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(71) Applicant: **TECHNOLOGY INVESTMENTS LIMITED**
County Meath (IE)

(72) Inventor: **Timoney, Eanna Pronsias**
Navan, County Meath (IE)

(74) Representative: **Schütte, Gearoid**
Cruickshank & Co.,
1 Holles Street
Dublin 2 (IE)

(54) Vehicle viewing system

(57) An armoured vehicle viewing system for a driver of the armoured vehicle (2) comprises a viewing cupola (1) rotatably mounted by a turntable in the vehicle (2). One side wall (4) of the cupola (1) has an enlarged viewing window for improved driver vision in peacetime operation of the vehicle (2). Rotation of the cupola (1) through 180° positions armoured viewing blocks (14,15,16) in opposite side walls (6,7,8) of the cupola (1) in front of the driver to provide ballistic protection to the driver during military actions.

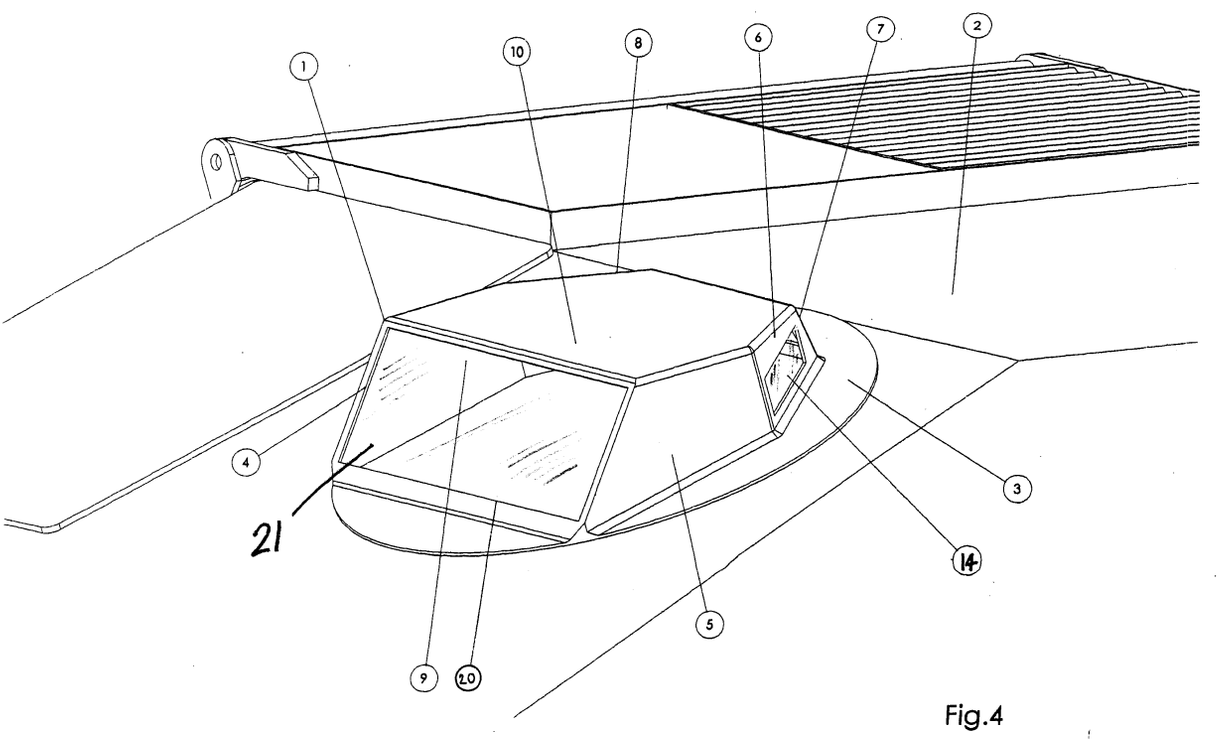

Fig.4

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Description

Technical Field

[0001] This invention relates to viewing systems for armoured vehicles, and in particular to viewing systems for drivers of armoured vehicles.

Background Art

[0002] The invention particularly relates to armoured vehicle viewing systems of the type comprising an armoured viewer mounted on a hull of the vehicle which provides ballistic protection to an occupant of the armoured vehicle whilst allowing said occupant to view outside the vehicle. It is well known in armoured vehicles to provide, at the drivers position, periscopes, armoured glass vision blocks (see e.g. US 4,346,915) or other mechanisms such as night-sights to provide ballistic protection to the driver. Unfortunately, the driver's field of view is somewhat restricted by these devices. During peacetime operation of the vehicles, some vehicles can be operated with the driver's hatch open so that the driver's head can protrude above the armoured hull giving the driver greatly improved visibility. However, the driver is exposed to the elements. In some cases, the driver wears goggles to protect his eyes whilst driving. In other cases, more commonly, a detachable windscreen is provided which affords forward, and perhaps some side protection to the driver - see for example DE 19506583. However, with either of these solutions, to attain the desired improved visibility, the driver is exposed to the elements which can be particularly uncomfortable for the driver in inclement weather conditions. Further, the performance of the vehicle heaters or air conditioners is adversely effected by the open driver's hatch.

[0003] The present invention is directed towards overcoming these problems.

Disclosure of the Invention

[0004] The invention is characterised in that means is provided for interchanging the armoured viewer with an enlarged unarmoured viewer or viewer of reduced armour protection whilst at the same time providing continuous weather protection for the driver of the vehicle. Thus, advantageously, the unarmoured viewer can be used during peacetime operation of the vehicle to provide increased visibility for the driver with an enlarged viewing window, while at the same time providing complete weather protection for the driver.

[0005] According to one embodiment of the invention, there is provided a viewing system for an armoured vehicle comprising an armoured viewer mounted on a hull of the vehicle at a viewing station which provides ballistic protection to an occupant of the armoured vehicle whilst allowing said occupant to view outside the vehicle, characterised in that the viewing system further comprises an auxiliary viewer which is either unarmoured or of reduced armour protection, said auxiliary viewer comprising a windscreen mounted on the hull of the vehicle at the viewing station in a manner which maintains hull integrity to provide full weather protection for an occupant of the vehicle, and said auxiliary viewer being sized to afford greater visibility to the occupant than the armoured viewer, the armoured viewer being movable between an in-use position and a stored position in which the auxiliary viewer is in use.

[0006] In a particularly preferred embodiment, the armoured viewer and the auxiliary viewer are mounted on a cupola which is rotatably mounted on the hull by a turntable, said turntable being operable to move each viewer between an in-use position and a stored position. Thus advantageously, the driver is protected from the weather at all times and can interchange the viewers as required.

[0007] In a further embodiment, means for rotating the turntable on the hull is drivably connected to a steering system of the armoured vehicle for controlled rotation of the turntable in response to vehicle steering for rotation of the in-use viewer in the direction of turning as the vehicle is being turned. Thus advantageously, the viewer is rotated to improve the drivers vision when turning.

[0008] In another embodiment, the cupola has a base flange rotatably engaged with the turntable, and side walls extending upwardly from the base flange and a top wall between the side walls. Preferably the side walls are arranged in a polygonal configuration.

[0009] In another embodiment, the cupola has the viewers mounted on opposite side walls of the cupola, rotation of the cupola moving each viewer between the in-use position and the stored position.

[0010] In a further embodiment, the armoured viewer comprises one or more armoured glass vision blocks mounted on side walls of the cupola.

[0011] In a preferred embodiment, three armoured glass vision blocks are provided mounted in three adjacent side wall portions of the cupola. Ideally, adjacent side wall portions carrying a glass vision block are disposed at an obtuse angle relative to each other.

[0012] In an alternative arrangement, the armoured viewer is a periscope viewer mounted on the top of the cupola. Preferably, a plurality of telescope viewers are mounted on the top of the cupola for viewing in a number of different directions.

[0013] In a preferred embodiment, the unarmoured viewer is a glass windscreen mounted on a side wall of the cupola. This glass windscreen may be a bullet-proof windscreen to provide some ballistic protection to the driver.

[0014] In a further embodiment, the auxiliary viewer is provided with ballistic protection means for use when the auxiliary viewer is in the stored position.

[0015] In another embodiment, the ballistic protection means is an armoured shield mounted on the hull such that said shield aligns with and shrouds the auxiliary

viewer when the auxiliary viewer is in the stored position.

[0016] In an alternative arrangement, the ballistic protection means comprises a plate mounted on the cupola adjacent the auxiliary viewer, said plate being movable between a stored position exposing the auxiliary viewer for use and a protective position across the auxiliary viewer.

Brief Description of the Drawings

[0017] The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a detail side elevational view showing the front end of an armoured vehicle incorporating a viewing system of the invention;

Fig. 2 is a view similar to Fig. 1 showing the viewing system in another position of use;

Fig. 3 is a detail perspective view of the vehicle and viewing system corresponding to Fig. 1;

Fig. 4 is a detail perspective view of the vehicle and viewing system corresponding to Fig. 2;

Fig. 5 is a perspective view showing another viewing system mounted on the armoured vehicle;

Fig. 6 is a schematic side sectional elevational view of another viewing system according to a third embodiment of the invention;

Fig. 7 is an elevational view of the viewing system shown in an armoured position of use; and

Fig. 8 is an elevational view of the system shown in an unarmoured position of use.

Detailed Description of the Preferred Embodiments

[0018] Referring to the drawings, and initially to Figs. 1 to 4 thereof, there is illustrated a viewing system according to the invention, comprising a viewing cupola indicated generally by the reference numeral 1 for mounting on an armoured vehicle 2. In the drawings, the viewing cupola 1 is shown mounted at the driving position at a front end of the vehicle 2. The cupola 1 is rotatably mounted on the hull of the vehicle 2 by means of a turntable (not shown) and has a base flange 3 mounted on or forming part of the turntable. Side walls 4-9 extend inwardly and upwardly from the flange 3 in an hexagonal configuration and are interconnected at their upper ends by a top wall 10. The cupola 1 is formed from an armoured material such as armoured steel. It will be noted that the side walls 6, 7 and 8 have window openings 14, 15 and 16 respectively, within which are mounted armoured glass vision blocks. The arrangement is such that a driver sitting within the vehicle 2 has vision ahead and to each side through the armoured glass which provides ballistic protection to the driver. It will be appreciated that the armoured windows 14,15,16 are relatively small so the drivers view is somewhat restricted. On an opposite side of the cupola 1, an enlarged windscreen opening 20 is provided in the side wall 4. An unarmoured windscreen 21 is mounted in the windscreen opening 20 which protects the driver from the weather and allows good vision to the driver when operating the vehicle 2 in peacetime conditions.

[0019] In use, the cupola 1 can be rotated on the hull of the vehicle 2 to provide either armoured or unarmoured forward viewing windows for the driver, depending on the conditions under which the vehicle 2 is being used. It will be appreciated that the driver is at all times protected from the weather.

[0020] In the armoured configuration (Figs. 1 and 3) the cupola 1 is positioned on the vehicle hull such that the armoured windows 14, 15, 16 are forward facing. In peacetime conditions the cupola 1 can be rotated to position the unarmoured window in a forward facing position (Figs. 2 and 4) providing greatly improved visibility for the driver with the large windscreen 21.

[0021] It will be appreciated that the viewing cupola may be integrally formed with the armoured vehicle or may be provided separately for retrofit to existing vehicles.

[0022] Referring now to Fig. 5, there is shown another viewing cupola 30. Parts similar to those described previously are assigned the same reference numerals. In this case, instead of the armoured glass vision blocks, periscope viewers 31 are provided on the top 10 of the cupola 30 above and in alignment with the side walls 6, 7 and 8.

[0023] Referring now to Figs. 6 to 8 there is shown another viewing system according to a third embodiment of the invention indicated generally by the reference numeral 40. In this case the system 40 comprises an armoured viewer 41 mounted on the hull 42 of an armoured vehicle at a window opening 43 in the hull 42. The armoured viewer 41 is pivotally movable about a hinge 44 for movement between an in-use position as shown in Fig. 6 and Fig. 7 across the window opening 43 and a raised stored position as shown in Fig. 8 away from the window opening 43. The armoured viewer 41 has an armoured flap 48 with a central opening within which is mounted an armoured glass vision block 49. Mounted across the opening 43 behind the armoured viewer 41 is a windscreen 50 of unarmoured glass, or possibly bullet-proof glass. The viewing area provided by the windscreen 50 is considerably larger than the viewing area provided by the armoured vision block 49. In peacetime conditions the armoured viewer 41 can be raised as shown in Fig. 8 so that a driver of the vehicle has an improved field of vision through the windscreen

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[0024] It is also envisaged that instead of the armoured flap 48 carrying an armoured vision block 49, the armoured flap 48 may be of armoured metal or the like and a separate periscope viewer may provide the armoured viewer for the vehicle. As previously described the armoured flap 48 would be shut down over the windscreen 50 during combat conditions, but could be raised in peacetime conditions to allow the increased field of vision afforded by the enlarged windscreen 50.

[0025] It will be appreciated that any suitable armoured viewer may be provided such as armoured glass vision blocks, periscopes, night-sights, or other viewing mechanisms.

[0026] The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail within the scope of the appended claims.

Claims

1. A viewing system for an armoured vehicle comprising an armoured viewer mounted on a hull of the vehicle at a viewing station which provides ballistic protection to an occupant of the armoured vehicle whilst allowing said occupant to view outside the vehicle, characterised in that the viewing system further comprises an auxiliary viewer which is either unarmoured or of reduced armour protection, said auxiliary viewer comprising a windscreen mounted on the hull of the vehicle at the viewing station in a manner which maintains hull integrity to provide full weather protection for an occupant of the vehicle, and said auxiliary viewer being sized to afford greater visibility to the occupant than the armoured viewer, the armoured viewer being movable between an in-use position and a stored position in which the auxiliary viewer is in use.

2. A viewing system as claimed in claim 1, wherein the armoured viewer and the auxiliary viewer are mounted on a cupola which is rotatably mounted on the hull by a turntable, said turntable being operable to move each viewer between an in-use position and a stored position.

3. A viewing system as claimed in claim 1 or claim 2, wherein means for rotating the turntable on the hull is drivably connected to a steering system of the armoured vehicle for controlled rotation of the turntable in response to vehicle steering for rotation of the in-use viewer in the direction of turning as the vehicle is being turned.

4. A viewing system as claimed in claim 2 or claim 3, wherein the cupola has a base flange rotatably engaged with the turntable, and side walls extending upwardly from the base flange and a top wall between the side walls.

5. A viewing system as claimed in claim 4, wherein the cupola has the viewers mounted on opposite side walls of the cupola, rotation of the cupola moving each viewer between the in-use position and the stored position.

6. A cupola as claimed in any preceding claim, wherein the armoured viewer comprises one or more armoured glass vision blocks mounted on side walls of the cupola.

7. A viewing system as claimed in claim 6, wherein three armoured glass blocks are provided mounted in three adjacent side wall portions of the cupola.

8. A viewing system as claimed in claim 7, wherein adjacent side wall portions carrying a glass vision block are disposed at an obtuse angle relative to each other.

9. A viewing system as claimed in any of claims 1 to 5, wherein the armoured viewer comprises a periscope viewer mounted on the top of the cupola.

10. A viewing system as claimed in claim 9, wherein a plurality of periscope viewers are mounted on the top of the cupola for viewing in a number of different directions.

11. A viewing system as claimed in any preceding claim, wherein the auxiliary viewer comprises a glass windscreen.

12. A viewing system as claimed in claim 11, wherein the glass windscreen is a bullet-proof glass windscreen.

13. A viewing system as claimed in any preceding claim, wherein the auxiliary viewer is provided with ballistic protection means for use when the auxiliary viewer is in the stored position.

14. A viewing system as claimed in claim 13, wherein the ballistic protection means is an armoured shield mounted on the hull such that said shield aligns with and shrouds the auxiliary viewer when the auxiliary viewer is in the stored position.

15. A viewing system as claimed in claim 13, wherein the ballistic protection means comprises a plate mounted on the cupola adjacent the auxiliary viewer and movable between a stored position exposing the auxiliary viewer for use and a protective position across the auxiliary viewer.

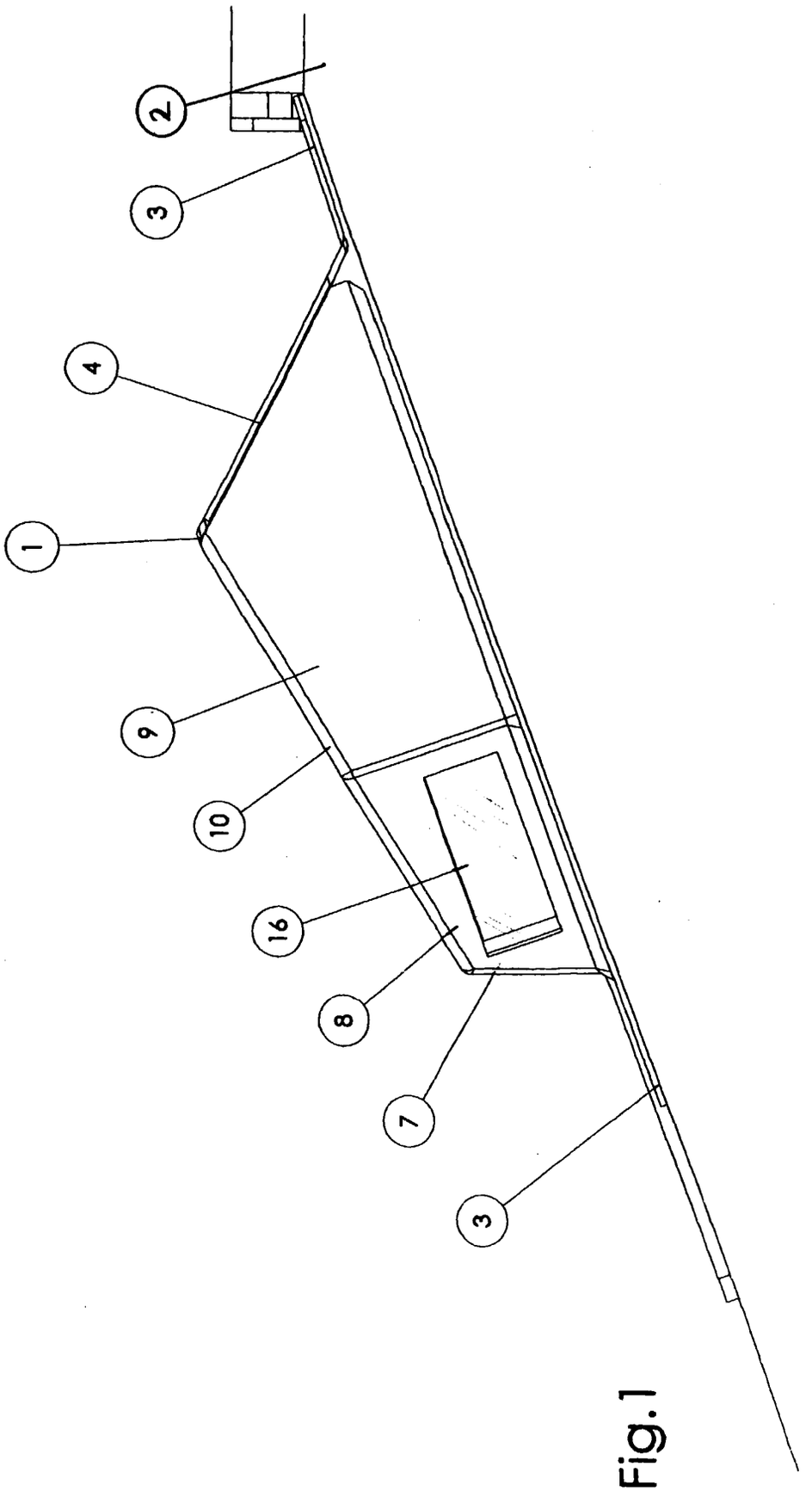

Fig.1

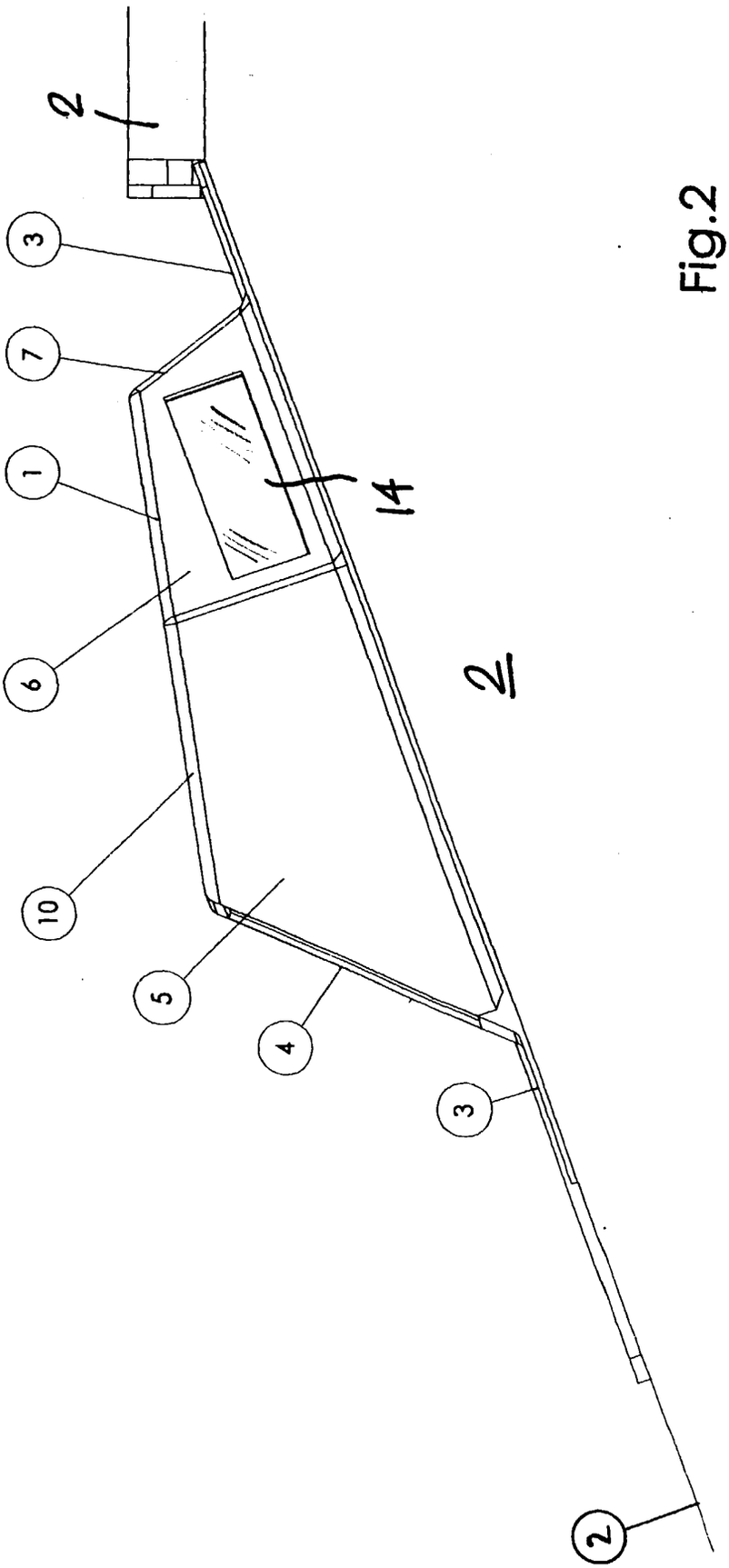

Fig.2

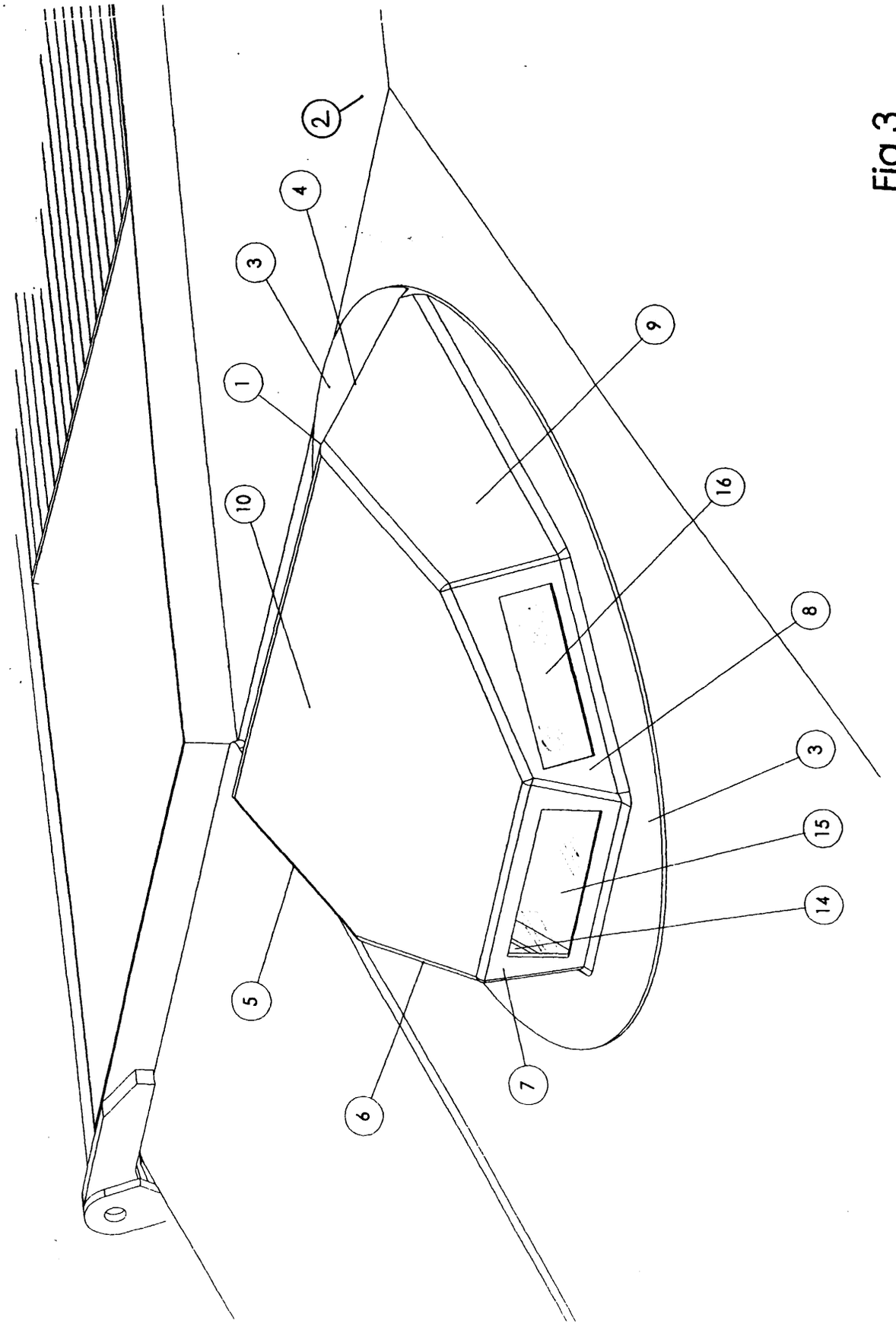

Fig.3

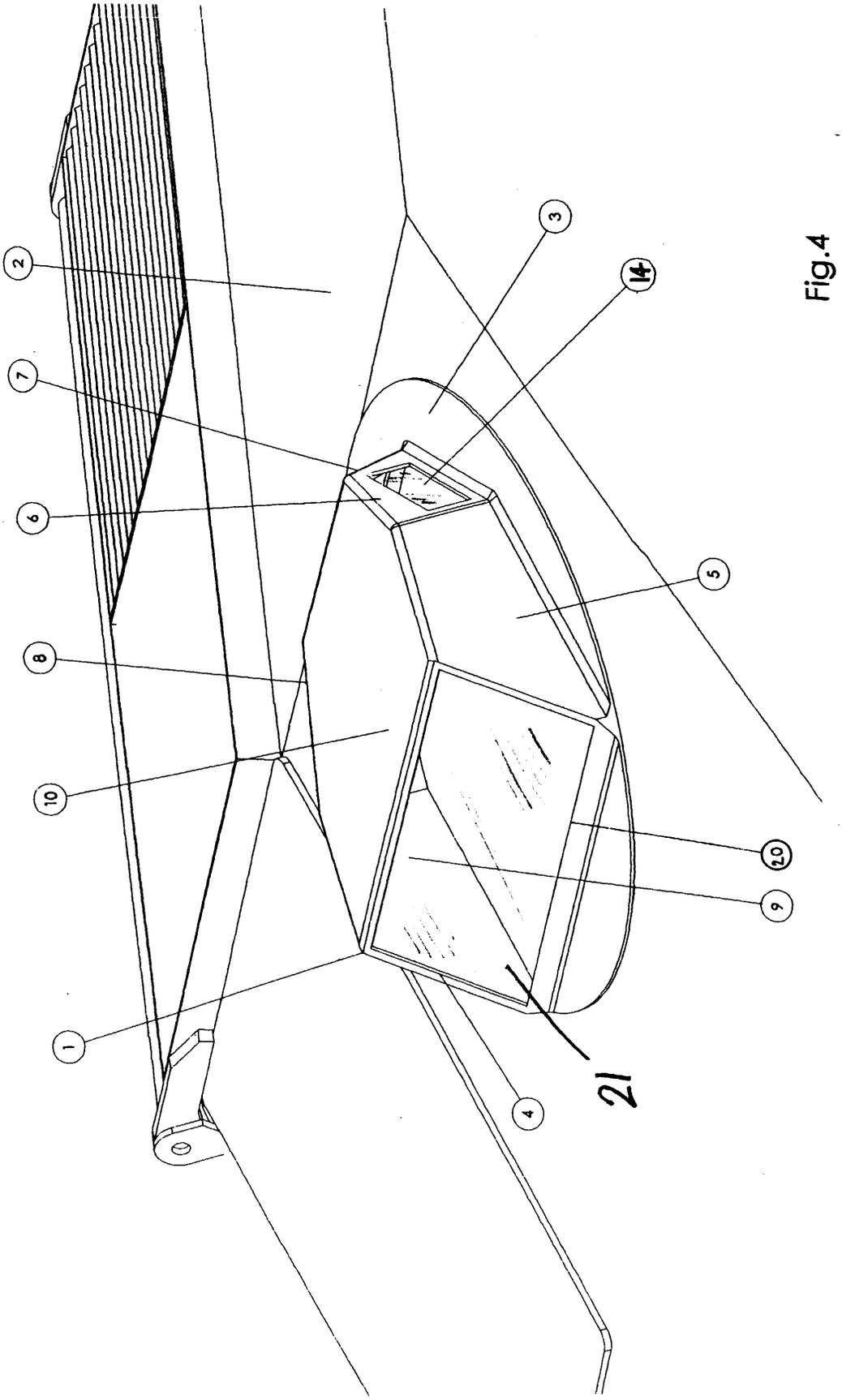

Fig.4

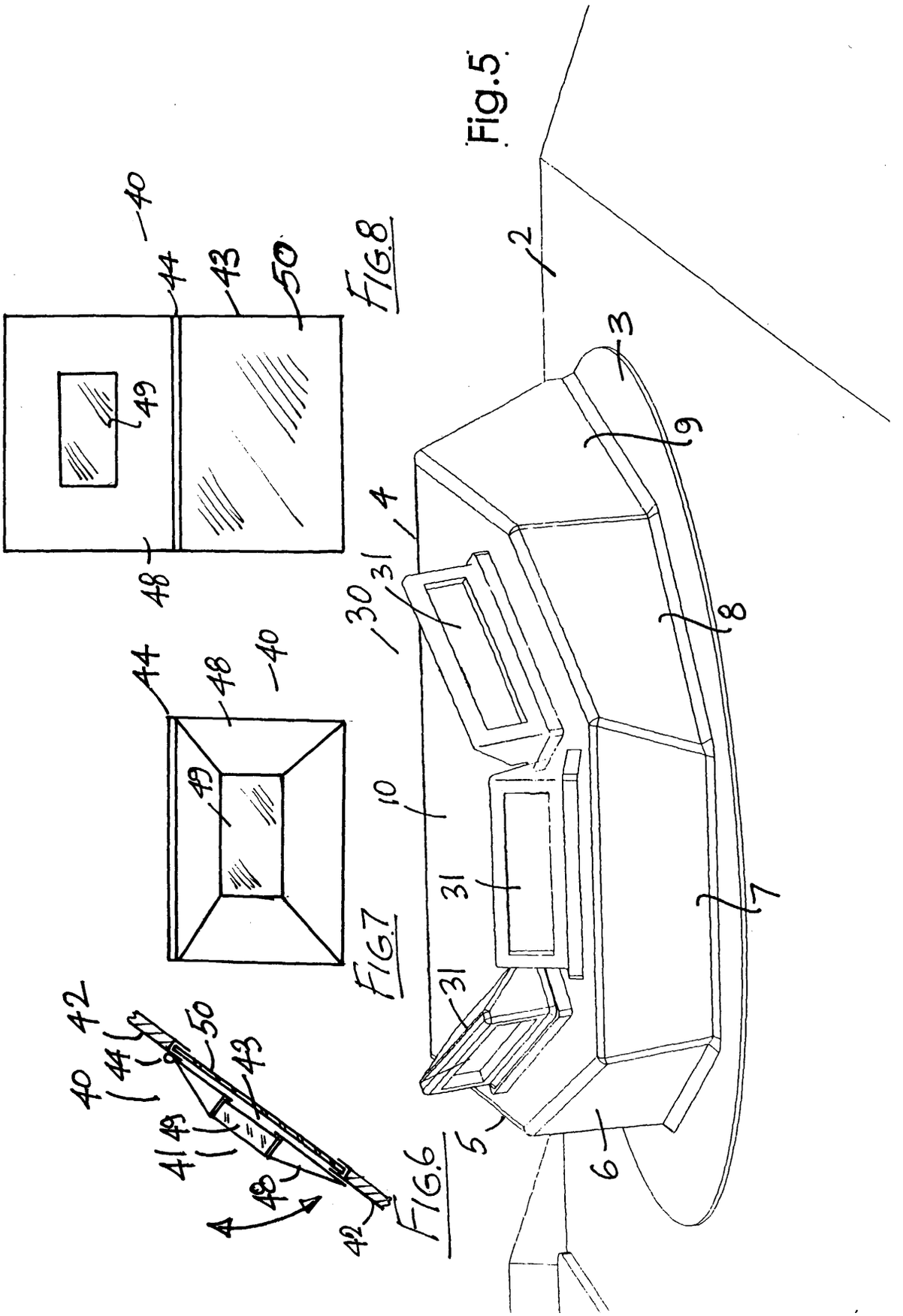
Fig.5
FIG.8
FIG.7
FIG.6
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