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(54) Benevnelse **SHIP PROVIDED WITH AN INSTALLATION FOR LAUNCHING AND RECOVERING VEHICLES**

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SHIP PROVIDED WITH AN INSTALLATION FOR LAUNCHING AND RECOVERING VEHICLES

FIELD OF THE INVENTION

The present invention relates to a ship provided with an installation for launching and recovering floating or submersible vehicles, which comprises a lifting device including a set of cables which retains a basket configured to support said vehicle during said launching and recovering operations.

TECHNICAL BACKGROUND OF THE INVENTION

Ships provided with an installation for launching and recovering floating or submersible vehicles are already known.

Thus, there exist fixed or movable ramps allowing crafts to be beached on the rear portion of a ship.

But these ramps must have a particular shape to be associated with the hull shape of the crafts. Under these conditions, this specific shape interferes with their versatility. Moreover, shocks caused by beaching represent a risk for persons and/or the crafts.

Also known is the floodable dock system, which is a compartment provided in the interior of a ship which can be opened to the outside and submerged.

Under certain environmental conditions, amplification phenomena of water movements are observed in the interior of the floodable dock which represent a risk during transfers. Moreover, floodable dock launching maneuvers using ballasting are long and tedious operations.

Davits, for their part, are systems which allow raising a craft by attaching one or more hooks to it, then moving it from the exterior to the interior of the ship.

But these davits necessitate that the craft be especially equipped with lifting points.

Moreover, these operations to be performed by the crew of the craft (recovery of the hook or the arm) are risky operations. And they are not compatible with craft of the drone type.

Cranes and gantries of the so–called “A Frame” type are versatile lifting means which can also be used in this context. But they have the same types of features and of limits as the davits mentioned above, the only difference being that they also allow submerged vehicles to be recovered (small exploration submersible, for example).

Described in document FR–A–2401867 is a handling device for a submersible vehicle, in this case a diving bell.

The handling device comprises a single cable connected to a lifting “slider”, which is guided along ramps.

The top of the bell cooperates, via a central male member, with a centering device positioned over the chassis of the slider. Shock–absorbing pads are associated with this system.

It is easily noted that the manipulation of such a device is not easy and that the presence of a cable in the central position interferes with the stability of the set, in the event that the guidance of the slider along the ramps is incorrectly engaged.

Documents DE3216051A1, US 3536023, GB2150903, WO 2015/087074, GB2277718, US5941192 and EP2468620 illustrate other types of handling devices.

The result of the foregoing is that there exists an un–resolved need to have available a ship provided with a launching and recovering system for floating or submersible vehicles which is as versatile and safe as possible, so that it is compatible with a large variety of sizes and types of devices to be recovered, whether they are automatic (drones) or not.

Moreover, the invention seeks to ensure that the maneuver of the vehicle occurs under the best conditions, to preserve the equipment and also the integrity of persons who may participate in the maneuver.

SUMMARY OF THE INVENTION

The present invention thus applies to a ship provided with an installation for launching and recovering floating or submersible vehicles, which comprises a lifting device including a set of cables which retains a basket configured to support said vehicle during said launching and recovering operations, said cables being movable vertically between two extreme positions, respectively high and low, said basket including at least one upper face which bears against at least one surface, referred to as a “contact surface”, of said lifting device, only when said cables are in the high position, characterized in that:

– said lifting device includes a dolly on which is arranged the set of cables, this dolly being configured to be moved horizontally;

- the ship includes a guidance member which connects said basket to a wall of said ship, which is configured to block the possible translation movements of the “sway” or “surge” type and rotation movements of the “yaw” type of said basket, when this basket is in the flotation position ;

– said guidance member cooperates with a pair of profiles with a guidance path with a generally vertical direction, mounted on said wall of said ship, this member including elements configured to be engaged in one profile and to move in the vertical direction along said guidance path during said launching and recovering operations and in that:

– said dolly carries a pair of profiles which are configured to be selectively positioned above and in the extension of said profiles mounted on said wall.

Thus, due to the fact that said at least one upper face of the basket bears directly against a surface of the lifting device, the seesaw movements which would normally occur here are limited, so that the safety of persons who participate in the maneuver is greatly improved.

According to other advantageous features of this ship:

– said “contact surface” of said lifting device consists of at least one portion of a lower face of said dolly;

– said "contact surface" of said lifting device consists of the lower face of stabilizing devices of said cables which protrude downward from said dolly;

– said basket is provided with at least one float;

– said “contact surface” of said lifting device consists of the lower face of stabilizing devices of said cables which protrude downward from said and said float includes at least one upper face which bears against said lower face of said stabilizing devices only when said cables are in the high position.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the invention will appear upon reading the following description of embodiments that are preferred, but not limiting of the invention. This description is made with reference to the appended drawings in which:

- figure 1 is a perspective view of an installation which forms a portion of the ship according to an embodiment excluded from the protection, this ship being shown only very partially;
- figure 2 is a side view of the installation of figure 1, the cables of this installation being shown on these two figures in the low position;
- figure 3 is a perspective view of the aforementioned guidance and of the means with which it cooperates;
- figure 4 is a view similar to figure 2, but showing a position of the installation in which the cables are in the high position, which corresponds to a transition position for the transfer of a craft to the ship;
- figure 5 is a view of the same installation, the craft being in a final position in which it can be deposited on the ship;
- figures 6 and 7 are perspective views, in two different directions of a second embodiment of the invention, the cables of the installation not being shown and the craft being in a low position;
- figure 8 is a perspective view particularly intended to show the structure of the guidance means used;

– figure 9 is a side view of the installation of figures 6 and 7, in a position substantially identical to that of figure 4;
– figure 10 is also a side view of the installation of figures 6 and 7, in a position substantially identical to that of figure 5;
– figure 11 is a perspective view of another embodiment of the invention;
– figure 12 is also a perspective view of a variant of the embodiment of figure 11.

DETAILED DESCRIPTION OF THE INVENTION

In all the appended figures, the ship 1 in question is only very partially shown, for reasons of simplification.

In this particular case, it has been satisfactory to show a wall 10 of this ship, a generally vertical wall which can consist for example of a portion of the hull of the ship. Also shown is a flat surface 11 which preferably consists of an upper deck 11 of said ship.

This ship 1 is provided with an installation 2 for launching and recovering in a floating or submersible vehicle.

More particularly, this installation 2 comprises a lifting device 3 which is installed on the aforementioned deck 11.

This lifting device 3 could consist of a simple lifting crane or a gantry. However, in the exemplary embodiment, which is shown here, the lifting device 3 is slightly different from a crane and its description is given hereafter.

This lifting device comprises four legs 30 and 30’ which are hinged to the deck 11 and which form together a fictitious and deformable rectangular parallelepiped. As shown more particularly by figures 1 and 2, two legs 30 constitute one pair and are connected by a cross–member 31 so that the assembly constitutes a sort of inverted “U”.

This pair of legs 30 is the farthest from the edge of the deck 11. The second pair of legs 30’, which is closest to the edge of the deck, includes a cross–member which is hinged to the pair of legs 30’. This cross–member is labeled 31’.

The means which allow the legs 30 to be jointly actuated so as to impart to them a rotation movement so that they can pass from a position tilted toward the front to a position tilted toward the rear, as figures 1 and 5, respectively, most particularly show, are labeled 32.

The lifting device 3 also comprises a parallelepiped plate 33 which is disposed as a cantilever, horizontally, in the vicinity of the apex of the pair of legs 30 and 30'. More particularly, one end of this plate is hinged with respect to the cross–member 31 and only guided with respect to the cross–member 31'.

This plate is mostly cantilevered with respect to the pair of legs 30 and 30' so that, in the position of figure 1 as well as in that of figure 4, a large portion of this plate 33 is located vertically above the water over which the ship is positioned.

The plate 33 is provided with a movable dolly 34. To this end, the dolly 34 is provided with wheels 340 which can move along the guidance paths which are included in the opposite edges of the plate 33, as shown most particularly by figures 1 and 2.

The dolly 34 is provided with a lower face 341 of which the specific function will be explained later. This lower face has a horizontal rectangular surface with relatively large dimensions.

The dolly 34 is equipped with a set of cables 35 which, in the position of figure 1, are mostly unwound. Although this is not visible, the dolly 34 integrates a device for unwinding these cables so that these can be moved vertically, in the direction of the double arrow f of figure 2.

In other words, these cables can be unwound so as to have a craft, which will be described later, occupy a low position as shown by figures 1 and 2 and, respectively, a high position in which the cables are completely accommodated in the interior of the dolly 34, as shown more particularly in figure 4.

The set of cables 35 retains a basket 4 which is configured to support a vehicle consisting here, in the embodiment shown, of a craft E of the boat type. But it could be any other type of vehicle, for example a mini submersible.

This basket 4 includes a semi–rigid float 40 which has the shape, seen from above, of a “U” with a base 400 and two parallel flanks 401.

This “U” shaped structure provides an access opening 402 for the craft E, an opening which is therefore located opposite the base 400 of the float 40.

Cables, chains, straps, a net or any other device 42 the function of which is to support the craft E extend between the flanks 401 of this float.

Said float 40 has as its function to place the basket at a height compatible with the craft to be recovered and to allow said basket, when it is in the flotation position, to follow the movements of the water.

This support structure is capped by a slatted cage 43, of parallelepiped shape, which does not interfere in any way with the positioning of the craft in the basket 4 but can cover it at least partially, as shown more particularly in figures 1 and 2.

This cage 43 is endowed with an upper face 430. In the case shown here, this face is flat, horizontal and discontinuous (in two parts). But it could be otherwise.

In the embodiment illustrated in the appended drawings, the installation also comprises a guidance member 5 which connects the basket 4 to a wall of the ship, in this case the wall 10, member 5 which is configured to block the “yaw” (horizontal rotation movement around the vertical axis), and “surge” (translation on the horizontal transverse axis) and “sway” (rotation on the longitudinal horizontal axis) movements of the basket 4 during at least a portion of the vertical movement of the cables 35 in the direction of the double arrow f, but also when the basket 4 is in the flotation position.

More precisely, referring to the appended figure 3, this guidance member has the shape of a rod 5 which is integrated here with a pair of arms 6 constituting a frame 60.

More precisely, the rod 5 extends substantially parallel to the two flanks 401 of the float 40 of the basket 4 during the transition phase. This guidance member is therefore integral with the aforementioned frame 60 which is itself hinged to the float. A pair of wheels, of inflatable rings or of skids 601, of which the function will be explained below, extends at the end of the arms 6. The free end of the rod 5 has the shape of a sphere 50.

The guidance member, in this case the rod 5, cooperates with a profile 7 with a guidance path with a generally vertical direction, a profile 7 which is mounted on a wall of the ship, in this case the wall 10, as shown in the figures.

As is particularly visible in figure 3, the end 50 with the shape of a sphere is configured to be engaged in the profile 7 and to move in the vertical direction along the guidance path. More precisely, the profile 7 has, seen from above, a “C” shape with an opening 70 turned toward the basket 7. Its upper end is open so that the sphere 50 can be engaged in this profile only at the top.

For the purpose of facilitating engagement from the top downward, the upper end of the profile 7 can advantageously be designed to be divergent upward and/or forward and includes for this purpose a set of plates 71 and 72 which confers a funnel shape to the assembly.

We will now explain how to use the installation according to the present invention, first of all with reference to figures 1 and 2.

In these figures, the craft to be returned to the deck of the ship is already placed in the basket 4.

This assumes that, previously, the lifting device 3 has been actuated so as to have it occupy the position illustrated where the plate 33 is in large part vertically above the water. Moreover, the cables 35 have been controlled so that they occupy a low position in which the basket 4 is located at the level of the water, or slightly lower.

In doing so, during the descending movement, the sphere 50 of the arm 5 has been engaged in the interior of the profile 7, this maneuver being facilitated by the funnel shape of its upper portion.

During the descending movement, the sphere 50 travels in the interior of the profile, while the wheels (or rings or skids) 601 bear against the wall 10 of the ship. During this descending movement but also during the contrary rising movement, the possible movements of the basket in translation in the direction of the ship 1 are prevented by the rod 5, likewise the movements of the wheels. On the other hand, possible “pitch” (rotation around the transverse horizontal axis), “roll” (rotation around the longitudinal horizontal axis), and “heave” (translation on the vertical axis) movements are not blocked when the basket is in the flotation position.

Once the craft E has been placed on the basket, which is itself in the flotation position, to have it occupy the positions of figures 1 and 2, the winding of the cables is then controlled so as to have the basket rise in the direction of the dolly 34 and plate 33.

During this rising movement, the aforementioned movements are also blocked, which greatly improves the safety of person who are either located in the craft, or located in proximity to the installation.

The rising movement is continued until the cables 35 occupy their high position, in which they are wound in the interior of the dolly 34.

In doing so, the upper surface 430 of the basket 4 comes into direct contact, or into engagement, with the lower surface 341 of the dolly 34, so that the basket 4 is to some degree immobilized with respect to the lifting device 2.

As mentioned above, the upper surface 430 of the basket 4 is discontinuous here, i.e. consisting of two portions facing one another. They therefore bear at the same time against the lower surface 341 of the dolly.

But this could also consist of a single upper surface 430 and a lower surface 341 in two portions, or surfaces 430 and 341 in several portion, the essential matter being that they bear directly against one another.

During this rising movement, the sphere 50 of the guidance rod 5 is disengaged from the profile 7, as shown by figure 4. This naturally arises from the fact that the profile has a height that is much smaller than that which separates the dolly 4 from the water level.

In the high position of the basket 4, the possible seesaw movements of the latter are eliminated because it becomes “integral” with the lifting device 2.

It is then sufficient to control the dolly 34 as well as the legs 30 and 30’ of the device to have it occupy the extreme position of figure 5 in which the craft E can be deposited on the deck 11 of the ship.

The embodiment illustrated in figures 6 to 10 has great similarity with the preceding one.

For this reason, the numerical labels of the elements common to the two embodiments are identical.

With some exceptions, only the differences relating to this second embodiment will be described hereafter.

The first essential difference resides in the fact that the guidance member 5’ has a different shape from that described previously.

Unlike the pair of arms 6 constituting the frame 60, what is involved is a cross–member 5’, cylindrical here, of which the two opposite ends carry wheels 50’ or other rolling or sliding members of the skid, inflatable ring, etc. type.

Moreover, instead of the single profile 7, what is involved is a pair of profiles with a “C” shaped cross–section, their respective openings, directed vertically, facing one another.

The two profiles 7 have the function of guiding, as before, the wheels 50’ during the rise/descent of the basket 4.

The profiles 7 are advantageously designed to be fixed. However, they could be made sliding with respect to the wall 10, so as to be able to retract their upper end downward, which during the operation of the device is raised above the plane of the deck 11.

Also shown in the figures is additional stabilizing equipment which can, if applicable, be associated with the profiles 7.

This equipment is integral with the dolly 34.

Here it comprises arms 8, in this case two pairs of arms 8, which extend obliquely and downward from the dolly 34.

The lower end of each of these pairs is extended by a profile 80 which has the same shape and the same interior dimensions as the profiles 7.

The assembly is configured so that in a rising/descending position of the basket 4 (figures 6 to 9), the profiles 80 bear against the apex of the profiles 7 of which they constitute the extension in a manner of speaking.

Under these conditions, during the movement of the basket 4 into the high position, the wheels 50’ leave the profiles 7 to enter into the profiles 80.

Moreover, because these profiles 80 are integral with the dolly 34, the wheels 50’ remain prisoners of the profiles 80, even during the extreme maneuver (figure 10) of transfer of the craft E to the deck 11 of the ship. There too, this operation is accomplished with a perfectly stable craft.

In the embodiment of figure 11, the installation is practically identical to that of figures 6 to 10.

However, what is involved here are four cables 35 which retain the basket 4, each cable being associated with a stabilizing device 9, called in professional terms a “brace,” which has the function of guiding the cables and holding them separated two by two. When the basket 4 is moved toward its high position, then the aforementioned surface 430 bear against the lower face 90 of each of the braces. In this case, two braces are in contact with a first portion of the surface 430 and the two others with the second portion.

The embodiment which is shown in figure 12 is extremely close to the preceding one.

In fact, stabilizing devices 9 (“braces”) similar to those previously described, but of great length, are also used here.

Moreover, the basket 4 which receives the craft E has no cage 43, so that the cables 35 associated with the stabilizing devices 9 are attached to the upper face 403 of the flanks 401 of the float 40 of the basket 4. In this embodiment, the length of the stabilizing devices is substantially identical to the height of the cage 43 described in the other embodiments, to allow the recovering of floating vehicles of substantially identical size.

Under these conditions, when the craft E completes its rise, each aforementioned upper face 403 bears against the lower face 90 of two of the braces 9.

It is noted from the preceding description that all the maneuvers of recovering or launching of a floating or non–floating vehicle are in large part made safe by the fact that possible translation or rotation movements are perfectly controlled. Consequently, the maneuvers can be carried out with full safety.

Patentkrav

1. Skip (1) utstyrt med en installasjon (2) for sjøsetting og opptak av flytende eller neddykkbare fartøyer (E), som omfatter en løfteanordning (3) som inkluderer et sett av kabler (35) som holder på plass en kurv (4) innrettet for å støtte fartøyet (E) under sjøsettings- og opptaksoperasjonene, hvor kablene (35) er bevegelige vertikalt mellom to ytterposisjoner, henholdsvis høy og lav, hvor kurven (4) inkluderer minst én overside (430, 403) som hviler mot minst én overflate (341), omtalt som en "kontaktflate", av løfteanordningen (3), kun når kablene (35) er i den høye posisjonen, karakterisert ved at:

løfteanordningen (3) inkluderer en vogn (34) som settet av kabler (35) er anordnet på, hvor denne vognen (34) er innrettet for å beveges horisontalt;

skipet inkluderer et føringsorgan (5, 5') som forbinder kurven (4) med en vegg (10) til skipet (1), som er innrettet for å blokkere for eventuelle translatoriske bevegelser av type "svai" eller "jag" og rotasjonsbevegelser av type "giring" av kurven (4), når denne kurven (4) er i vannlinjeposisjonen;

føringsorganet (5, 5') samvirker med et par av profiler (7) med en føringsbane med en i det vesentlige vertikal retning, montert på veggen (10) til skipet (1), hvor dette organet (5,5') inkluderer elementer som hvert er innrettet for å stå i inngrep i et profil (7) og for å bevege seg i vertikal retning langs føringsbanen under sjøsettings- og opptaksoperasjonene;

og ved at

vognen (34) bærer et par av profiler (80) som er innrettet for selektivt å anbringes over og i forlengelsen av profilene (7) montert på veggen (10).

2. Skip ifølge krav 1, karakterisert ved at "kontaktflaten" til løfteanordningen (3) består av minst ett parti av en underside (341) av vognen (34).

3. Skip ifølge krav 1, karakterisert ved at "kontaktflaten" til løfteanordningen består av undersiden (90) av stabiliseringsanordninger (9) for kablene (35) som rager nedover fra vognen (34).

4. Skip ifølge ett av de foregående krav, karakterisert ved at kurven (4) er utstyrt med minst ett flytelegeme (40).

5. Skip ifølge krav 4, karakterisert ved at løfteanordningens "kontaktflate" består av undersiden (90) av stabiliseringsanordninger (9) for kablene (35) som rager nedover fra vognen (34), og at

flytelegemet (40) inkluderer minst én overside (403) som hviler mot undersiden (90) av stabiliseringsanordningen (9) kun når kablene (35) er i den høye posisjonen.

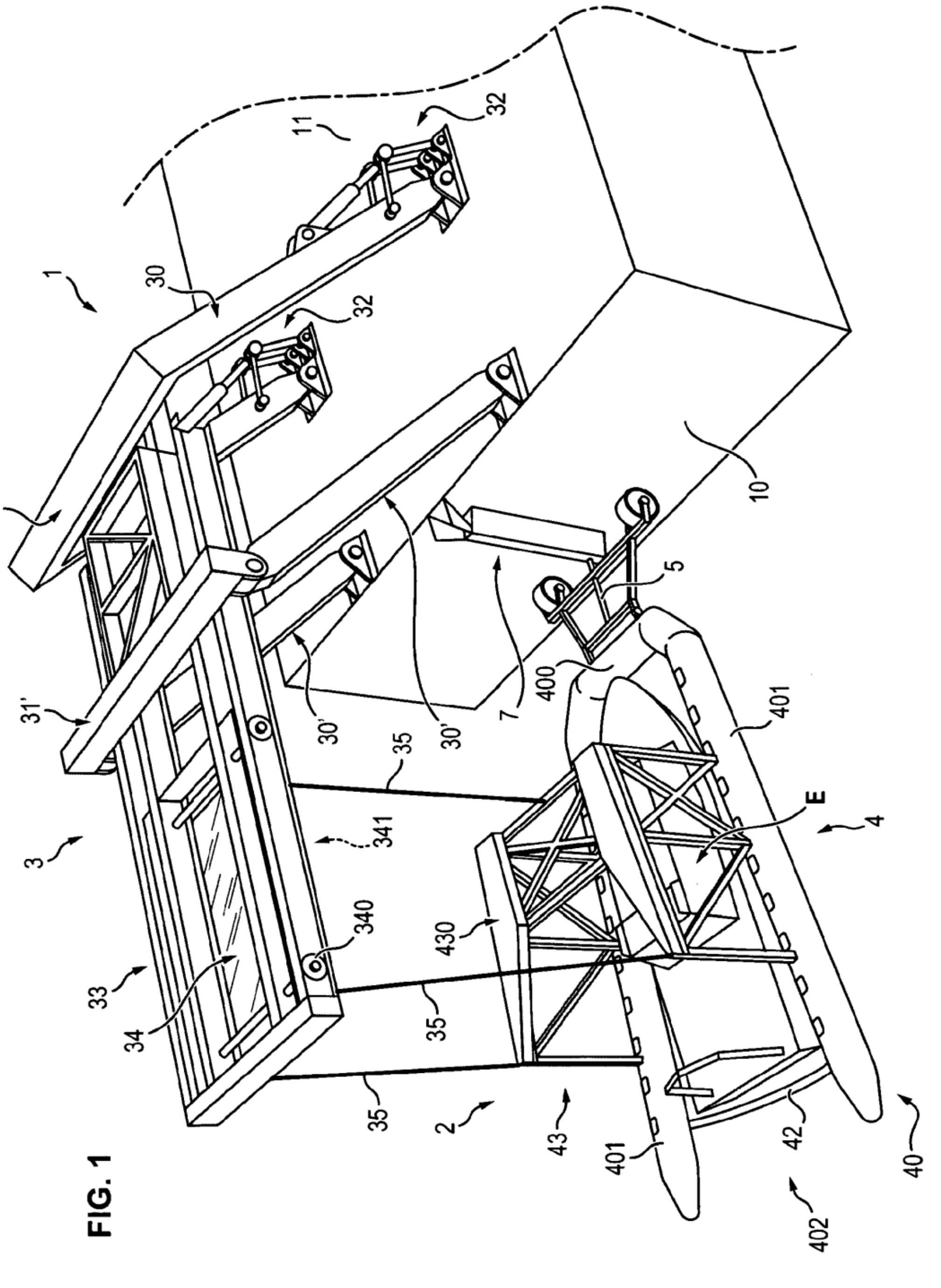
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FIG. 1

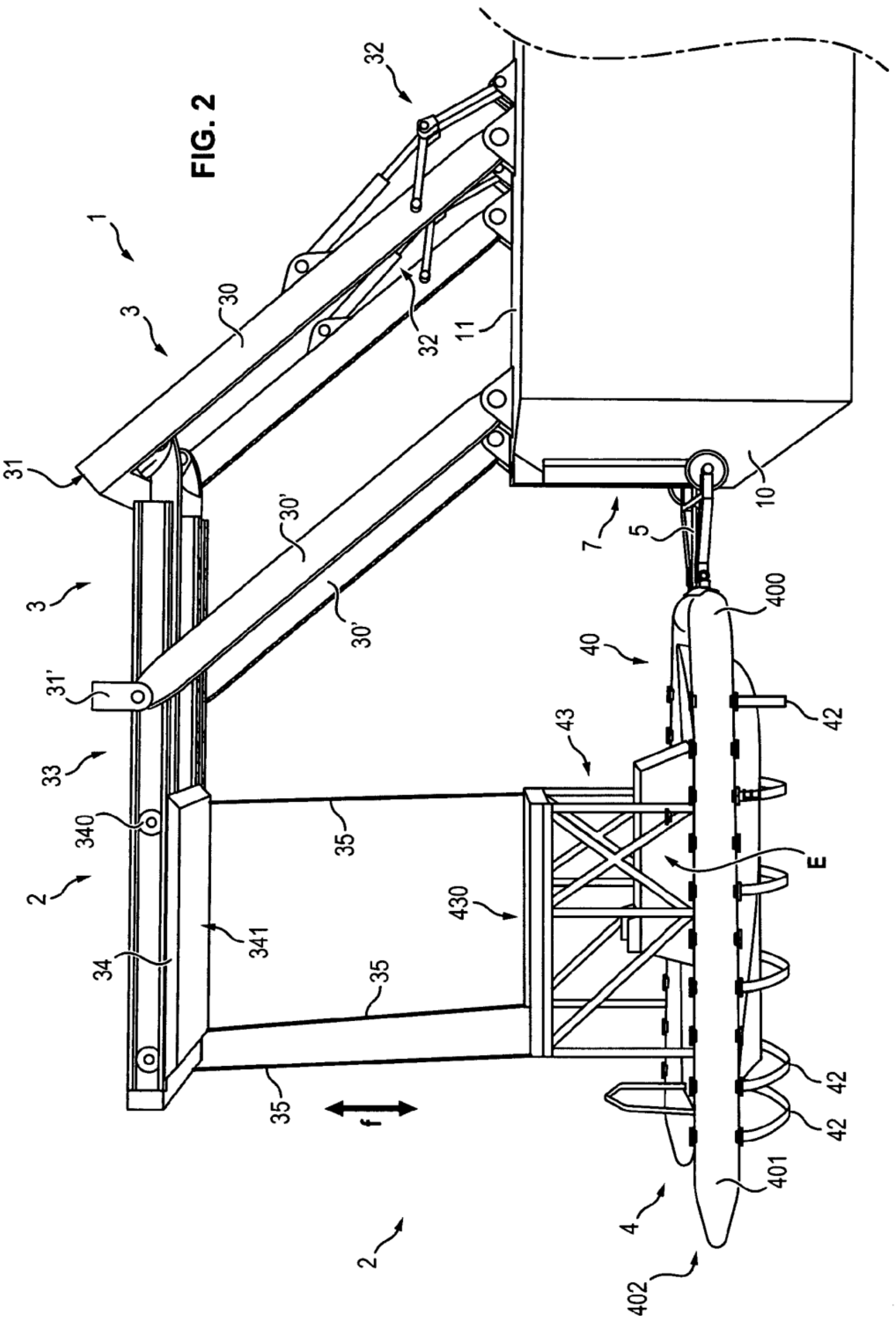
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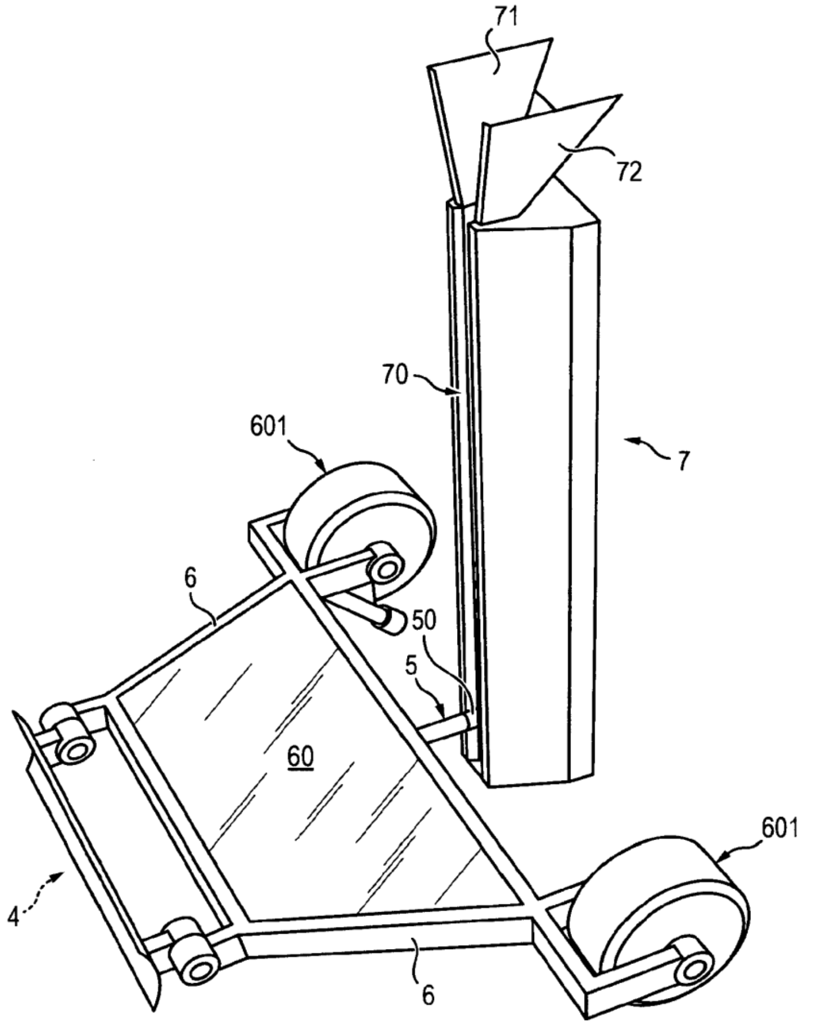
FIG. 2

FIG. 3



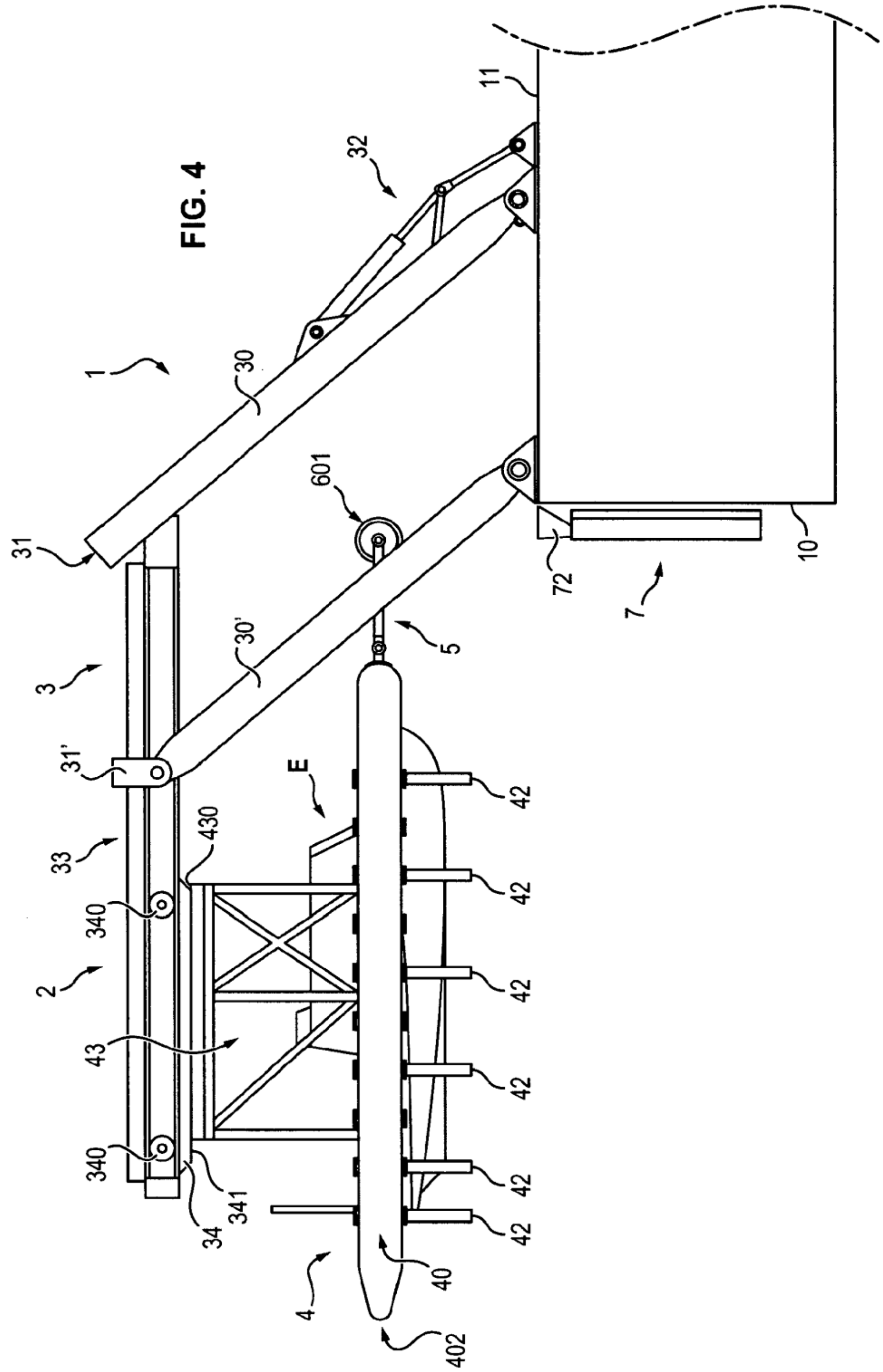

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FIG. 4

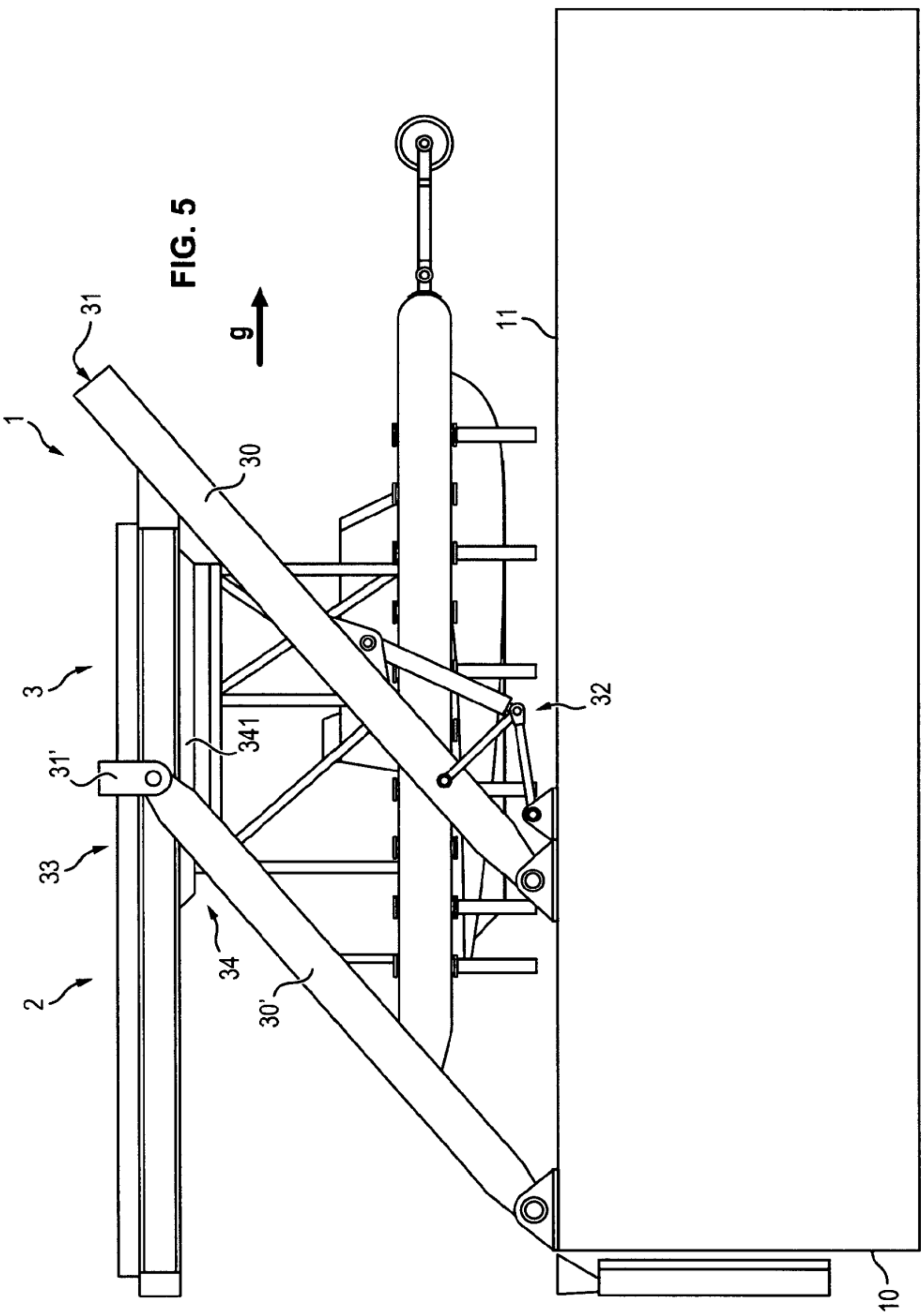


FIG. 5

FIG. 6

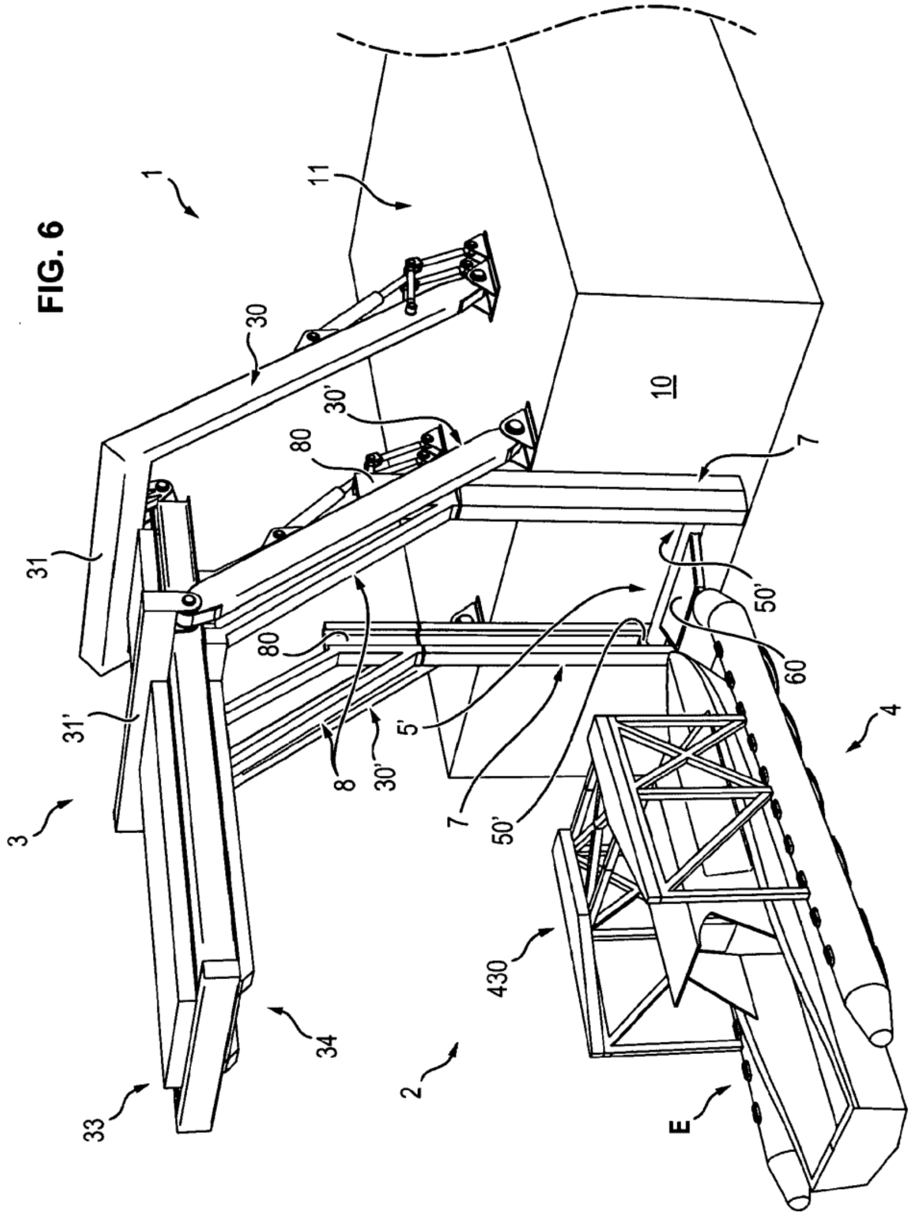


FIG. 7

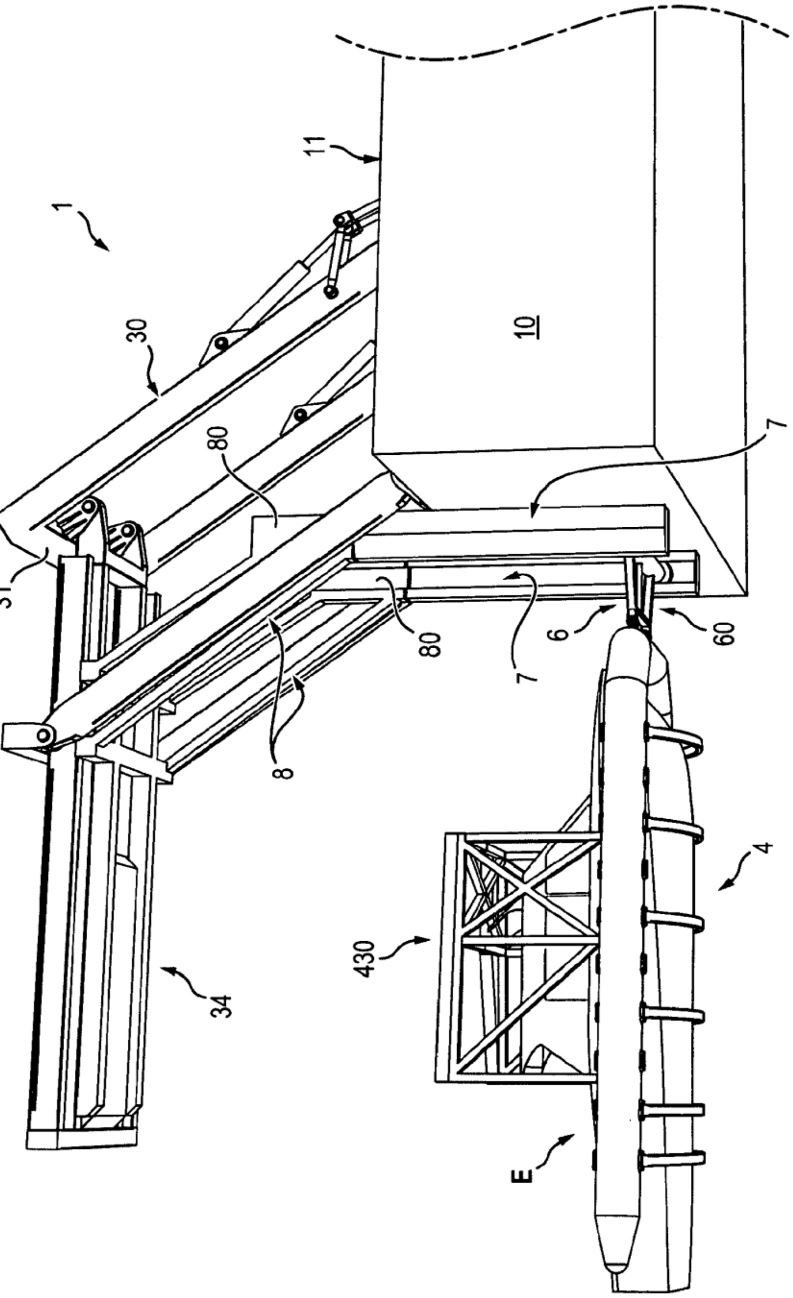


FIG. 8

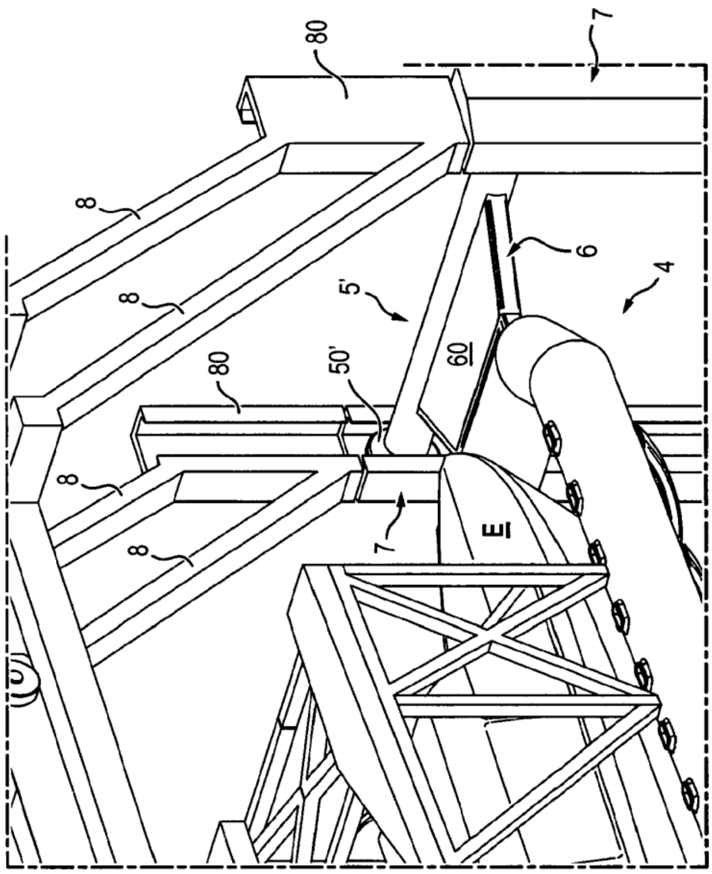


FIG. 9

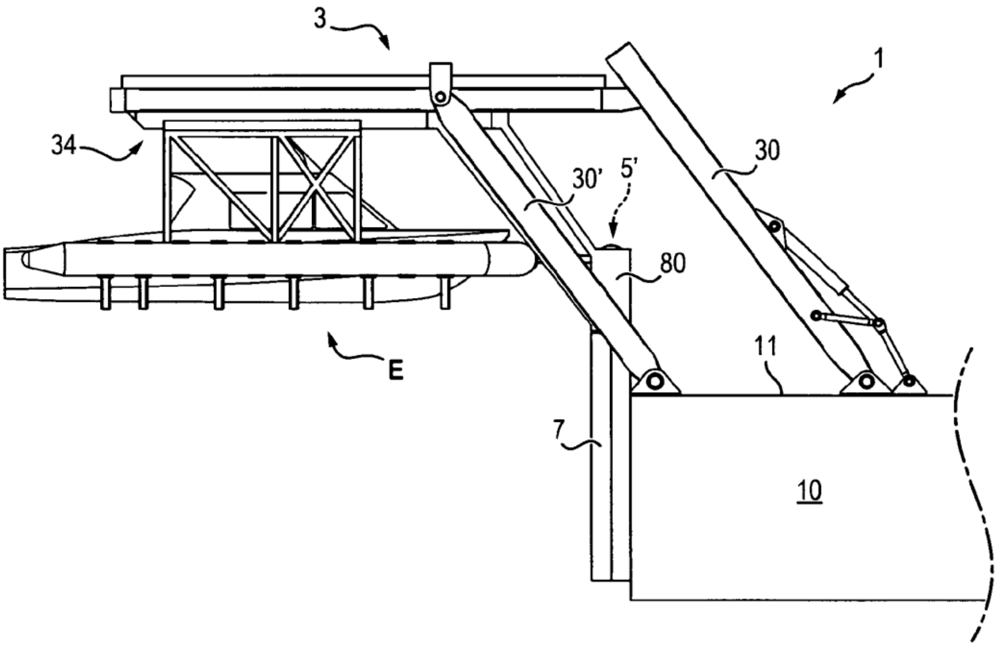


FIG. 10

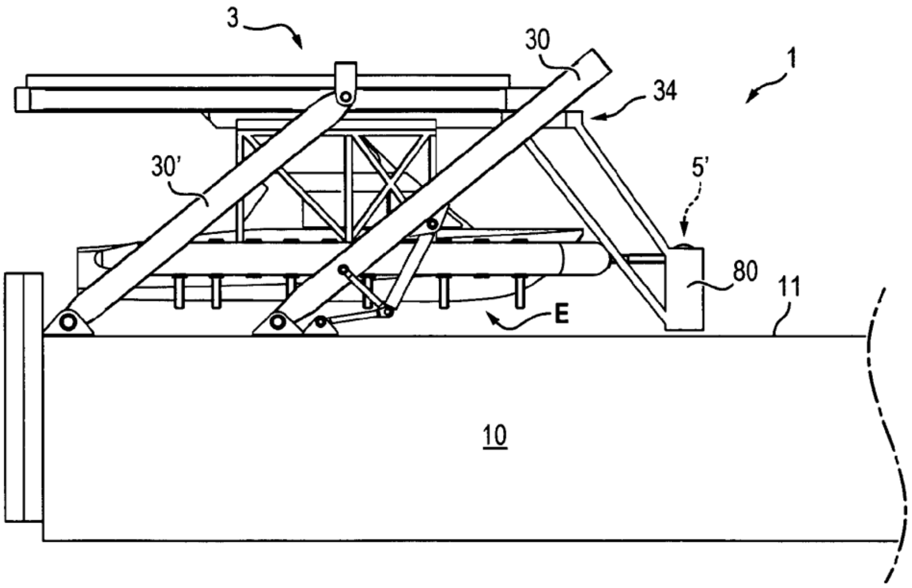
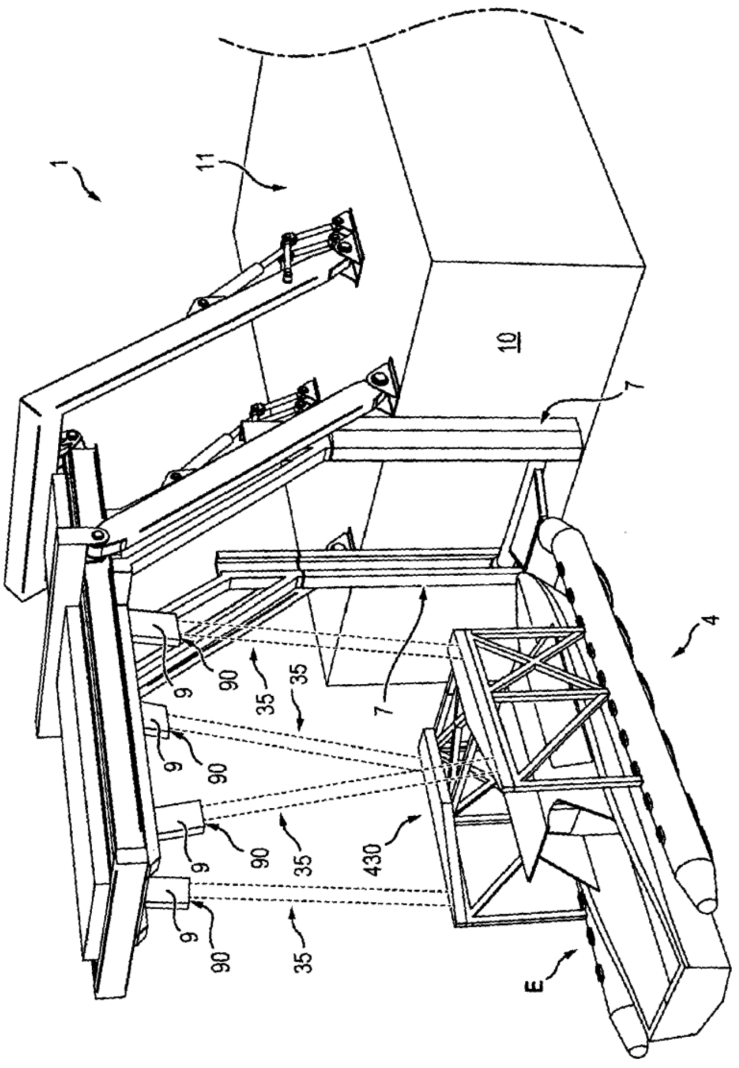
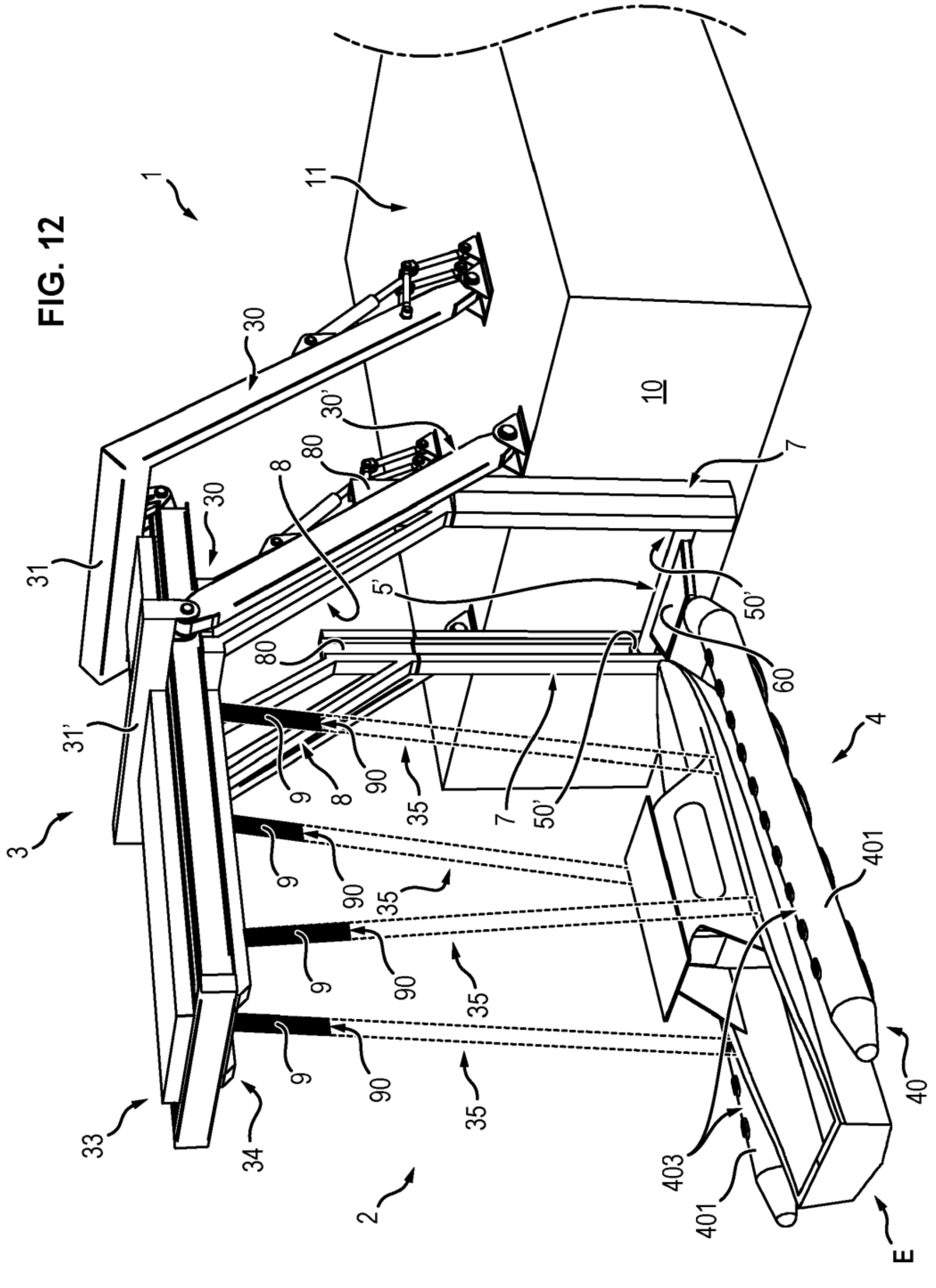


FIG. 11

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7
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401
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403
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FIG. 12