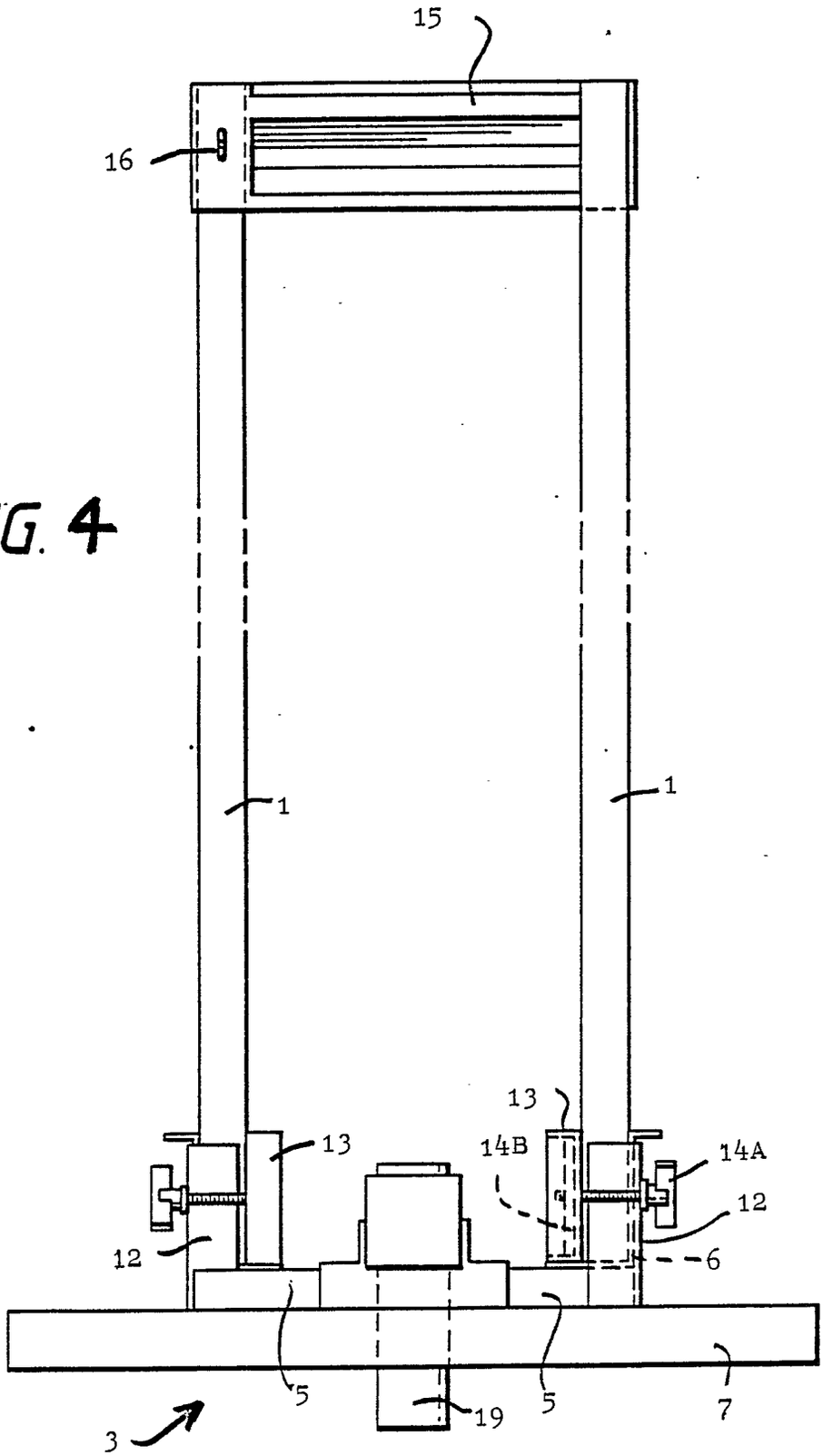


FIG. 3

FIG. 4



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EUROPEAN SEARCH REPORT

Application Number

EP 88 30 6125

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.4)
A	DE-C- 139 774 (ARMINGTON) * Page 1, lines 32-42; figures *	1	F 41 J 1/08 F 41 J 1/00
A	CH-A- 271 675 (GRÖLI) * Main claim; figures 1-3 *	1	
A	FR-A-1 254 778 (MEUNIER) * Page 1, right-hand column, lines 4-11; figure 2 *	1,2	
A	GB-A-2 009 689 (AUSTRALIAN TRAINING AIDS) * Page 3, lines 26-46; figure 1 *	1	
A	CH-A- 606 974 (VORSPRUNG) * Sub-claim 1 *	4	
A	EP-A-0 069 668 (GRAMARD)		
A	US-A-1 652 688 (STEINBERG)		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	DE-A-2 026 617 (HAMMARPLAST AB)		F 41 J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26-01-1989	RODOLAUSSE P.E.C.C.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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