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(54) **A LANDING CRAFT**

EIN LANDUNGSBOOT

BATEAU DE DÉBARQUEMENT

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Description

[0001] This invention relates generally to marine landing craft.

[0002] Conventionally, marine landing craft are flat-bottomed vessels with a substantially box shaped cross-section. The forward end of a conventional landing craft comprises a hinged ramp rather than a v-shaped bow typical of other boats and marine vessels. The ramp is provided to facilitate the loading and unloading of cargo onto a beach, for example. Furthermore, the ramp is generally attached to the landing craft via an external hinge and is raised or lowered by a pair of winch operated chains.

[0003] In operation, conventional landing craft tend to be slow and difficult to manoeuvre due to the square shape of the bow of the hull.

[0004] One way to increase the speed of a typical landing craft is to streamline the hull of the craft, that is to say introduce a v-shaped profile to at least the bow section of the vessel. However, and as shown in Figure 1 of the accompanying drawings, profiling the bow section in this manner necessarily leads to a narrowing of the hull opening which in turn restricts the type and size of cargo that can be usefully transported on the vessel. In other situations, a profiled bow section may result in the ramp having to be located higher up from the waterline. In situations where the ramp is in a position substantially above the waterline, the ability of the craft to be utilised in beach landing operations is negated, since this type of ramp will require a dock or quay to effect the disembarkation of personnel or the unloading of cargo.

[0005] A further problem arises when beaching a craft having a keel with a v-shaped profile: the keel edge will act as the only grounding point, leading to both transverse and longitudinal stability problems. These problems are exacerbated if the vessel is subjected to incoming waves that are breaking obliquely on the beach. For this reason, conventional landing craft incorporate a flat-bottomed bow section to circumnavigate the aforementioned problem. GB 1 402 735 A discloses a marine landing craft having a hinged ramp with fender means. US 6 176 192 B1 discloses a pivoting ramp for a ferry or floating bridge and having a differential cylinder with a pressure limiting valve to limit the bending moment in the area of the pivot.

[0006] According to the present invention there are provided a landing craft and a method of operating a landing craft as defined in independent product claim 1 and independent method claim 11, respectively. Additional technical features or method steps of the invention are disclosed in the dependent claims. The landing craft has a ramp pivotally mounted at an open end thereof, and includes biasing means for exerting a downward force on the ramp when in a lowered position exposing said open end, so as to move the ramp to a grounded position in which the landing craft is partially supported by the ramp. The ramp forms part of a forward portion of the landing craft, the forward portion having a substantially

V-shaped keel region.

[0007] Preferably, the biasing means also operates as an actuating device for lowering and raising the ramp.

[0008] Preferably, the biasing means comprises at least one hydraulic ram or actuator. Preferably, the landing craft includes locking means for locking the ramp in a lowered position.

[0009] Preferably, the ramp includes lateral guide portions adapted to co-operate with landing craft frontal portions that delimit an opening of said open end.

[0010] Preferably, a surface of the ramp that faces outward when said ramp is in a raised position is faceted and includes a triangular portion disposed so as to provide a ramp ground contact portion when said ramp is in a lowered position.

[0011] Preferably, the landing craft has a substantially v-shaped keel and a forward section that tapers inwardly towards the bow.

[0012] Preferably, the lateral guide portions of the ramp form a contiguous bow section of a landing craft forward section when said ramp is in a raised position.

[0013] Preferably, the ramp is pivotally mounted to said landing craft via a hinge system that is internal to the hull of the craft.

[0014] Preferably, the ramp includes a sensing system adapted to detect loads that exceed a predetermined safety level and to deactivate said locking means in response to predetermined safety parameters.

[0015] A method of operating the landing craft includes the steps of: lowering the ramp until a forward grounding edge of the ramp is grounded; applying a required amount of downforce at the grounding edge until a predetermined proportion of the landing craft displacement is supported by the grounding edge; and locking the ramp in place so as to maintain support for the predetermined proportion of the landing craft displacement. Preferably, the required amount of downforce is applied to the grounding edge via at least one hydraulic ram or actuator.

[0016] Preferably, the method includes the step of detecting when a ramp load exceeds a predetermined safety limit.

[0017] Preferably, the method also includes the step of unlocking the ramp when one or more predetermined safety parameters have been breached.

[0018] Also described, yet not forming part of the present invention, is a landing craft having a ramp pivotally mounted at an open end thereof, wherein a forward facing surface of said ramp is non-planar and includes a grounding section, and wherein said grounding section is adapted to anchor the ramp in response to an applied downward force when the ramp is in a lowered position. Preferably, the grounding section is a triangular planar surface.

[0019] An embodiment of the present invention will now be described, by way of example only, and with reference to the accompanying schematic drawings, in which:

Figure 1 shows a conventional landing craft including a tapered bow;

Figure 2 shows the forward section of a landing craft in accordance with an embodiment of the present invention;

Figure 3 shows a ramp of a landing craft in accordance with an embodiment of the present invention;

Figure 4 shows a partial view of a grounded landing craft in accordance with an embodiment of the present invention; and

Figure 5 is a partial close-up view of the landing craft of Figure 4.

[0020] As shown in Figure 1, a conventional landing craft 1 comprises a generally box-shaped hull 2, a wheel-house 6 situated in the stern section 3, and a ramp 4 allowing access to a cargo hold area 5. The ramp 4 is pivotally attached to the hull 2 via an external hinge (not shown) located proximal to the waterline.

[0021] As Figure 1 shows, the bow section 7 tapers inwardly towards the ramp 4. In order to maintain mechanical strength and structural stability with such a bow profile, it is necessary to incorporate bow reinforcement structures 10. These reinforcement structures introduce a bottleneck section 8 that results in an overall reduction of the cargo hold area 5. Not only does this reduce the total cargo capacity of the vessel, it also restricts the width 9 of the ramp 4, which in turn restricts the size and type of cargo that may access the landing craft 1.

[0022] In contrast, the landing craft 20 shown partially and beached in Figure 4 has no equivalent bottleneck section since the tapered forward section (or portion) 30 (see Figure 2) does not compromise the width 22 of the cargo hold area 21. Here, the forward section 30 includes a contiguous bow section 25 formed by the ramp 24. Structural integrity is maintained by constructing the ramp 24 to include lateral guide portions 28.

[0023] The lateral guide portions 28 advantageously serve as guide rails that aid the loading and unloading of vehicular cargo. Furthermore, they provide additional protection to the bow structure from impact or collision damage. Although not shown in the Figures, the hinging system interconnecting the ramp 24 with the forward section 30 is internal to the hull. The hinging system is disposed with respect to the ramp 24 such that the ramp 24 is clear of the hull opening when in a fully lowered position.

[0024] In operation, the landing craft 20 is beached by grounding the v-shaped keel 26 on a shore line, for example. Prior to beaching, ramp lowering will be initiated so that ramp 24 will come into contact with the beach shortly after the keel 26 has ground on the beach.

[0025] The ramp 24 is lowered under operation of a ramp actuator 11 (see Figure 5). In an embodiment of

the present invention it is envisaged that there are a pair of ramp actuators 11, one situated either side of the hull, and that each actuator 11 comprises a hydraulic ram and any other such ancillary equipment as is known to be required for their controlled operation.

[0026] In another embodiment of the present invention, the ramp 24 is raised and lowered by means of a winch and chain system and the ramp actuators 11 provide ramp biasing means.

[0027] The external surface of the ramp, as shown in Figure 2, is faceted and includes a triangular section (or portion) 29. The forward edge 27 of the triangular section 29 constitutes a second grounding means and comes into contact with the ground shortly after the keel 26 has grounded. Once the ramp has made initial contact with the beach 12 (partially shown in Figures 4 and 5), downward pressure is applied through the forward edge 27 by continued operation of the ramp actuators 11. Downward pressure through the forward edge 27 is applied until a small, predetermined portion of the total displacement of the ship is borne by the forward edge 27, at which point the ramp is locked in place by suitable locking means (not shown).

[0028] If necessary, after the ramp has been locked in place, further pressure can be applied to the forward edge 27 to force the ramp to dig into the beach by engaging the landing craft engines, thus urging the craft forwards.

[0029] Once the ramp 24 has been locked in place, the landing craft 20 is stable with respect to both transverse and longitudinal disturbances, thus facilitating quicker and safer loading/unloading operations or the disembarkation of personnel from the cargo hold area 21.

[0030] In a preferred embodiment, the landing craft 20 includes a ramp safety system implemented to ensure that the ramp 24 when locked in a lowered position is automatically unlocked in the event that one or more predetermined safety parameters have been breached or compromised. The safety system would also incorporate an alarm for indicating when a ramp load has exceeded a predetermined maximum load capacity.

Claims

1. A landing craft (20) having a ramp (24) pivotally mounted at an open end thereof, **characterised in that** the landing craft includes biasing means (11) arranged to exert a downward force on the ramp when in a lowered position exposing said open end so as to move the ramp to a grounded position in which the landing craft is partially supported by the ramp; and **in that** the ramp forms part of a forward portion (30) of the landing craft, the forward portion having a substantially V-shaped keel region (26).
2. A landing craft as claimed in claim 1, wherein the biasing means also operates as an actuating device

for lowering and raising the ramp.

3. A landing craft as claimed in claim 1 or 2, wherein the biasing means comprises at least one hydraulic ram or actuator. 5
4. A landing craft as claimed in claim 1, 2 or 3, wherein the landing craft includes locking means operable in the grounded position of the ramp for locking the ramp in the grounded position. 10
5. A landing craft as claimed in any preceding claim, wherein the ramp includes lateral guide portions (28) adapted to co-operate with landing craft frontal portions that delimit an opening of said open end. 15
6. A landing craft as claimed in any preceding claim, wherein a surface of the ramp that faces outward when said ramp is in a raised position is faceted and includes a triangular portion (29) disposed so as to provide a ramp ground contact portion when said ramp is in a lowered position. 20
7. A landing craft as claimed in any preceding claim, wherein the forward portion tapers inwardly towards the bow. 25
8. A landing craft as claimed in any preceding claim, wherein the ramp includes lateral guide portions (28) which form a contiguous bow section (25) of the forward portion when said ramp is in a raised position. 30
9. A landing craft as claimed in any preceding claim, wherein the ramp is pivotally mounted to said landing craft via a hinge system that is internal to the hull of the craft. 35
10. A landing craft as claimed in any preceding claim, wherein the ramp includes a sensing system adapted to detect loads that exceed a predetermined safety level and to deactivate said locking means in response to predetermined safety parameters. 40
11. A method of operating a landing craft (20), the landing craft including biasing means (11) and a forward portion (30), the forward portion including a ramp (24); the method comprising the steps of: providing the forward portion of the landing craft with a substantially V-shaped keel region (26); and in use, lowering the ramp until a forward grounding edge (27) of the ramp is grounded; and then applying by virtue of said biasing means (11) a required amount of downforce at the forward grounding edge until a predetermined proportion of the landing craft displacement is supported by the forward grounding edge; and then locking the ramp in place so as to maintain support for the predetermined proportion of the landing craft displacement. 45 50 55

12. A method as claimed in claim 11, wherein the required amount of downforce applied to the forward grounding edge is via at least one hydraulic ram or actuator (11).

13. A method as claimed in claim 11 or 12, wherein the method includes the step of detecting when a ramp load exceeds a predetermined safety limit.

14. A method as claimed in claim 11, 12 or 13, wherein the method includes the step of unlocking the ramp when one or more predetermined safety parameters have been breached.

Patentansprüche

1. Landungsboot (20) mit einer Rampe (24), die an einem offenen Ende davon schwenkbar montiert ist, **dadurch gekennzeichnet, dass** das Landungsboot ein Vorspannungsmittel (11) beinhaltet, das dazu eingerichtet ist, eine nach unten gerichtete Kraft auf die Rampe auszuüben, wenn diese sich in einer abgesenkten Position befindet, wodurch das offene Ende freigelegt wird, um die Rampe in eine auf Grund gesetzte Position zu bewegen, in der das Landungsboot zum Teil von der Rampe gestützt wird; und dass die Rampe einen Teil eines vorderen Abschnitts (30) des Landungsboots bildet, wobei der vordere Abschnitt einen im Wesentlichen V-förmigen Kielbereich (26) aufweist.
2. Landungsboot nach Anspruch 1, wobei das Vorspannungsmittel außerdem als eine Betätigungsvorrichtung zum Absenken und Anheben der Rampe arbeitet.
3. Landungsboot nach Anspruch 1 oder 2, wobei das Vorspannungsmittel mindestens einen Hydraulikzylinder oder hydraulischen Antrieb umfasst.
4. Landungsboot nach Anspruch 1, 2 oder 3, wobei das Landungsboot ein Arretiermittel beinhaltet, das in der auf Grund gesetzten Position der Rampe zum Arretieren der Rampe in der auf Grund gesetzten Position betreibbar ist.
5. Landungsboot nach einem vorhergehenden Anspruch, wobei die Rampe seitliche Führungsabschnitte (28) beinhaltet, die dazu angepasst sind, mit Landungsbootfrontabschnitten, die eine Öffnung des offenen Endes begrenzen, zusammenzuwirken.
6. Landungsboot nach einem vorhergehenden Anspruch, wobei eine Oberfläche der Rampe, die nach außen weist, wenn die Rampe sich in einer angehobenen Position befindet, facettenartig ist und einen dreieckigen Abschnitt (29) beinhaltet, der angeord-

net ist, um einen Rampenbodenkontaktabschnitt bereitzustellen, wenn die Rampe sich in einer abgesenkten Position befindet.

7. Landungsboot nach einem vorhergehenden Anspruch, wobei der vordere Abschnitt sich nach innen in Richtung des Bugs verjüngt. 5
8. Landungsboot nach einem vorhergehenden Anspruch, wobei die Rampe seitliche Führungsabschnitte (28) beinhaltet, die eine durchgängige Bugsektion (25) des vorderen Abschnitts bilden, wenn die Rampe sich in einer angehobenen Position befindet. 10
9. Landungsboot nach einem vorhergehenden Anspruch, wobei die Rampe an dem Landungsboot mittels eines Scharniersystems, das intern zu dem Rumpf des Boots ist, schwenkbar montiert ist. 15
10. Landungsboot nach einem vorhergehenden Anspruch, wobei die Rampe ein Erfassungssystem beinhaltet, das dazu angepasst ist, Lasten zu erkennen, die ein vorher bestimmtes Sicherheitsniveau überschreiten, und das Arretiermittel als Reaktion auf vorher bestimmte Sicherheitsparameter zu deaktivieren. 20
11. Verfahren zur Bedienung eines Landungsboots (20), wobei das Landungsboot ein Vorspannungsmittel (11) und einen vorderen Abschnitt (30) beinhaltet, wobei der vordere Abschnitt eine Rampe (24) beinhaltet; wobei das Verfahren die folgenden Schritte umfasst: Versehen des vorderen Abschnitts des Landungsboots mit einem im Wesentlichen V-förmigen Kielbereich (26) und im Gebrauch Absenken der Rampe, bis eine vordere Aufgründsetzungskante (27) der Rampe auf Grund gesetzt ist; und dann Anwenden eines erforderlichen Ausmaßes einer nach unten gerichteten Kraft an der vorderen Aufgründsetzungskante durch das Vorspannungsmittel (11), bis ein vorher bestimmter Anteil der Landungsbootverdrängung von der vorderen Aufgründsetzungskante gestützt wird; und dann Arretieren der Rampe in dieser Position, um eine Stützung des vorher bestimmten Anteils der Landungsbootverdrängung aufrechtzuhalten. 25
12. Verfahren nach Anspruch 11, wobei das erforderliche Ausmaß der nach unten gerichteten Kraft, das auf die vordere Aufgründsetzungskante angewendet wird, mittels mindestens einem Hydraulikzylinder oder hydraulischen Antrieb (11) ist. 30
13. Verfahren nach Anspruch 11 oder 12, wobei das Verfahren den Schritt des Erkennens beinhaltet, wenn eine Rampenlast eine vorher bestimmte Sicherheits- 35

grenze überschreitet.

14. Verfahren nach Anspruch 11, 12 oder 13, wobei das Verfahren den Schritt des Entsperrens der Rampe beinhaltet, wenn eine oder mehrere vorher bestimmte Sicherheitsparameter gebrochen wurden. 40

Revendications

1. Bateau de débarquement (20) ayant une rampe (24) montée de manière pivotante au niveau d'une extrémité ouverte de celui-ci, **caractérisé en ce que** le bateau de débarquement comprend un moyen de sollicitation (11) agencé pour exercer une force allant vers le bas sur la rampe quand en position abaissée exposant ladite extrémité ouverte de manière à déplacer la rampe jusque sur une position de mise à terre dans laquelle le bateau de débarquement est partiellement supporté par la rampe ; et **en ce que** la rampe fait partie d'une partie avant (30) du bateau de débarquement, la partie avant ayant une région formant quille sensiblement en forme de V (26). 45
2. Bateau de débarquement selon la revendication 1, dans lequel le moyen de sollicitation sert aussi de dispositif d'actionnement pour abaisser et relever la rampe. 50
3. Bateau de débarquement selon la revendication 1 ou la revendication 2, dans lequel le moyen de sollicitation comporte au moins un actionneur ou béliet hydraulique. 55
4. Bateau de débarquement selon la revendication 1, la revendication 2 ou la revendication 3, dans lequel le bateau de débarquement comprend un moyen de verrouillage fonctionnant dans la position de mise à terre de la rampe à des fins de verrouillage de la rampe dans la position de mise à terre.
5. Bateau de débarquement selon l'une quelconque des revendications précédentes, dans lequel la rampe comprend des parties de guidage latérales (28) adaptées pour coopérer avec les parties avant du bateau de débarquement qui délimitent une ouverture de ladite extrémité ouverte.
6. Bateau de débarquement selon l'une quelconque des revendications précédentes, dans lequel une surface de la rampe qui est orientée vers l'extérieur quand ladite rampe est dans une position relevée est à facettes et comprend une partie triangulaire (29) disposée de manière à mettre en oeuvre une partie en contact avec le sol de la rampe quand ladite rampe est dans une position abaissée.

7. Bateau de débarquement selon l'une quelconque des revendications précédentes, dans lequel la partie avant va en s'effilant vers l'intérieur en direction de la proue. 5
8. Bateau de débarquement selon l'une quelconque des revendications précédentes, dans lequel la rampe comprend des parties de guidage latérales (28) qui forment une section de proue contiguë (25) de la partie avant quand ladite rampe est dans une position relevée. 10
9. Bateau de débarquement selon l'une quelconque des revendications précédentes, dans lequel la rampe est montée de manière pivotante sur ledit bateau de débarquement par le biais d'un système d'articulation qui est interne à la coque du bateau. 15
10. Bateau de débarquement selon l'une quelconque des revendications précédentes, dans lequel la rampe comprend un système de détection adapté pour détecter des charges qui dépassent un niveau de sécurité prédéterminé et pour désactiver ledit moyen de verrouillage en réponse à des paramètres de sécurité prédéterminés. 20 25
11. Procédé de fonctionnement d'un bateau de débarquement (20), le bateau de débarquement comprenant un moyen de sollicitation (11) et une partie avant (30), la partie avant comprenant une rampe (24) ; le procédé comportant les étapes consistant à : mettre en oeuvre la partie avant du bateau de débarquement avec une région formant quille sensiblement en forme de V (26) ; et lors de l'utilisation, abaisser la rampe jusqu'à ce qu'un bord de mise à terre avant (27) de la rampe soit mis à terre ; et puis appliquer, en vertu dudit moyen de sollicitation (11), une quantité requise de force allant vers le bas au niveau du bord de mise à terre avant jusqu'à ce qu'une proportion prédéterminée de déplacement du bateau de débarquement soit supportée par le bord de mise à terre avant ; et puis verrouiller la rampe en place de manière à maintenir le support pour la proportion prédéterminée de déplacement du bateau de débarquement. 30 35 40 45
12. Procédé selon la revendication 11, dans lequel la quantité requise de force allant vers le bas appliquée sur le bord de mise à terre avant passe par le biais d'au moins un actionneur ou béliet hydraulique (11). 50
13. Procédé selon la revendication 11 ou la revendication 12, dans lequel le procédé comprend l'étape consistant à détecter quand une charge de rampe dépasse une limite de sécurité prédéterminée. 55
14. Procédé selon la revendication 11, la revendication 12 ou la revendication 13, dans lequel le procédé comprend l'étape consistant à déverrouiller la rampe quand un ou plusieurs paramètres de sécurité prédéterminés n'ont pas été respectés.

Fig. 1

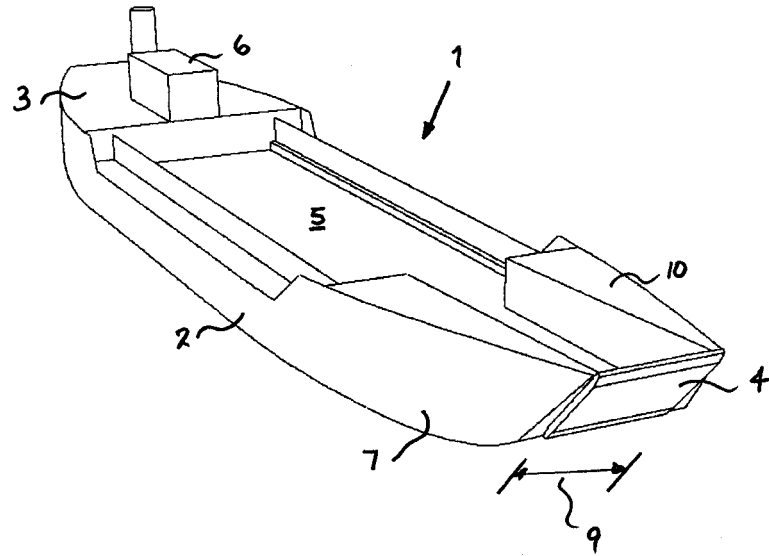


Fig.2

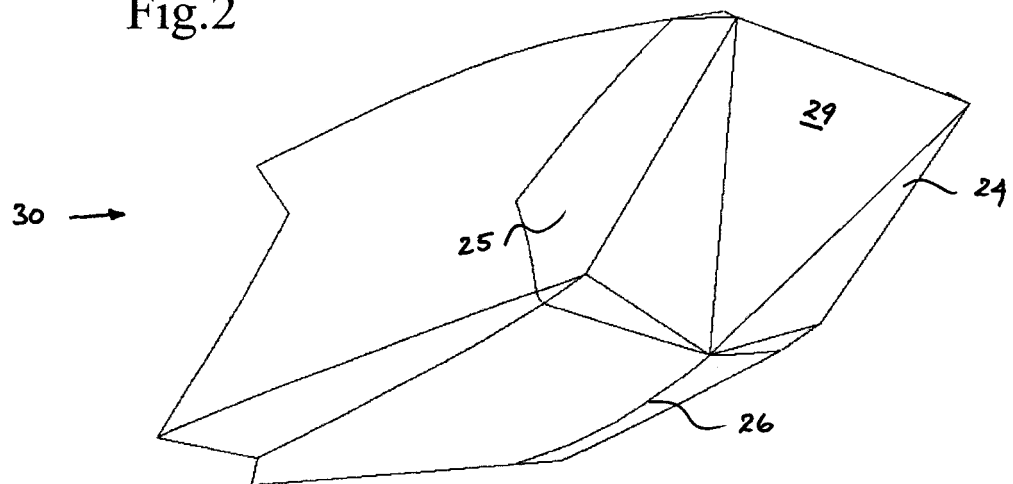


Fig.3

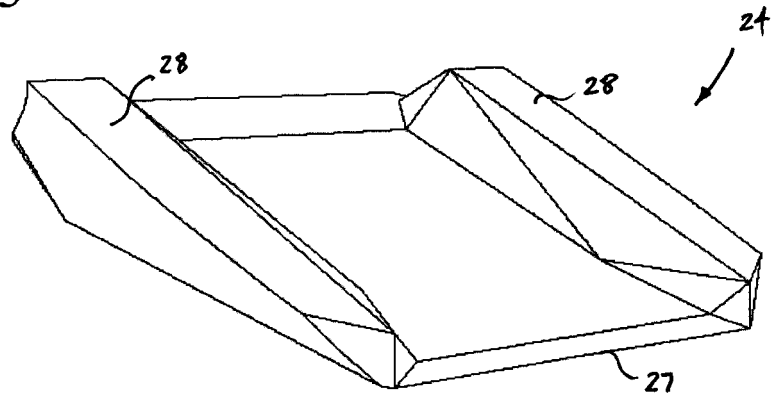


Fig. 4

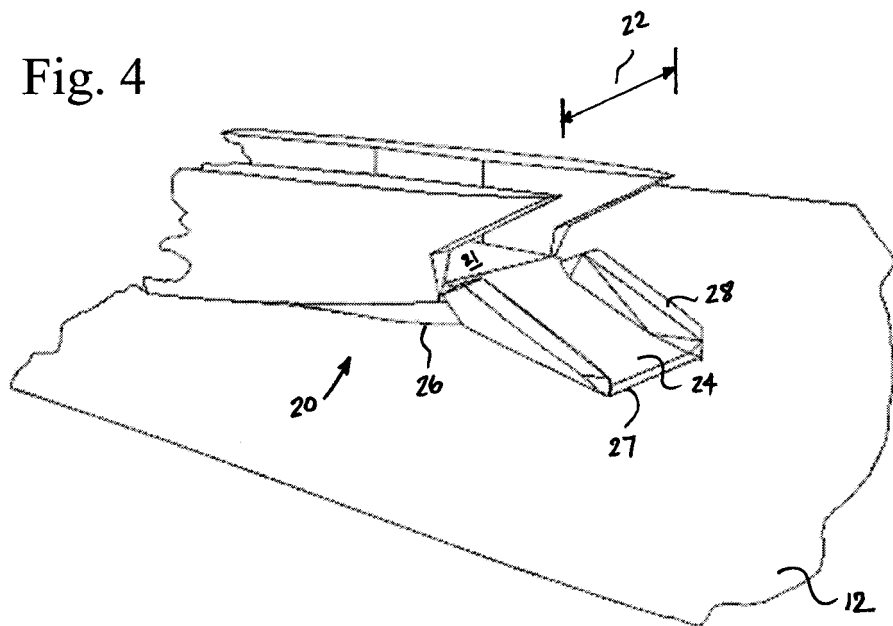
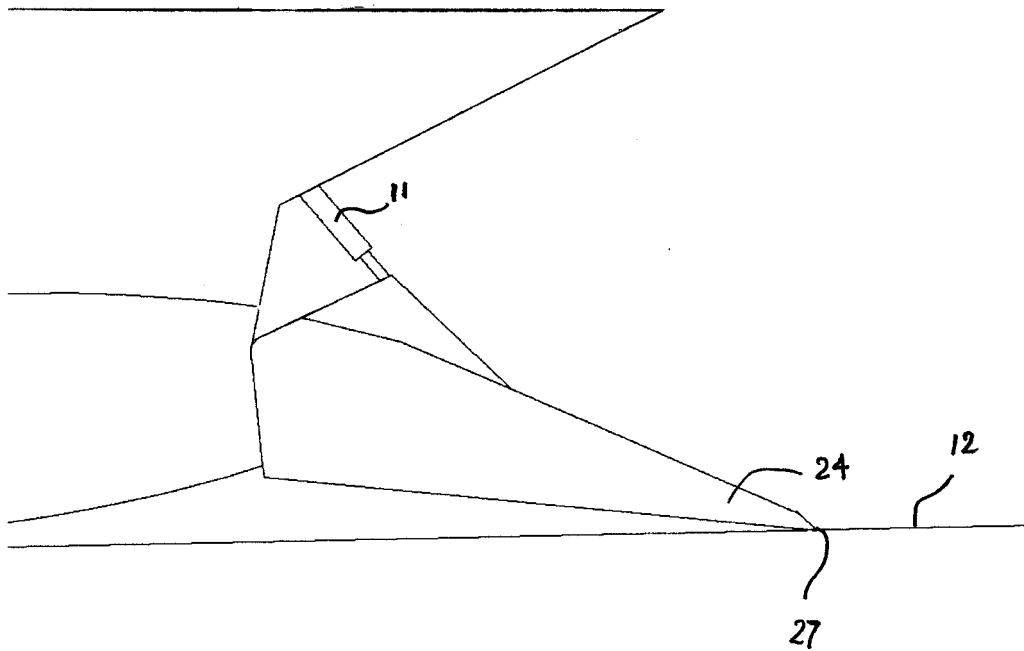


Fig. 5



REFERENCES CITED IN THE DESCRIPTION

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