

(19)



(11)

EP 3 170 729 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.05.2017 Bulletin 2017/21

(51) Int Cl.:
B63B 23/04 (2006.01)

(21) Application number: **16199468.6**

(22) Date of filing: **18.11.2016**

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

(71) Applicant: **MacTaggart Scott (Holdings) Ltd.**
Loanhead, Midlothian EH20 9SP (GB)

(72) Inventor: **WHITE, Andrew**
Loanhead, Midlothian EH20 9SP (GB)

(74) Representative: **Murray, David Craig**
Marks & Clerk LLP
Aurora
120 Bothwell Street
Glasgow G2 7JS (GB)

(30) Priority: **18.11.2015 GB 201520333**

(54) HANDLING APPARATUS & METHOD

(57) A handling apparatus (10) for supporting and deploying an object (12), such as a marine craft, comprises a support frame (18) and a cradle (20) upon which the object (12) to be deployed is disposed. A retaining flap (24) forms a first portion of the cradle (20) and is coupled to a deployment ramp (26) which forms a second portion of the cradle (20), the retaining flap (24) being

moveable between a first position which retains the object (12) on the cradle (20) and a second position in which the object (12) is released for movement relative to the cradle (20). The handling apparatus (10) is moveable from a first, storage, position to a second, deployment, position in which the object (12) can be deployed.

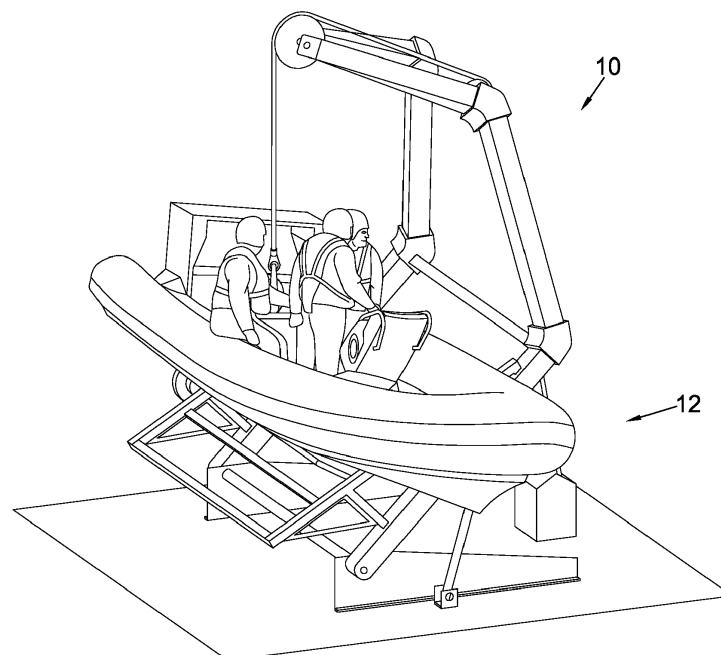


Fig. 1

Description

FIELD

[0001] This invention relates to a handling apparatus and method. More particularly, but not exclusively, embodiments of the invention relate to a davit apparatus for use in the deployment of an object, such as a daughter craft, from a marine craft, and to a deployment method.

BACKGROUND

[0002] In many industries, there is a requirement to move objects from one location to another location and a wide variety of equipment and techniques have been developed for this purpose. In the marine industry, for example, many larger marine craft carry one or more smaller craft which can be deployed from and/or recovered to the larger vessel, the larger vessel typically being referred to as the mother ship while the smaller craft is referred to as the daughter craft or satellite craft. In some instances, deployment and/or recovery of the satellite craft may be by way of a ramp or slipway provided on the mother ship. In other instances, deployment and/or recovery may be by way of a crane or davit.

[0003] A davit typically comprises a frame or arm which supports the satellite craft and which is moved from a first, storage, position proximal to the mother ship to a second, more distal, position from which the satellite craft can be deployed, often by means of a winch.

[0004] Although davits are used successfully in many applications, there are nevertheless drawbacks associated with conventional systems and techniques. For example, a conventional davit used in the deployment of a satellite craft is typically manipulated using one or more hydraulic actuator; hydraulic actuators being used due to their ability to manipulate large loads and for their suitability for use in the marine environment. However, in order to ensure that the davit remains operational in the event of power loss - as required by International maritime regulations - there is a requirement to provide additional hydraulic capacity to supply the actuators where conventional power systems are not available. This additional capacity is typically provided in the form of hydraulic accumulators. However, while accumulators are capable of maintaining operation, such accumulators require a significant amount of deck space which is otherwise redundant during normal operation.

SUMMARY

[0005] According to a first aspect, there is provided a handling apparatus for supporting and deploying an object, the handling apparatus operable between a first, storage, position and a second, deployment, position for deploying the object, the handling apparatus comprising:

a cradle for supporting the object to be deployed ther-

eon, the cradle comprising a first cradle portion coupled to a second cradle portion, the first cradle portion moveable from a first, extended, position relative to the second cradle portion in which the object is retained on the cradle by the first cradle portion to a second, retracted, position relative to the second cradle portion in which the object is released for movement relative to the cradle; and

a release arrangement operable to release the object for movement relative to the cradle, the release arrangement configured to move or permit movement of the first cradle portion to the second, retracted, position,

wherein the handling apparatus releasably retains the object and is configured, to move from the first, storage, position to the second, deployment, position to facilitate deployment of the object when the first cradle portion moves to the second, retracted, position.

[0006] Embodiments of the present invention beneficially provide a handling apparatus which is capable of operation in the event of power loss or where power is otherwise not available and which occupies a small footprint.

[0007] In particular embodiments, the handling apparatus comprises a davit. For example, the handling apparatus may comprise a davit for use in the deployment and/or recovery of a marine craft, such as a lifeboat, rigid inflatable boat (RIB) or the like. By permitting operation in the event of power loss or where power is otherwise not available, embodiments of the present invention may be particularly beneficial for use in safety critical systems, such as in the deployment of lifeboats.

[0008] The handling apparatus may be configured to move from the first, storage, position to the second, deployment, position as a result of the mass of the object to be deployed. For example, once the object has been released for movement relative to the cradle by the release arrangement, the mass of the object may move the handling apparatus from the first position to the second position for deployment of the object.

[0009] Movement of the object may initiate movement of the handling apparatus from the first position to the second position. For example, movement of the mass of the object may move the balance point of the handling apparatus to a position which causes the handling apparatus to move to the second position.

[0010] Movement of the object and/or the handling apparatus may occur as a result of manipulation of the position of the object by a deployment arrangement, for example comprising a winch arrangement, which forms part of the handling apparatus or with which the handling apparatus is operatively associated.

[0011] In use, the deployment arrangement may move the object, altering the balance point of the handling apparatus and causing the handling apparatus to move to the second position.

[0012] Alternatively, movement of the object and/or the handling apparatus may occur automatically, that is without external manipulation.

[0013] Alternatively or additionally, the handling apparatus may move from the first, storage, position to the second, deployment, position as a result of a change in the balance of mass of the handling apparatus caused by movement of the first cradle portion.

[0014] As outlined above, the first cradle portion is moveable from the first, extended, position to the second, retracted, position in which the object is released for movement relative to the cradle. In particular embodiments, the first cradle portion may be pivotably coupled to the second cradle portion and the first cradle portion may be pivotable from the first, extended, position to the second, retracted, position, and vice-versa. Alternatively, or additionally, the first cradle portion may be axially moveable relative to the second cradle portion.

[0015] The first cradle portion may define a retaining member of the handling apparatus. The first cradle portion may comprise a retaining flap.

[0016] The first cradle portion may be pivotably coupled to the second cradle portion via an axle.

[0017] The first cradle portion may comprise a plate.

[0018] The first cradle portion may comprise a framework.

[0019] The second cradle portion may comprise a deployment ramp.

[0020] The second cradle portion may comprise a plate.

[0021] The second cradle portion may comprise a framework. Beneficially, the provision of a framework reduces the mass of the handling apparatus. The second cradle portion may be rectangular.

[0022] The handling apparatus may comprise a support arrangement. In use, the support arrangement may support the cradle.

[0023] The support arrangement may comprise an arm.

[0024] The support arrangement may comprise a support frame.

[0025] The support frame may be pivotably coupled to a mounting surface. The mounting surface may comprise a deck or hull of a marine craft, such as a mother ship.

[0026] In use, the handling apparatus may move from the first, storage, position to the second, deployment, position by pivoting the support frame. The support frame may define a loading arm for deploying the object from the handling apparatus when in the deployment position.

[0027] The cradle may be disposed on the support arrangement, in particular the support frame of the support arrangement.

[0028] The cradle may be integrally formed with the support frame. However, in particular embodiments the cradle may be mounted to the support arrangement. For example, the second cradle portion may be mounted on the support frame. The second cradle portion may be secured to the support frame by any suitable means. For

example, the second cradle portion may be secured to the support frame by bolts, a weld connection.

[0029] The second cradle portion may define a ramp angle with respect to the support frame. The second cradle portion may be mounted on the support frame by a plurality of legs. The legs may have varying length, the lengths of the legs progressively increasing from a first, proximal, end of the cradle to a second, distal, end of the cradle. The support arrangement may comprise an anchor mount, such as an anchor plate arrangement. The anchor mount may secure the handling apparatus to the mounting surface. The anchor mount may be secured to the mounting surface by any suitable means. For example, the anchor mount may be secured to the mounting surface by bolts or a weld connection.

[0030] The support frame may be pivotably coupled to the mounting surface via the anchor mount, for example but not exclusively via an axle. In particular embodiments, the support frame may be modular. The support frame may comprise a support frame assembly. The support frame assembly may comprise a plurality of beams. The support frame assembly may comprise a plurality of nodes. In use, the nodes and beams form a framework.

[0031] In other embodiments, the support frame may comprise a unitary construction.

[0032] The support frame may be constructed from any suitable material. For example, the support frame may be constructed from a metallic material. The support frame may be constructed from steel. In particular embodiments, however, the support frame may be at least partially constructed from a composite material, in particular but not exclusively a GRP composite material. For example, in embodiments where the support frame comprises a support frame assembly, at least one of the beams of the support frame assembly may be constructed from a composite material, such as a GRP composite material. Beneficially, providing the beams from a composite material reduces weight and improves corrosion resistance of the handling apparatus while providing the required strength to support and manipulate the load forces exerted on the support frame in use.

[0033] As outlined above, the release arrangement is operable to release the object for movement by moving or permitting movement of the first cradle portion to the second, retracted, position.

[0034] In particular embodiments, the release arrangement is manually operable. Beneficially, this facilitates operation of the handling apparatus when power is lost or is otherwise unavailable.

[0035] In a first configuration, the release arrangement may be configured to prevent movement of the first cradle portion relative to the second cradle portion. In a second configuration, the release arrangement may be configured to permit movement of the first cradle portion relative to the second cradle portion.

[0036] The release arrangement may comprise a sleeve. The sleeve may be configured for movement from a first position in which movement of the first cradle por-

tion is prevented to a second position in which the first cradle portion is released for movement relative to the second cradle portion. The sleeve may, for example, be configured for axial movement from the first position to the second position.

[0037] The release arrangement may comprise a lock. The lock may be provided between the first cradle portion, in particular but not exclusively between an axle of the first cradle portion, and the sleeve. In use, the lock may be unlocked by movement of the sleeve.

[0038] The lock may comprise a locking dog, such as a ball, and in particular embodiments the lock may comprise a plurality of circumferentially arranged locking dogs.

[0039] The locking dogs or dogs may be disposed in a groove or pockets provided in the first cradle portion.

[0040] In the first configuration, radially outward movement of the locking dog or dogs may be prevented by the sleeve.

[0041] The sleeve may comprise a recess. In use, axial movement of the sleeve may align the recess with the locking dog or dogs, permitting the locking dog or dogs to move radially outwards, and thereby release the first cradle portion for movement.

[0042] The release arrangement may comprise a mandrel. In use, the mandrel may provide mounting for the sleeve.

[0043] The mandrel may be hollow. The mandrel may define, or may be coupled to, a flange. The flange may secure the mandrel to the support frame. The mandrel may comprise a number of circumferentially spaced bores through which the locking dog or dogs extend.

[0044] The release arrangement may be biased towards its first configuration. The release arrangement may comprise a biasing member, such as a spring. In use, the biasing member may bias the sleeve towards the first position.

[0045] The handling apparatus may comprise an actuator arrangement.

[0046] In particular embodiments, the actuator arrangement may comprise a plurality of actuators.

[0047] The actuator arrangement may comprise a linear actuator.

[0048] The actuator arrangement may comprise at least one of a hydraulic actuator; an electric actuator; a pneumatic actuator; a mechanical actuator, such as a screw jack; or the like.

[0049] In use, and in conditions where power is available to the actuator, the actuator may be operable to move the handling apparatus from the first, storage, position to the second, deployment, position to facilitate deployment of the object. However, in conditions where power is not available to the actuator, the handling apparatus remains operational between the first and second positions, since the handling apparatus can move between the first and second positions, where required. In either case, the actuator may assist in controlling movement of the handling apparatus between the first

and second positions.

[0050] The apparatus may comprise, or may be operated associated with, a deployment arrangement. In particular embodiments, the deployment arrangement may comprise a winch arrangement. Alternatively, or additionally, the deployment arrangement may comprise a pulley system or the like. The deployment arrangement may comprise a hydraulic deployment arrangement. The deployment arrangement may comprise an electric deployment arrangement. The deployment arrangement may comprise a manual deployment arrangement.

[0051] The handling apparatus may comprise or may be operatively associated with a control system. The control system may control operation of the actuator. The control system may control operation of the deployment arrangement.

[0052] The object may comprise a marine craft. In particular embodiments, the object may comprise a daughter vessel or craft such as a lifeboat, rigid inflatable boat (RIB) or the like. Alternatively, the object may comprise cargo.

[0053] According to a second aspect, there is provided a method comprising:

providing a handling apparatus comprising: a cradle for supporting an object to be deployed thereon, the cradle comprising a first cradle portion coupled to a second cradle portion; and a release arrangement operable to release the object for movement relative to the cradle;

operating the release arrangement by moving the first cradle portion from a first, extended, position relative to the second cradle portion to a second, retracted, position relative to the second cradle portion, in which second position the object is released for movement relative to the cradle; and moving the handling apparatus between a first, storage, position and a second, deployment, position suitable for deploying the object.

[0054] The method may comprise deploying the object.

[0055] The method may comprise operating a deployment arrangement to move the object. Following release of the object by the release arrangement, movement of the object by the deployment arrangement may alter the balance point of the handling apparatus and cause the handling apparatus to move to the second position.

[0056] It should be understood that the features defined above in relation to any aspect, embodiment or arrangement or described below in relation to any specific embodiment or arrangement may be utilised, either alone or in combination with any other defined feature.

BRIEF DESCRIPTION OF THE DRAWINGS

[0057] These and other aspects of the present invention will now be described, by way of example only, with

reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a handling apparatus according to an embodiment of the present invention, showing the apparatus supporting an object;

Figure 2 shows a perspective view of the handling apparatus shown in Figure 1, with the object omitted for clarity;

Figure 3 shows an enlarged perspective view of part of the handling apparatus shown in Figures 1 and 2, showing the release arrangement in a first position; Figure 4 shows an enlarged perspective view of part of the handling apparatus shown in Figure 1 and 2, with the release arrangement in the second position; Figure 5 shows an embodiment of the release arrangement shown in Figures 3 and 4;

Figure 6 shows a cross-sectional view of the release arrangement shown in Figure 5;

Figure 7 shows another cross-sectional view of the release arrangement shown in Figures 5 and 6; Figure 8 shows a perspective view of the handling apparatus shown in Figures 1 to 7, in a first, storage, position;

Figure 9 shows an enlarged perspective view of part of the handling apparatus shown in Figure 8, with the cradle in the first position;

Figure 10 shows a perspective view of the handling apparatus shown in Figures 1 to 9 in a second, deployment, position;

Figure 11 shows an enlarged perspective view of part of the handling apparatus shown in Figure 10, with the cradle in the second position;

Figure 12 shows a perspective view of a handling apparatus according to an alternative embodiment of the present invention;

Figure 13 shows an enlarged view of part of the handling apparatus shown in Figure 12, showing the release arrangement;

Figure 14 shows a release arrangement according to another embodiment of the present invention, with the release arrangement in a first position; and

Figure 15 shows the release arrangement shown in Figure 14, with the release arrangement in a second position.

DETAILED DESCRIPTION

[0058] Referring first to Figures 1 and 2 of the accompanying drawings, there is shown a handling apparatus in the form of a davit 10 according to an embodiment of the present invention. In Figure 1, an object 12 in the form of a lifeboat is shown, while in Figure 2 the object 12 is omitted for clarity. In use, the davit 10 supports the object 12 and is moveable from a first, storage, position in which the object 12 is stowed on the davit 10 to a second, deployment, position in which the object 12 can be deployed.

[0059] As will be described further below, the davit 10 releasably retains the object 12 and is configured so that, once released, the davit 10 moves from the first, storage, position to the second, deployment, position to facilitate deployment of the object 12.

[0060] In the illustrated embodiment, the davit 10 is mounted to the deck 14 of a marine craft 16 and the object 12 to be deployed is a daughter craft, such as a lifeboat, rigid inflatable boat (RIB) or the like. A davit 10 according to embodiments of the present invention is particularly beneficial for use in safety critical systems, such as deployment of lifeboats. However, it will be recognised that the davit 10 may be mounted on any structure, including for example but not exclusively a floating platform, a dock or other land-based structure or the like and the object 12 may comprise any object suitable for deployment.

[0061] As shown in Figure 2, the davit 10 comprises a support frame 18 and a cradle 20 upon which the object 12 to be deployed is disposed. In use, the support frame 18 supports the cradle 20 and defines a loading arm for a winch arrangement 22 used to deploy the object 12 from the davit 10 when in the deployment position, the winch arrangement 22 forming a deployment arrangement of the davit 10.

[0062] A retaining flap 24 forms a first portion of the cradle 20 and is pivotably coupled to a deployment ramp 26 which forms a second portion of the cradle 20. In the illustrated embodiment, the deployment ramp 26 does not form a continuous planar ramp surface but rather comprises a rectangular framework. Beneficially, the framework reduces the mass of the structure.

[0063] As shown more clearly in later Figures, the retaining flap 24 is pivotably coupled to the deployment ramp 26 via an axle 28 and, in use, the retaining flap 24 is pivotable between a first position which retains the object 12 on the cradle 20 (as shown in Figure 2) and a second position in which the object 12 is released for movement relative to the cradle 20 (as shown in Figure 3).

[0064] In the illustrated embodiment, the retaining flap 24 comprises a rectangular plate. However, in other embodiments the retaining flap 24 may take other forms, such a framework.

[0065] The deployment ramp 26 of the cradle 20 is mounted to the support frame 18 via legs 30. As shown, the legs 30 have varying length, the lengths of the legs 30 progressively increasing from a first, proximal, end of the cradle 20 to a second, distal, end of the cradle 20. The deployment ramp 26 thus defines a ramp angle A with respect to the support frame 18.

[0066] As shown in Figure 2, the support frame 18 is secured to the deck 14 via anchor plates 32, the support frame 18 being pivotable about axle 34 to move the davit 10 from the first, storage, position to the second, deployed, position.

[0067] Two linear actuators 36 are disposed between the support frame 18 and the deck 14. In the illustrated embodiment, the actuators 36 comprise hydraulic actuators. However, the actuators 36 may alternatively com-

prise electric actuators, pneumatic actuators, mechanical actuators such as a screw jacks or the like.

[0068] In use, and in conditions where power is available to the actuators 36, the winch arrangement 22 is utilised to lift the object 12 from the cradle 20 and the actuators 36 are operable to move the davit 10 from the first, storage, position to the second, deployment, position to facilitate deployment of the object 12. However, in conditions where power is not available to the actuators 36, the davit 10 remains operational between the first and second positions, since the davit 10 can move between the first and second positions, where required, by pivoting the retaining flap 24 between its first, retaining, position and its second position in which the object 12 is released for movement relative to the cradle 20. In either scenario, the actuators 36 may also provide the additional functions of controlling the rate of deployment of the davit 10 between the first and second positions and thus acting as a damper, and/or limiting the extent of travel of the davit 10.

[0069] As shown in Figure 2, the support frame 18 is modular in construction and comprises a number of beams 38 and nodes 40. A pulley wheel 42 is also provided for guiding the winch arrangement 22. The support frame 18 may be constructed from any suitable material. In the illustrated embodiment the beams 38 are constructed from a GRP composite material and the nodes 40 are constructed from stainless steel. Beneficially, providing the beams 38 from a composite material reduces weight of the davit 10 while providing the required strength to support and manipulate the load forces exerted on the support frame 18 in use.

[0070] As described above, and referring now also to Figures 3 to 7 of the accompanying drawings, the davit 10 releasably retains the object 12 and is configured so that, once released, the davit 10 moves from the first, storage, position to the second, deployment, position to facilitate deployment of the object 12.

[0071] Figures 3 and 4 show a release arrangement 44 for use in the davit 10 shown in Figures 1 and 2. Figure 3 shows the release arrangement 44 in a first configuration in which the retaining flap 24 is locked in the first, extended, position to retain the object 12 relative to the cradle 12. Figure 4 shows the release arrangement 44 in a second configuration in which the retaining flap 24 defines the second, retracted, position relative to the deployment ramp 26, such that the object 12 is permitted to move relative to the deployment ramp 26.

[0072] The release arrangement 44 is secured to the support frame 18 via an L-shaped bracket 46. In the illustrated embodiment, the release arrangement 44 comprises a hollow mandrel 48, a first end portion 50 of the mandrel 48 defining a flange 52 for securing the release arrangement 44 to the bracket 46 and a second end portion 54 of the mandrel 48 comprising a number of circumferentially spaced bores 56 for receiving locking dogs 58 - which in the illustrated embodiment take the form of balls. As shown in Figure 12, the locking dogs 58 extend

through the bores 56 and into pockets 60 formed in an end portion 62 of the axle 28. A sleeve 64 is disposed around the mandrel 48, an inner surface 66 of the sleeve 64 defining recesses 68. The sleeve 64 is initially biased towards an extended position (relative to the flange 52) by a spring 70. In this position, the locking dogs 58 are disposed in the pockets 60 and so are retained in a radially retracted configuration by the sleeve 64. In use, axial movement of the sleeve 64 towards a retracted position (towards the flange 52) aligns the recesses 68 with the dogs 58, permitting the dogs 58 to move radially outwards from the pockets 60, thereby releasing the axle 28 and the retaining flap 24 for rotational movement.

[0073] As described above, in conditions where power is available to the actuators 36, the winch arrangement 22 is utilised to lift the object 12 from the cradle 20 and the actuators 36 are operable to move the davit 10 from the first, storage, position to the second, deployment, position to facilitate deployment of the object 12. However, in conditions where power is not available the davit 10 remains operational since the release arrangement 44 can be initiated manually by pushing sleeve 64 towards flange 52. In some embodiments, a handle or lever (not shown) may be provided to effect movement of the sleeve 64. However, in the illustrated embodiment, a handle or lever is not required.

[0074] Operation of the davit 10 will now be described with reference in particular to Figures 8 to 11. The davit 10 initially defines the first, storage, position shown in Figure 8. In this position, the support frame 18 is oriented in its first position and the retaining flap 24 is positioned in its first, extended, position relative to the deployment ramp 26. During normal operational conditions, the davit 10 is operable in a first mode which uses the marine craft's power and control systems to lift the object 12 from the cradle 20 using the winch arrangement 22 and to move the davit 10 from the first, storage, position to the second, deployment, position using the actuators 36. In the event of loss of power, the davit 10 is operable in a second mode. In this second mode, manual initiation of the release arrangement 44 moves the retaining flap 24 from the first, extended, position to the second, retracted, position. The winch arrangement 22 then manually lowers the object 12 a small distance, which alters the loading on the frame support 18 and causes it to pivot to the deployment position. The winch arrangement 22 is then operable manually to deploy the object 12.

[0075] It should be understood that the embodiment described herein is merely exemplary and that various modifications may be made thereto without departing from the scope of the invention.

[0076] For example, Figures 12 and 13 show a release arrangement 44' according to an alternative embodiment of the present invention. In this embodiment, the release arrangement 44' comprises a first, drive, gear 72 coupled to a handle 74 and a second, driven, gear 76 coupled to the axle 28.

[0077] Another alternative release arrangement 44" is

shown in Figures 14 and 15. In this embodiment, a pinned bar 78 is coupled to the axle 28. The pinned bar 78 is initially retained by a release member 80. However, movement of the release member 80 releases the pinned bar 78 for rotation.

Claims

1. A handling apparatus (10) for supporting and deploying an object (12), the handling apparatus (10) operable between a first, storage, position and a second, deployment, position for deploying the object (12), the handling apparatus (10) comprising:

a cradle (20) for supporting the object (12) to be deployed thereon, the cradle (20) comprising a first cradle portion (24) coupled to a second cradle portion (26), the first cradle portion (24) moveable from a first, extended, position relative to the second cradle portion (26) in which the object (12) is retained on the cradle (20) by the first cradle portion (24) to a second, retracted, position in which the object (12) is released for movement relative to the cradle (20); and a release arrangement (44) operable to release the object (12) for movement relative to the cradle (20), the release arrangement (44) configured to move or permit movement of the first cradle portion (24) to the second, retracted, position,

wherein the handling apparatus (10) releasably retains the object (12) and is configured, to move from the first, storage, position to the second, deployment, position to facilitate deployment of the object (12) when the first cradle portion (24) moves to the second, retracted, position.

2. The handling apparatus (10) of claim 1, wherein the handling apparatus (10) comprises a davit.
3. The handling apparatus (10) of claim 1 or 2, wherein the handling apparatus (10) is configured to move from the first, storage, position to the second, deployment, position as a result of movement of the object (12) to be deployed.
4. The handling apparatus (10) of any preceding claim, wherein the first cradle portion (24) is pivotably coupled to the second cradle portion (26) and the first cradle portion (24) is pivotable from the first, extended, position to the second, retracted, position.
5. The handling apparatus (10) of any preceding claim, wherein the handling apparatus (10) comprises a support arrangement, the support arrangement comprising a support frame (18).

6. The handling apparatus (10) of claim 5, wherein the support frame (18) is pivotably coupled to a mounting surface (14), the handling apparatus (10) moveable from the first, storage, position to the second, deployment, position by pivoting the support frame (18).

7. The handling apparatus (10) of claim 5 or 6, wherein the support frame (18) is at least partially constructed from a composite material.

8. The handling apparatus (10) of any preceding claim, wherein the release arrangement (44) is manually operable.

9. The handling apparatus (10) of any preceding claim, wherein the release arrangement (44) comprises a sleeve (64) configured for movement from a first position in which movement of the first cradle portion (24) is prevented to a second position in which the first cradle portion (24) is released for movement relative to the second cradle portion (26).

10. The handling apparatus (10) of any preceding claim, wherein the handling apparatus (10) comprises, or is operated associated with, a deployment arrangement (22).

11. The handling apparatus (10) of claim 10, wherein the deployment arrangement (22) comprises a winch arrangement.

12. The handling apparatus (10) of any preceding claim, comprising an actuator arrangement (36).

13. A method comprising:

providing a handling apparatus (10) comprising: a cradle (20) for supporting an object (12) to be deployed thereon, the cradle (20) comprising a first cradle portion (24) coupled to a second cradle portion (26); and a release arrangement (44) operable to release the object (12) for movement relative to the cradle (20); operating the release arrangement (44) by moving the first cradle portion (24) from a first, extended, position relative to the second cradle portion (26) to a second, retracted, position relative to the second cradle portion (26), in which second position the object (12) is released for movement relative to the cradle (20); and moving the handling apparatus (10) between a first, storage, position and a second, deployment, position suitable for deploying the object (12).

14. The method of claim 13, comprising deploying the object (12).

15. The method of claim 13 or 14, comprising operating a deployment arrangement (22) to move the object (12).

5

10

15

20

25

30

35

40

45

50

55

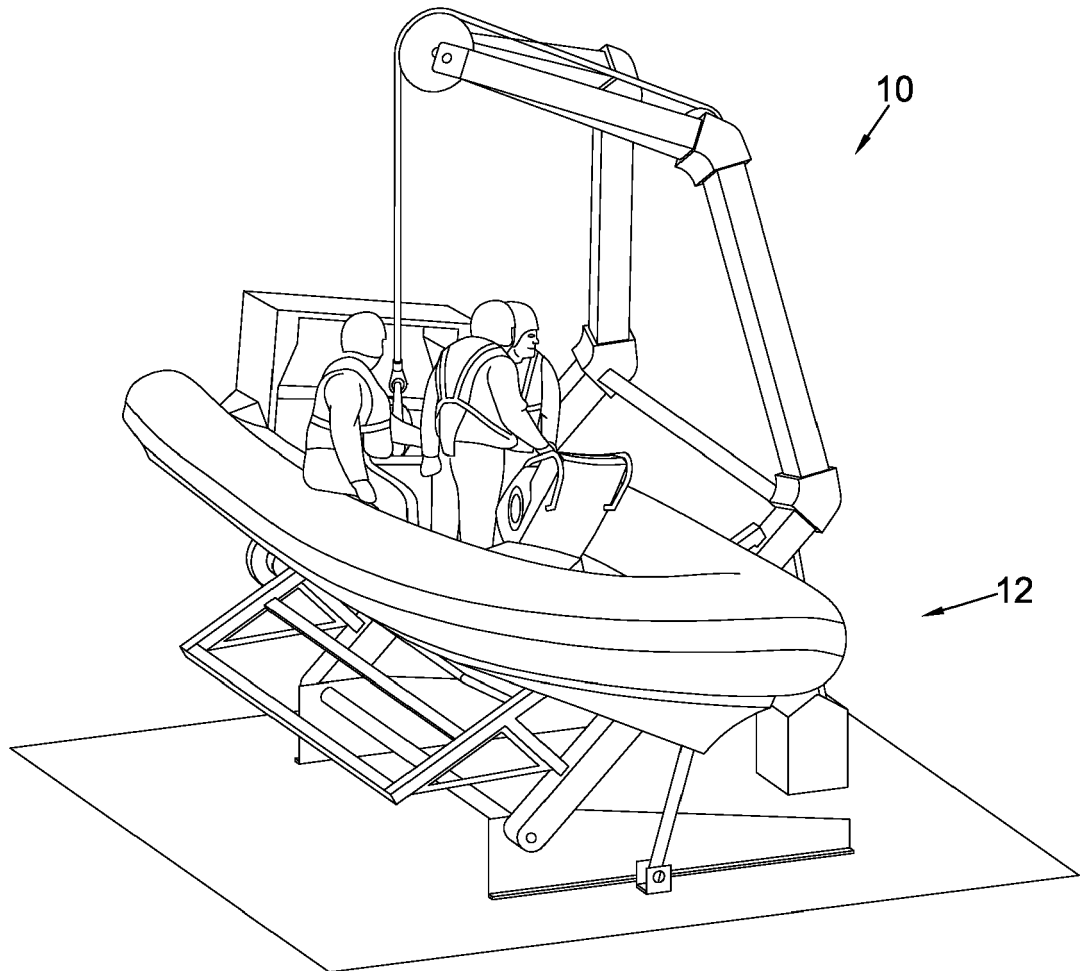


Fig. 1

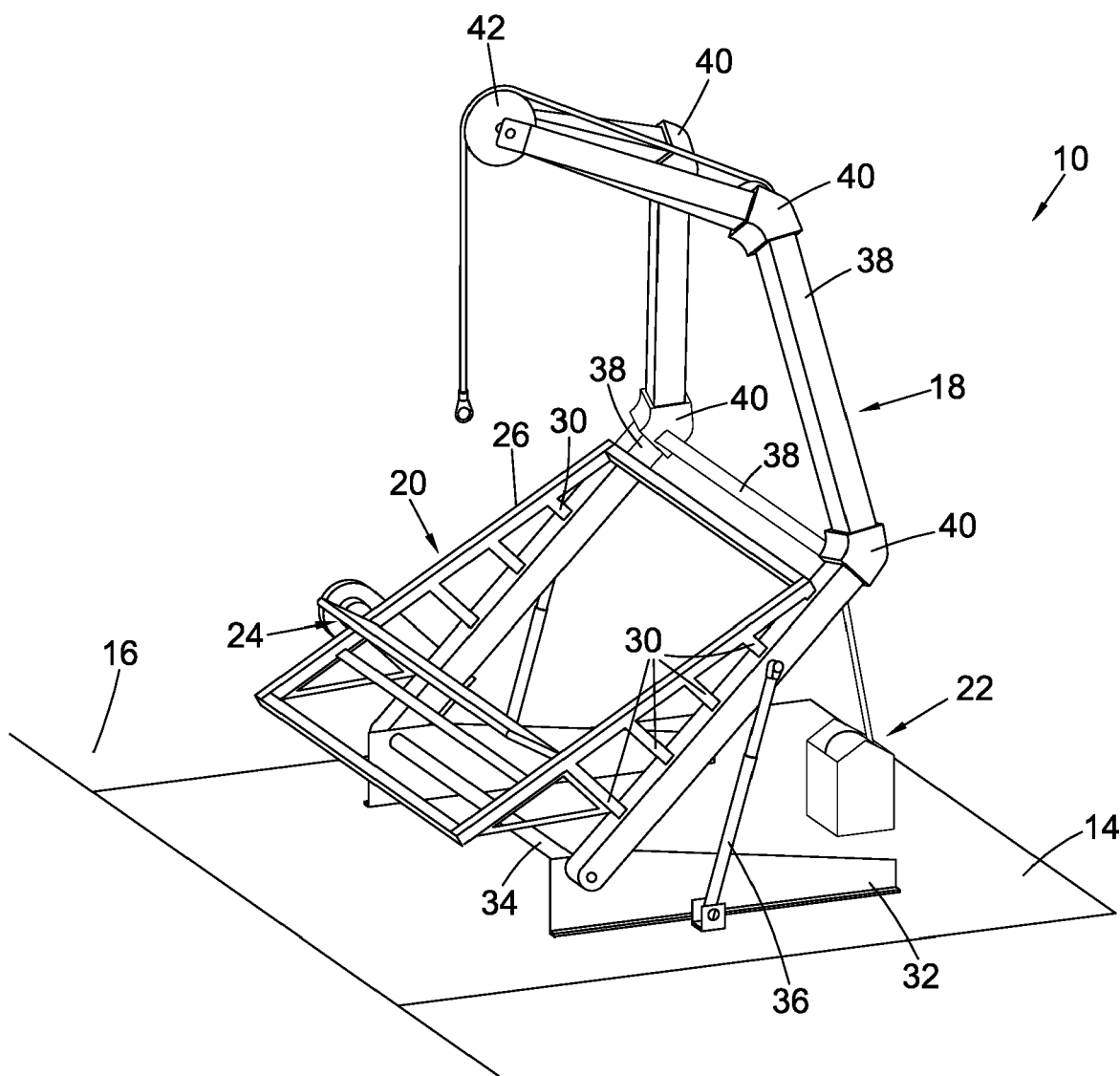


Fig. 2

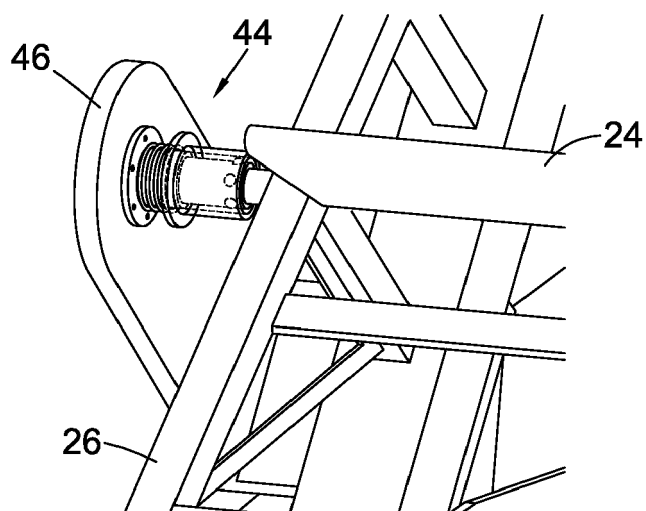


Fig. 3

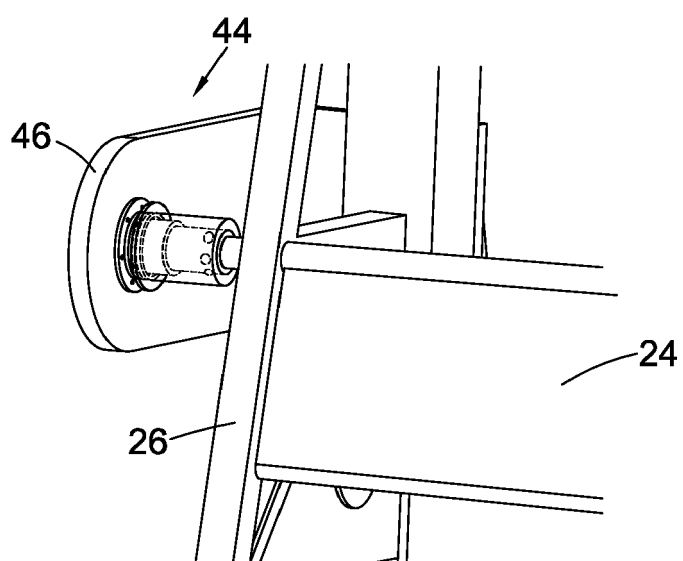


Fig. 4

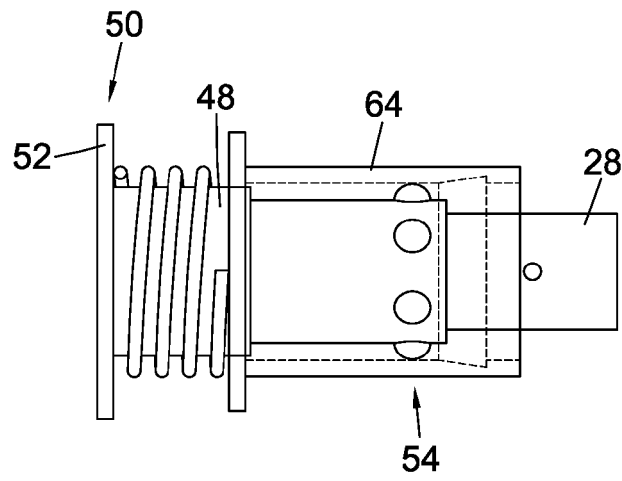


Fig. 5

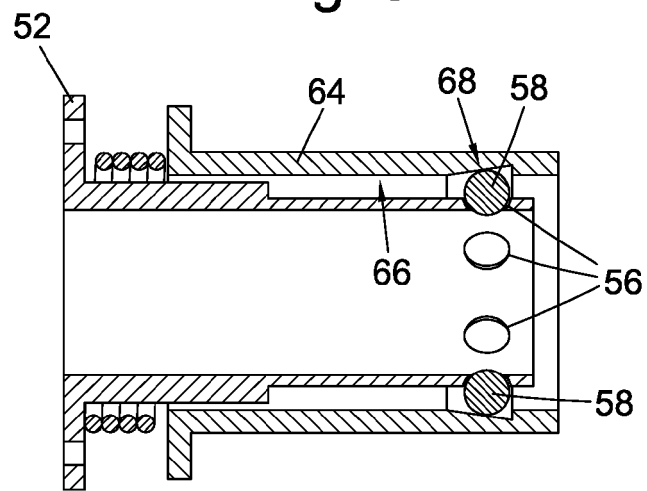


Fig. 6

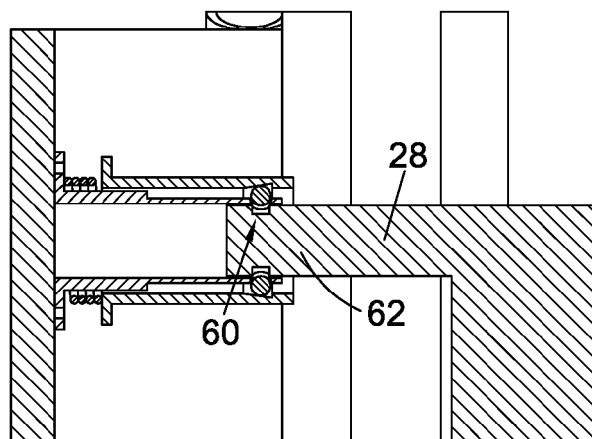


Fig. 7

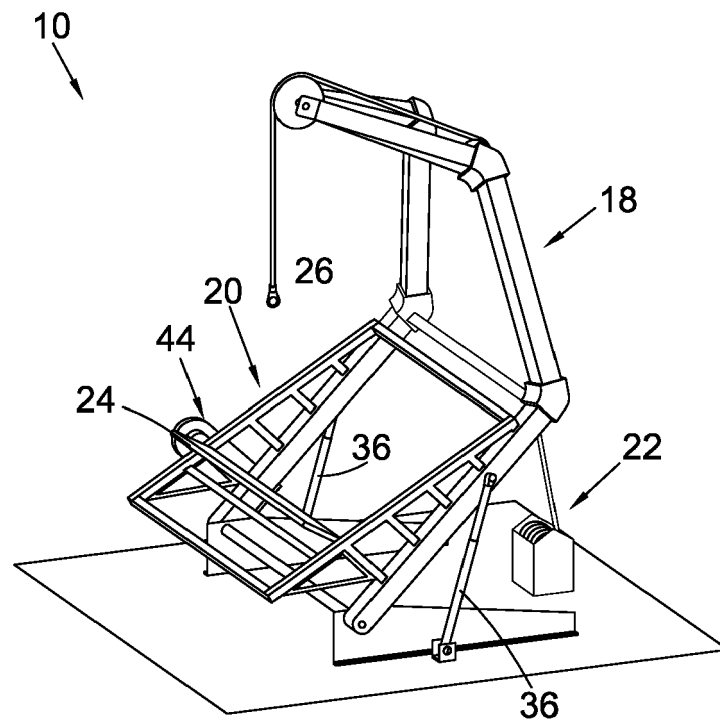


Fig. 8

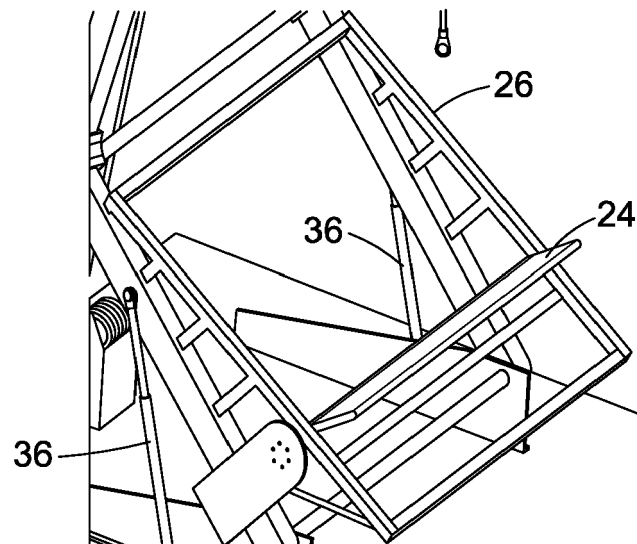


Fig. 9

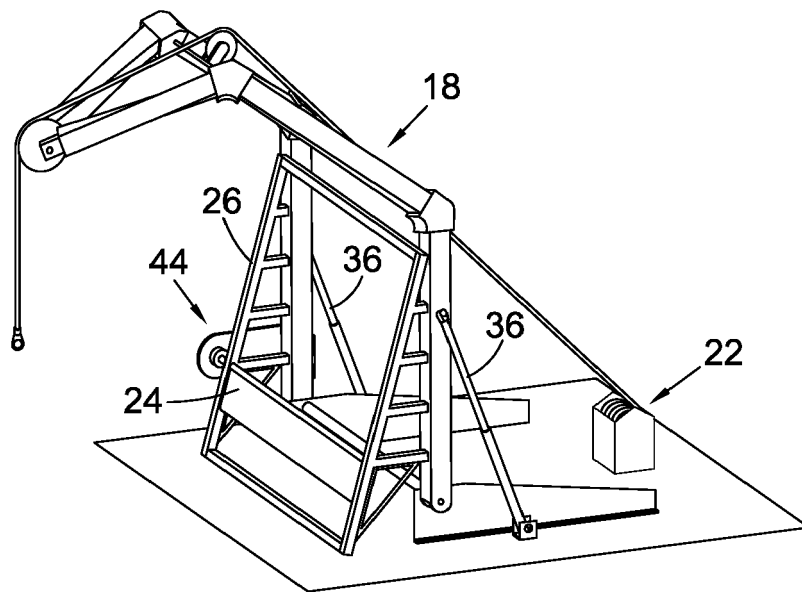


Fig. 10

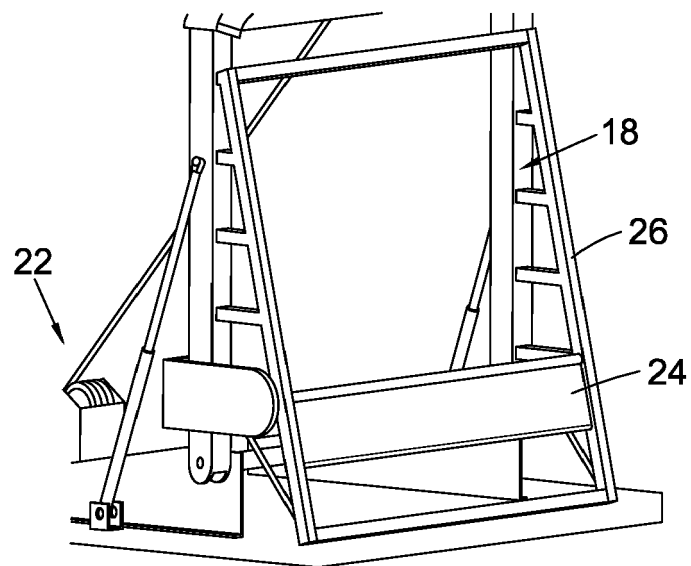


Fig. 11

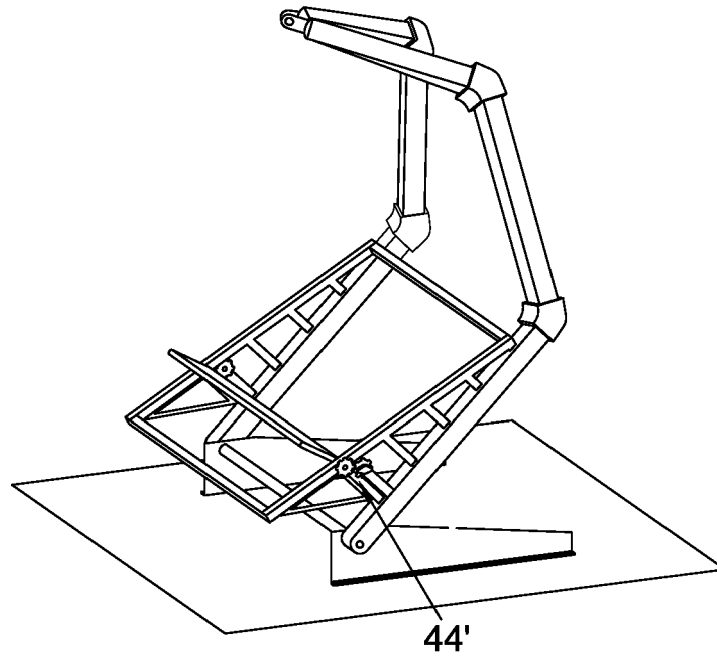


Fig. 12

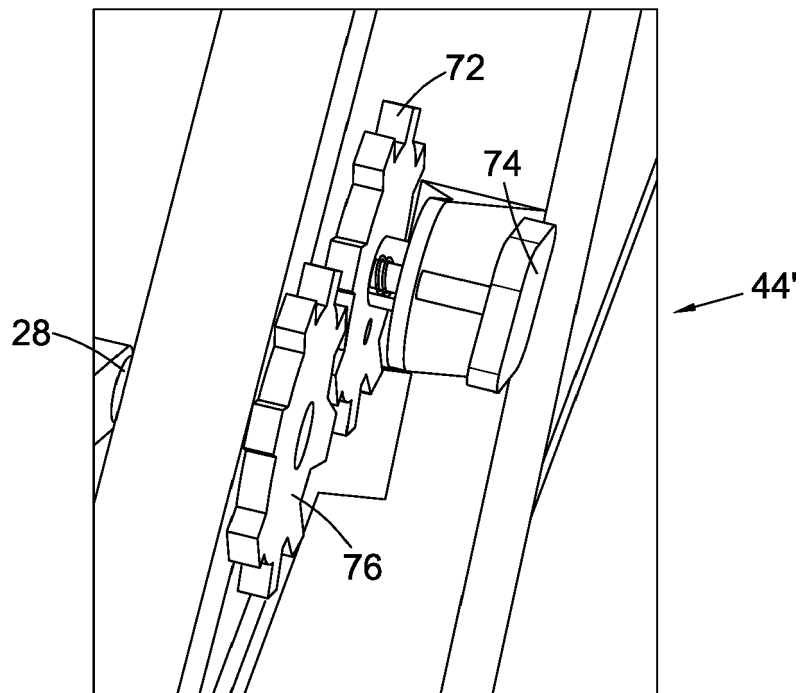


Fig. 13

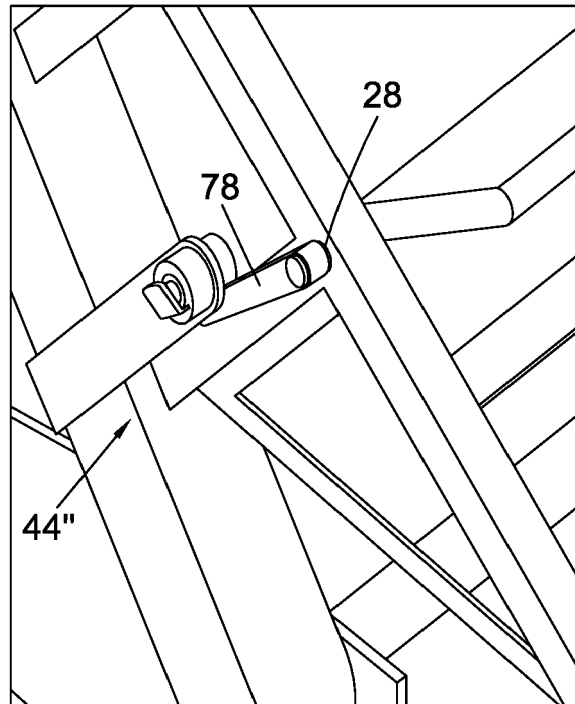


Fig. 14

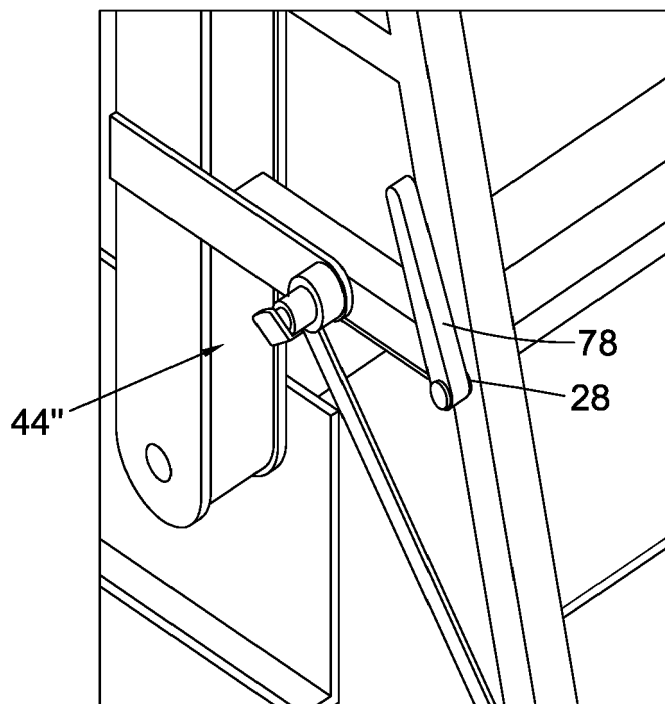


Fig. 15



EUROPEAN SEARCH REPORT

Application Number
EP 16 19 9468

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 1 009 753 A (HUNTINGTON ROBERT [US]) 28 November 1911 (1911-11-28) * page 1, line 92 - page 4, line 33; figures 1, 3 *	1-15	INV. B63B23/04
X	US 1 046 675 A (SWEDENBORG GEORGE W [US]) 10 December 1912 (1912-12-10) * page 1, line 69 - page 3, line 20; figures 1-3 *	1-15	
X	US 1 475 290 A (ELLISON CHARLES F ET AL) 27 November 1923 (1923-11-27) * page 1, line 84 - page 2, line 124; figures 1-6 *	1-15	
X	US 1 827 535 A (MCKENZIE ANGUS D) 13 October 1931 (1931-10-13) * page 2, line 9 - page 6, line 90; figures 1, 18 *	1,2,14, 15	
X	US 2 650 377 A (DOMENICO BARRICELLI) 1 September 1953 (1953-09-01) * column 2, line 32 - column 5, line 24; figures 1, 4, 5 *	1,2,14, 15	TECHNICAL FIELDS SEARCHED (IPC) B63B
X	DD 276 263 A1 (VOLKSWERFT STRALSUND VEB [DD]) 21 February 1990 (1990-02-21) * page 2; figure 1 *	1,2,14, 15	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 March 2017	Examiner Brumer, Alexandre
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	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 16 19 9468

5

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.

14-03-2017

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 1009753	A	28-11-1911	NONE
US 1046675	A	10-12-1912	NONE
US 1475290	A	27-11-1923	NONE
US 1827535	A	13-10-1931	NONE
US 2650377	A	01-09-1953	NONE
DD 276263	A1	21-02-1990	NONE

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82