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⑤④ **Transport of prefabricated offshore structures.**

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## Description

This invention relates to the transport of prefabricated offshore structures, for example drill jackets.

A drill jacket is an elongated offshore structure made up of a plurality of tubular members with cross bracing. The structure is installed by lowering it to rest on the sea bottom. The jacket is secured in this position and functions to support a deck unit and hydrocarbon production equipment above the water line. The deck unit, which usually comprises a flat deck area with a plurality of legs extending downwardly therefrom, provides support for oil drilling and recovery equipment. These components make up an offshore facility.

The manufacture of prefabricated components of such an offshore facility has in the past required that the fabrication yards or sites be built relatively close to a final desired location for the facility. Most of these yards are located near shallow water areas. When components are fabricated in such yards, the components may be loaded onto barges having shallow drafts. The barges are then towed to the final location for installation of the facility. Such a procedure, in accordance with the pre-characterizing part of claim 1, may be reliably accomplished safely if the seas are calm and if the duration of such a tow is no more than a day or two, since weather forecasts for such short durations are usually fairly reliable. However, even though a tow may be of short duration, long delays may be experienced while waiting for calm seas. When these tows do arrive at the installation site, the barges may be moored in shallow water alongside the construction equipment at the site, which equipment may include, for example cranes mounted on flat barges.

Offshore facility components may often be built more economically at fully integrated fabrication yards. However, due to existing favorable conditions at such fabrication yards and the quantity thereof being limited by the cost of building them, such fabrication yards may be located at extreme distances from the final offshore facility locations. The technical and safety risks of long tows, however, make it difficult for these remote yards to compete with fabrication yards located near the final offshore facility sites. Shallow draft barges for loading offshore structures in the typically shallow waters, because of the size and bulk of such structures, may be unstable in open sea thus requiring periods of calm weather for towing safety and, therefore, long delays may be experienced while waiting for these calm conditions. On long tows such as over an ocean, there is also no assurance, as previously noted, that good weather and calm seas will prevail throughout the transport. Rough seas may in addition cause severe fatigue or other damage to the offshore components during a tow by barge.

The fatigue stresses during such transport are increased with higher accelerations during the roll of the transport structure. Barges typically

have a low period of roll with resulting high accelerations during the roll as compared to a self-propelled sea-going vessel. Furthermore, the total fatigue stresses on an offshore structure during a transport of specified length is related to the duration of transport. The speed of a barge being towed is typically slow as compared to the speed of a self-propelled sea-going vessel resulting typically in more than twice as many fatigue cycles when an offshore structure is towed by barge. Thus, in calm seas as well as rough seas, the number of and severity of fatigue stresses on an offshore structure being towed by barge may be much greater, resulting in increased risk of damage over what would be the case if the offshore structure were being carried by a sea-going vessel over the same distance.

Since a barge deck is typically low in the water, an offshore structure is subjected undesirably to the stressful pounding of waves thereagainst. This of course becomes more of a problem as the length of tow is increased and as the seas become rougher. It is thus desirable to raise an offshore structure so that it is disposed higher than and thus out of the way of the waves during a typical storm as well as during other weather conditions.

Since the fabrication yards are usually located near shallow water, ships for carrying such structures may typically be incapable of getting close enough for loading of the structures directly thereon. In addition, such prefabricated offshore structures may be longer and/or wider than the ships on which it is desirable to load them.

French Patent Application Publication No. FR—A—2 508 410 discloses a marine transport system corresponding to the pre-characterizing part of claim 2, comprising a sea-going self-propelled vessel having a well deck and a raised deck with means in the vessel for submerging the well deck to a selected depth without submerging the raised deck; and a floating object having a draft which is less than said selected depth and a length which is less than a length of the well deck, the floating object being disposed on the well deck.

According to the invention there is provided a method of loading a prefabricated offshore structure for transport from a fabrication yard adjacent shallow water to a final site for installation, the method comprising:

floating a barge to a position adjacent the fabrication yard;

transferring the offshore structure from the fabrication yard onto the barge; and

floating the barge to a deep water area;

and the method being characterised by:

sailing a self-propelled transport vessel to the deep water area adjacent the barge, the vessel having a mid deck and at least one deck raised above the mid deck;

maintaining the raised deck above water level while ballasting the vessel to submerge the mid deck to a depth which is equal at least to the draft of the barge with the offshore structure disposed thereon;

floating the barge over the submerged mid deck;

deballasting the vessel to raise the mid deck above water level to support the barge and the offshore structure; and

securing the barge to the vessel and securing the offshore structure on the barge whereby the offshore structure may be transported over an ocean to a final site for installation;

the vessel and barge being sized such that the maximum height of the vessel and barge system is equal to the height of the top surface of the barge when the barge is disposed on the mid deck whereby the prefabricated offshore structure may extend over the entire length of the vessel.

The invention also provides a marine transport system comprising:

a sea-going self-propelled vessel having a well deck and a raised deck with means in the vessel for submerging the well deck to a selected depth without submerging the raised deck;

a floating object having a draft which is less than said selected depth and a length which is less than a length of the well deck, the floating object being disposed on the well deck; and

the system being characterised in that:

the floating object is a barge having a top surface for supporting a prefabricated offshore structure;

means is provided on the barge for skidding a prefabricated offshore structure onto the barge;

means is provided for securing the barge to the vessel and for securing a prefabricated offshore structure on the barge for ocean transport of the offshore structure; and

the maximum height of the vessel and barge system is equal to the height of the top surface of the barge when disposed on the well deck whereby a loaded prefabricated offshore structure may extend over the entire length of the vessel.

The invention can be so embodied, as described hereinbelow, as a system and method that can provide one or more of the following advantageous features.

(i) They can provide long distance ocean transport of prefabricated offshore structures which is both fast and safe, thus ensuring that the components arrive undamaged and on time.

(ii) They can provide quick, safe, and reliable transportation over an ocean of prefabricated offshore structures from a fabrication yard near shallow water.

(iii) They can minimize the number of and severity of fatigue stresses on an offshore structure during ocean transport thereof so as to minimize the risk of damage to the offshore structure.

(iv) They can raise an offshore structure for ocean transport so that it is disposed higher than and thus out of the way of the waves during a typical storm to thus minimize risk of damage to the offshore structure.

(v) They can enable transportation of a prefabricated offshore structure which is longer than the

length of a ship used in the transportation.

(vi) They can provide more efficient transport of bulky prefabricated offshore structures.

(vii) They can render it practical and commercially advantageous to utilize any suitably outfitted fabrication yard or site to manufacture large bulky offshore structures for installation at desired offshore sites anywhere in the world.

The invention will now be further described, by way of illustrative and non-limiting example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a system embodying the invention with a prefabricated offshore structure loaded thereon for transport;

Fig. 2 is a top plan view illustrating the loading of a jacket from a fabrication yard onto a shallow draft barge;

Fig. 3 is a view similar to Fig. 2 illustrating the loading of a deck unit;

Fig. 4 is a top plan view showing the orientation of a barge loaded with a prefabricated offshore structure to a transport vessel before the barge is floated onto a mid deck of the vessel;

Fig. 5 is a side elevational view of the transport vessel with its mid deck submerged;

Fig. 6 is an enlarged sectional view taken along line 6—6 of Fig. 4;

Fig. 7 is a sectional view similar to Fig. 6 with the barge shown positioned over the vessel mid deck;

Fig. 8 is a view similar to Fig. 7 after the transport has been floated to support the barge loaded with the prefabricated offshore structure;

Fig. 9 is a top plan view of the vessel with barge and prefabricated offshore structure assembled for ocean transport;

Fig. 10 is a side elevational view of the embodiment shown in Fig. 9;

Fig. 11 is a side elevational view showing an intermediate position during the launching of a jacket from a specially designed shallow draft barge;

Fig. 12 is a side elevational view of equipment used in off-loading a shallow draft barge used in accordance with the invention; and

Fig. 13 is a top plan view showing the relative size and orientation of a shallow draft barge used in accordance with the invention and a construction barge for off-loading the shallow draft barge.

Referring to Fig. 1, there is shown a system for transporting large bulky prefabricated offshore structures such as, for example, drill jacket 10 utilizing a sea-going self-propelled vessel such as the ship generally designated 12. The ship 12 includes a power plant for propulsion as well as ballasting equipment for submerging a mid or well deck 14 to a level which is below the draft of a shallow draft barge 16. Ship 12 includes raised forward and aft decks 18 and 20 respectively. These decks 18 and 20 are provided with a height to remain above the water line and are suitably sized, in accordance with principles of common knowledge to those of ordinary skill in the art to which this invention pertains, to maintain stability

and flotation of the vessel while mid deck 14 is submerged to a depth for barge 16 with jacket 10 to be floated over the top of the deck 14. A fixed suitable connection means may be provided for securing the barge 16 to vessel 12 such as the at least four point tie-down system illustrated at 24. Although a drill jacket is used as an example herein, this invention is meant to include procedures and apparatus for transporting various other prefabricated offshore structures such as decks or modules.

In both Figs. 2 and 3, a fabrication yard 40 is illustrated adjacent shallow water 42 which is sufficiently deep for shallow draft barge 16, but has insufficient depth for positioning ship 12 for loading of a drill jacket 10 directly onto the ship. In order to load drill jacket 10 onto a sea-going vessel for safe and fast ocean transport to an installation site, the drill jacket 10 is discharged from the fabrication yard 40 onto barge 16 which in turn is towed into deep water (that is; water which is sufficiently deep for a sea-going self-propelled vessel such as ship 12 shown in Fig. 4) for loading onto ship 12 as will hereinafter be described.

In Fig. 2, drill jacket 10 is shown being skidded onto shallow draft barge 16 by means such as portable load-out rails or guides 28. Jacket 10 is provided with a plurality of skids 30 which slide along rails 28 and, at the interface between bulkhead 32 and barge 16, onto rails or tracks 34 on the top surface of the barge 16. Fig. 3 shows the loading of an offshore drilling platform deck unit 36 onto a barge 16. Here again, rails 28 and tracks 34 are utilized on which skids slide to support the downwardly extending legs 38 of deck unit 36.

After it is loaded, barge 16 is floated and vessel 12 is sailed into the positions shown in Fig. 4 in deep water with respect to each other and, as shown in Fig. 5, vessel 12 is ballasted by means such as ballast tanks schematically indicated at 47 to submerge its mid deck 14.

Figs. 6, 7, and 8 show the relative positions of the barge 16 and ship 12 as the two structures are combined to form a single ocean going unit 44. In Fig. 7, barge 16 is shown floating over the deck 14 which has been submerged to a selected depth sufficient for floating of the barge thereover. As shown in Fig. 8, the vessel 12 is then deballasted to raise the deck 14 above the water line and raise barge 16 with its drill jacket load 10. The vessel 12 should preferably be sufficiently large and stable to support the barge and oversized load during typical rough seas and weather conditions, and such sizing can be determined utilizing principles of common knowledge to those of ordinary skill in the art to which this invention pertains.

When loaded on the barge as shown in Fig. 6, the height of the offshore structure above the water level is less than the overall height of the barge. This is illustrative of the height of the offshore structure during a typical tow by barge. When the offshore structure loaded barge is loaded onto the ship as shown in Fig. 8, the height

of the offshore structure above the water is increased so that its height is greater than the overall barge height so that the offshore structure may be disposed higher than and thus out of the way of the waves during rougher seas to thus minimize risk of damage to the offshore structure.

Figs. 9 and 10 show the orientation of barge 16 on the vessel 12. For launching the jacket 10, tie-down connections between the barge 16 and vessel 12 are disconnected, vessel 12 is reballasted to float barge 16 which can then be easily towed away from vessel 12 and to the desired location for launching jacket 10.

Fig. 11 shows the barge 16 specially outfitted with a pivot support 54 for launching the jacket 10. To accomplish this, jacket 10 is slid rearwardly on barge 16 so that its center of gravity moves onto support 54. With suitable ballasting of barge 16 while maintaining its stability in accordance with principles of common knowledge to those of ordinary skill in the art to which this invention pertains, jacket 10 is rotated into the water through the pivoting of support 54 thereby launching the jacket into the sea at the desired location. A deck unit 36 can be off-loaded from barge 16 using a crane 56 mounted on a derrick or construction barge 58 which is anchored at the offshore site: see Figs. 12 and 13. With jacket 10 already in place, crane 56 is utilized to lift deck 36 from barge 16 and lower it onto the top of jacket 10.

Referring back to Fig. 1, in order to transport a prefabricated offshore structure which, as is sometimes the case, has a length greater than the length of the transporter vessel, the maximum height of the vessel and barge system is equal to the height illustrated at 15 of the top surface 22 of the barge 16 when the barge is disposed on the well deck 14. In other words, all deck houses and other structures on forward and aft decks 18 and 20 have a height no higher than the supporting surfaces 22 on top of barge 16 which support lower segments of jacket 10. In this way, the elongated jacket 10 can extend beyond the length of barge 16 and over the forward and aft decks 18 and 20 and may extend beyond the forward and aft ends of the vessel. In addition to the tie-down system 24, deck supports 26 may also be provided on forward and aft decks 18 and 20 respectively for supporting the overhanging portions of jacket 10 to further reduce stresses experienced by the jacket during rough sea conditions.

A vessel and barge system embodying the present invention may comprise, for example, a sea going vessel 12 of about 320 m (1050 feet) in length with a mid-deck 14 of about 213 m (700 feet) in length. Mid deck 14 may be approximately 53 to 69 m (175 to 225 feet) wide. Such a size may be provided by a converted tanker having a dry weight tonnage of 230,000. A 198 m (650 foot) barge 16 having a width of 52 m (170 feet) may be provided to carry a jacket 10 of 40,640 tonnes (40,000 tons). Such a combined structure may deliver the jacket at a cruising speed of about 7.2 m/s (14 knots) or more. While such a vessel may

require a water depth for loading and unloading operations of 35 m (115 feet) or more, the shallow draft barge 16 may operate in as little as 7.6 m (25 feet) of water for loading of a drill jacket at a fabrication yard near shallow water. Thus, an offshore structure may be prefabricated at a fabrication yard near shallow water and then provided with quick, safe, and reliable transportation over an ocean.

### Claims

1. A method of loading a prefabricated offshore structure for transport from a fabrication yard adjacent shallow water to a final site for installation, the method comprising:

floating a barge (16) to a position adjacent the fabrication yard (40);

transferring the offshore structure (10, 36) from the fabrication yard (40) onto the barge (16); and

floating the barge (16) to a deep water area;

and the method being characterised by:

sailing a self-propelled transport vessel (12) to the deep water area adjacent the barge (16), the vessel having a mid deck (14) and at least one deck (18, 20) raised above the mid deck;

maintaining the raised deck (18, 20) above water level while ballasting the vessel (12) to submerge the mid-deck (14) to a depth which is equal at least to the draft of the barge (16) with the offshore structure (10, 36) disposed thereon;

floating the barge (16) over the submerged mid deck (14);

deballasting the vessel (12) to raise the mid deck (14) above water level to support the barge (16) and the offshore structure (10, 36); and

securing the barge (16) to the vessel (12) and securing the offshore structure (10, 36) on the barge whereby the offshore structure may be transported over an ocean to a final site for installation;

the vessel (12) and barge (16) being sized such that the maximum height of the vessel and barge system is equal to the height of the top surface of the barge when the barge is disposed on the mid deck (14) whereby the prefabricated offshore structure (10, 36) may extend over the entire length of the vessel.

2. A marine transport system comprising:

a sea-going self-propelled vessel (12) having a well deck (14) and a raised deck (18, 20) with means in the vessel (12, 64) for submerging the well deck (14) to a selected depth without submerging the raised deck (18, 20); and

a floating object (16) having a draft which is less than said selected depth and a length which is less than a length of the well deck (14), the floating object being disposed on the well deck;

the system being characterised in that:

the floating object (16) is a barge having a top surface (22) for supporting a prefabricated offshore structure (10, 36);

means (34) is provided on the barge (16) for skidding a prefabricated offshore structure (10, 36) onto the barge;

means is provided for securing the barge (16) to the vessel (12) and for securing a prefabricated offshore structure on the barge for ocean transport of the offshore structure; and

the maximum height of the vessel and barge system is equal to the height (15) of the top surface (22) of the barge (16) when disposed on the well deck (14) whereby a loaded prefabricated offshore structure (10, 36) may extend over the entire length of the vessel (12).

3. A system according to claim 2, comprising in combination therewith a prefabricated offshore structure (10) of a length which is greater than the length of the vessel (12).

4. A system according to claim 3, wherein the width of the prefabricated offshore structure (10) is greater than the width of the vessel (12).

5. A system according to any one of claims 2 to 4, comprising two said raised decks (18, 20), namely a forward raised deck (18) and an aft raised deck (20), the well deck (14) being disposed between the forward and aft raised decks (18, 20).

6. A system according to claim 5, comprising supports (26) on the forward and aft decks (18, 20) for supporting portions of a prefabricated offshore structure (10) spaced from the barge (16) when the barge and offshore structure are mounted on the well deck (14).

7. A system according to any one of claims 2 to 6, comprising launch means on the barge (16) for launching a prefabricated offshore structure (10), the launch means including a pivot support (54) articulated to the barge at one end thereof for supporting at least a portion of the offshore structure (10) and pivotable for launching the offshore structure (10) from the barge (16) when the barge is disengaged from the vessel (12).

### Patentansprüche

1. Verfahren zum Beladen eines vorgefertigten Offshore-Bauwerkes für den Transport von einer Fabrikationswerft nahe seichtem Wasser zu einem endgültigen Standort für den Einbau, wobei das Verfahren aufweist:

Treiben eines Lastkahns (16) zu einer Position nahe der Fabrikationswerft (40);

Überführen des Offshore-Bauwerkes (10, 36) von der Fabrikationswerft (40) auf den Lastkahn (16); und

Treiben des Lastkahns (16) zu einem Tiefwasserbereich; wobei das Verfahren gekennzeichnet ist durch:

Fahren eines selbstangetriebenen Transportschiffes (12) zum Tiefwasserbereich neben dem Lastkahn (16), wobei das Schiff ein Mitteldeck (14) und mindestens ein Deck (18, 20) hat, welches über das Mitteldeck erhaben ist;

Halten des erhabenen Decks (18, 20) über Wasserniveau, während des Schiff (12) mit Ballast beladen wird, um das Mitteldeck (14) auf eine Tiefe unterzutauchen, die mindestens gleich dem Tiefgang des Lastkahns (16) mit dem darauf angeordneten Offshore-Bauwerk (10, 36) ist;

Treiben des Lastkahns (16) über das unterge-  
tauchte Mitteldeck (14);

Abladen des Ballasts des Schiffes (12) zum  
Anheben des Mitteldecks (14) über das Wasserni-  
veau zur Unterstützung des Lastkahns (16) und  
des Offshore-Bauwerkes (10, 36); und

Befestigen des Lastkahns (16) am Schiff (12)  
und Befestigen des Offshore-Bauwerkes (10, 36)  
auf dem Lastkahn, wodurch das Offshore-Bau-  
werk über See zu einem endgültigen Standort für  
den Einbau transportiert werden kann;

wobei das Schiff (12) und der Lastkahn (16)  
derart bemessen sind, daß die Maximalhöhe des  
Systems von Schiff und Lastkahn gleich der Höhe  
der oberen Fläche des Lastkahns ist, wenn der  
Lastkahn auf dem Mitteldeck (14) angeordnet ist,  
wodurch das vorgefertigte Offshore-Bauwerk (10,  
36) sich über die ganze Länge des Schiffes  
erstrecken kann.

2. Seetransportsystem mit:

einem selbstangetriebenen Hochseeschiff (12)  
mit einem Welldeck (14) und einem (erhabenen)  
Back- und/oder Vorderdeck (18, 20) mit Mitteln im  
Schiff (12, 64) zum Untertauchen des Welldeckes  
(14) auf eine ausgewählte Tiefe ohne Untertauchen  
des erhabenen Deckes (18, 20); und

einem schwimmenden Objekt (16) mit einem  
Tiefgang, der kleiner ist als die ausgewählte Tiefe,  
und mit einer Länge, die kleiner ist als die ausge-  
wählte Tiefe, und mit einer Länge, die kleiner ist  
als eine Länge des Welldeckes (14), wobei das  
schwimmende Objekt auf dem Welldeck ange-  
ordnet ist;

wobei das System dadurch gekennzeichnet ist,  
daß:

das schwimmende Objekt (16) ist ein Lastkahn  
mit einer oberen Fläche (22) für die Abstützung  
eines vorgefertigten Offshore-Bauwerkes (10, 36);

ein Mittel (34) ist auf dem Lastkahn (16) vorge-  
sehen für das Fortschieben eines vorgefertigten  
Offshore-Bauwerkes (10, 36) auf Schienen oder  
Rollen auf dem Lastkahn;

ein Mittel ist vorgesehen zum Befestigen des  
Lastkahns (16) am Schiff (12) und zum Befestigen  
eines vorgefertigten Offshore-Bauwerkes auf dem  
Lastkahn für den Seetransport des Offshore-Bau-  
werkes; und

die Maximalhöhe des Schiffs- und Lastkahnsy-  
stems ist gleich der Höhe (15) der oberen Fläche  
(22) des Lastkahns (16), wenn er sich auf dem  
Welldeck (14) befindet, wodurch sich ein aufgela-  
denes, vorgefertigtes Offshore-Bauwerk (10, 36)  
über die ganze Länge des Schiffes (12) erstrecken  
kann.

3. System nach Anspruch 2, welches in Kombi-  
nation damit ein vorgefertigtes Offshore-Bauwerk  
(10) einer Länge aufweist, welche größer ist als  
die Länge des Schiffes (12).

4. System nach Anspruch 3, wobei die Breite  
des vorgefertigten Offshore-Bauwerkes (10) grö-  
ßer ist als die Breite des Schiffes (12).

5. System nach einem der Ansprüche 2 bis 4 mit  
zwei der erhabenen Decks (18, 20), nämlich einem  
vorderen erhabenen oder Vorderdeck (18) und  
einem hinteren erhabenen oder Backdeck (20),

wobei das Welldeck (14) zwischen dem vorderen  
und hinteren erhabenen Deck (18, 20) angeordnet  
ist.

6. System nach Anspruch 5 mit Stützen (26) auf  
dem vorderen und hinteren Deck (18, 20) zum  
Abstützen von Teilen eines vorgefertigten Off-  
shore-Bauwerkes (10) im Abstand vom Lastkahn  
(16), wenn der Lastkahn und das Offshore-Bau-  
werk auf dem Welldeck (14) angebracht sind.

7. System nach einem der Ansprüche 2 bis 6 mit  
Ablaufmitteln auf dem Lastkahn (16) für den  
Ablauf eines vorgefertigten Offshore-Bauwerkes  
(10), wobei die Ablaufmittel eine Schwenkstütze  
(54) aufweisen, welche gelenkig am Lastkahn an  
seinem einen Ende angebracht ist zur Abstützung  
mindestens eines Teils des Offshore-Bauwerkes  
(10) sowie schwenkbar zum Ablafen des Off-  
shore-Bauwerkes (10) von dem Lastkahn (16),  
wenn der Lastkahn vom Schiff (12) außer Eingriff  
gebracht wird.

## Revendications

1. Procédé de chargement de structure offshore  
préfabriquée à transporter à partir d'un chantier  
de fabrication voisin d'un haut fond jusqu'à un  
lieu final d'installation, le procédé comprenant:

l'amenée par flottage d'une barge (16) jusqu'en  
un emplacement voisin du chantier de fabrication  
(40);

le transfert de la structure offshore (10, 36) du  
chantier de fabrication (40) sur la barge (16); et

l'amenée par flottage de la barge (16) en une  
zone d'eau profonde;

et le procédé étant caractérisé en ce que:

on amène un bateau de transport autopropulsé  
(12) dans la zone d'eau profonde auprès de la  
barge, le bateau présentant un entrepont (14) et  
au moins un pont (18, 20) surélevé au-dessus de  
l'entrepont;

on maintient le pont surélevé (18, 20) au-dessus  
du niveau de l'eau en lestant le bateau (12) pour  
immerger l'entrepont (14) jusqu'à une profondeur  
au moins égale au tirant d'eau de la barge (16)  
portant la structure offshore (10, 36) disposée sur  
elle;

on amène par flottage la barge (16) au-dessus  
de l'entrepont immergé (14);

on déleste le bateau (12) pour amener l'entre-  
pont (14) au-dessus du niveau de l'eau afin qu'il  
supporte la barge (16) et la structure offshore (16,  
36); et

on fixe la barge (16) au bateau (12) et la  
structure offshore (10, 36) sur la barge de façon à  
pouvoir transporter la structure offshore au long  
cours jusqu'au lieu final d'installation;

le bateau (12) et la barge (16) étant dimen-  
sionnés en sorte que la hauteur maximale du  
système bateau-barge soit égale à la hauteur  
atteinte par la surface supérieure de la barge  
quand la barge est disposée sur l'entrepont (14)  
de façon que la structure offshore préfabriquée  
(10, 36) puisse s'étendre sur toute la longueur du  
bateau.

2. Système de transport marin comprenant:

un bateau de haute mer autopropulsé (12) présentant un pont à coffre (14) et un pont surélevé (18, 20) avec présence sur le bateau de moyens (12, 64) permettant d'immerger le pont à coffre (14) jusqu'à une profondeur choisie sans immerger le pont surélevé (18, 20);

un objet flottant (16) ayant un tirant d'eau inférieur à ladite profondeur choisie et une longueur inférieure à la longueur du pont à coffre (14) l'objet flottant étant disposé sur le pont à coffre; et

le système étant caractérisé en ce que:

l'objet flottant (16) est une barge présentant une surface supérieure (22) destinée à supporter une structure offshore préfabriquée (10, 36);

un moyen (34) est prévu sur la barge (16) pour amener à coulissement sur celle-ci une structure offshore préfabriquée (10, 36);

un moyen est prévu pour fixer la barge (16) au bateau (12) et pour fixer une structure offshore préfabriquée sur la barge en vue du transport au long cours de la structure offshore; et

la hauteur maximale du système bateau-barge est égale à la hauteur (15) atteinte par la surface supérieure (22) de la barge quand celle-ci est disposée sur le pont à coffre (14) de sorte qu'une structure offshore préfabriquée (10, 36) chargée peut s'étendre sur toute la longueur du bateau (12).

3. Système selon la revendication 2, comprenant en combinaison une structure offshore préfabriquée (10) de longueur supérieure à la longueur du bateau (12).

4. Système selon la revendication 3, dans lequel la largeur de la structure offshore préfabriquée (10) est supérieure à la largeur du bateau (12).

5. Système selon l'une quelconque des revendications 2 à 4, comprenant deux susdits ponts surélevés (18, 20), à savoir un pont surélevé avant (18) et un pont surélevé arrière (20), le pont à coffre (14) étant disposé entre les ponts surélevés avant et arrière (18, 20).

6. Système selon la revendication 5, comprenant des supports (26) prévus sur les ponts avant et arrière (18, 20) pour supporter des parties d'une structure offshore préfabriquée (10) espacée de la barge (16) quand la barge et la structure offshore sont montées sur le pont à coffre (14).

7. Système selon l'une quelconque des revendications 2 à 6, comprenant des moyens de lancement prévus sur la barge (16) pour lancer une structure offshore préfabriquée (10), les moyens de lancement comprennent un support pivotant (54) articulé sur la barge à l'une de ses extrémités pour supporter au moins une partie de la structure offshore (10) et pivotant pour lancer la structure offshore (10) depuis la barge (16) quand la barge est détachée du bateau (12).

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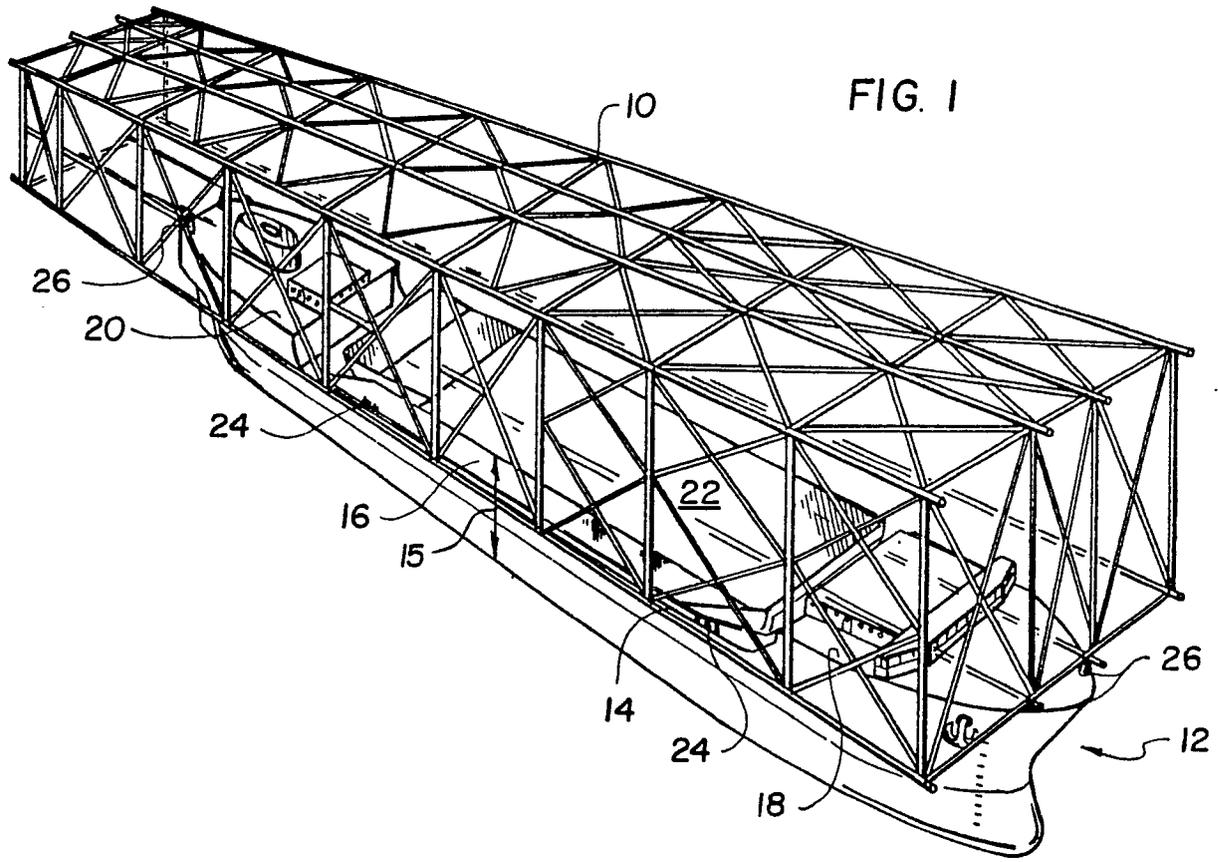
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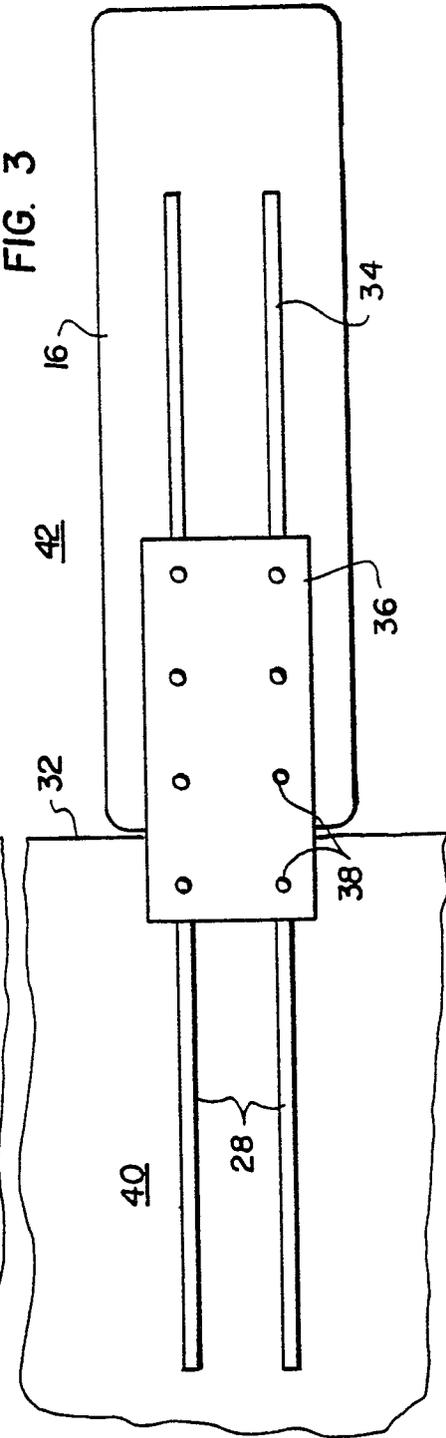
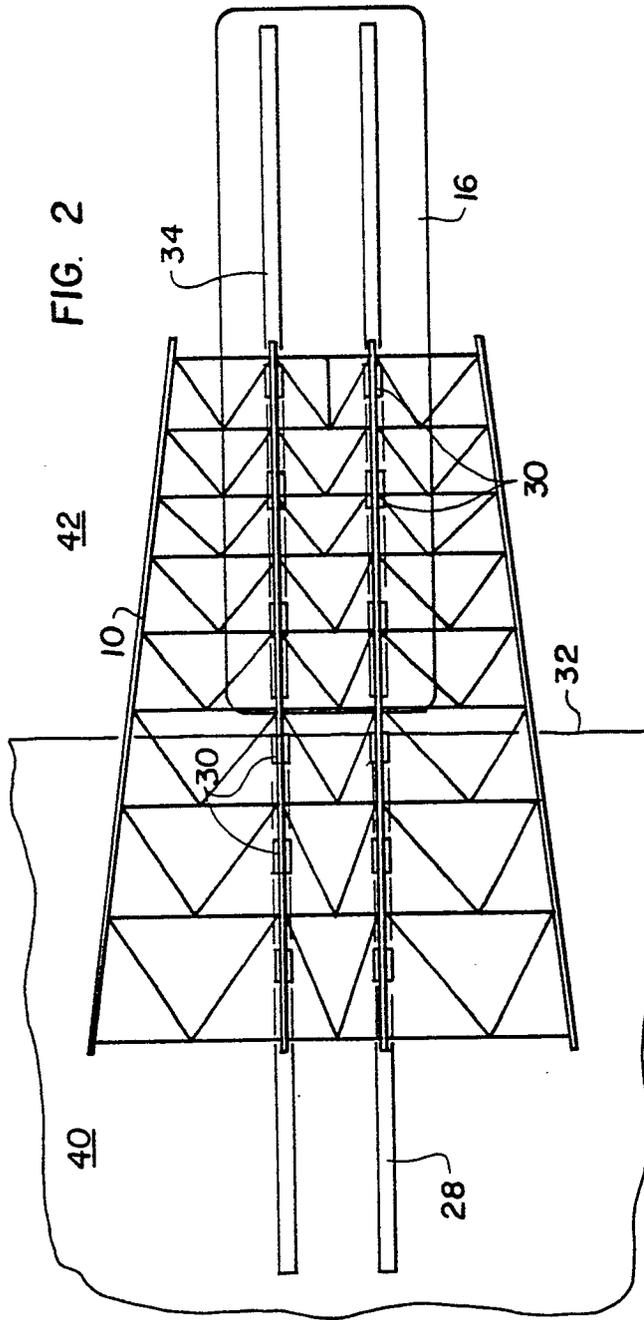


FIG. 4

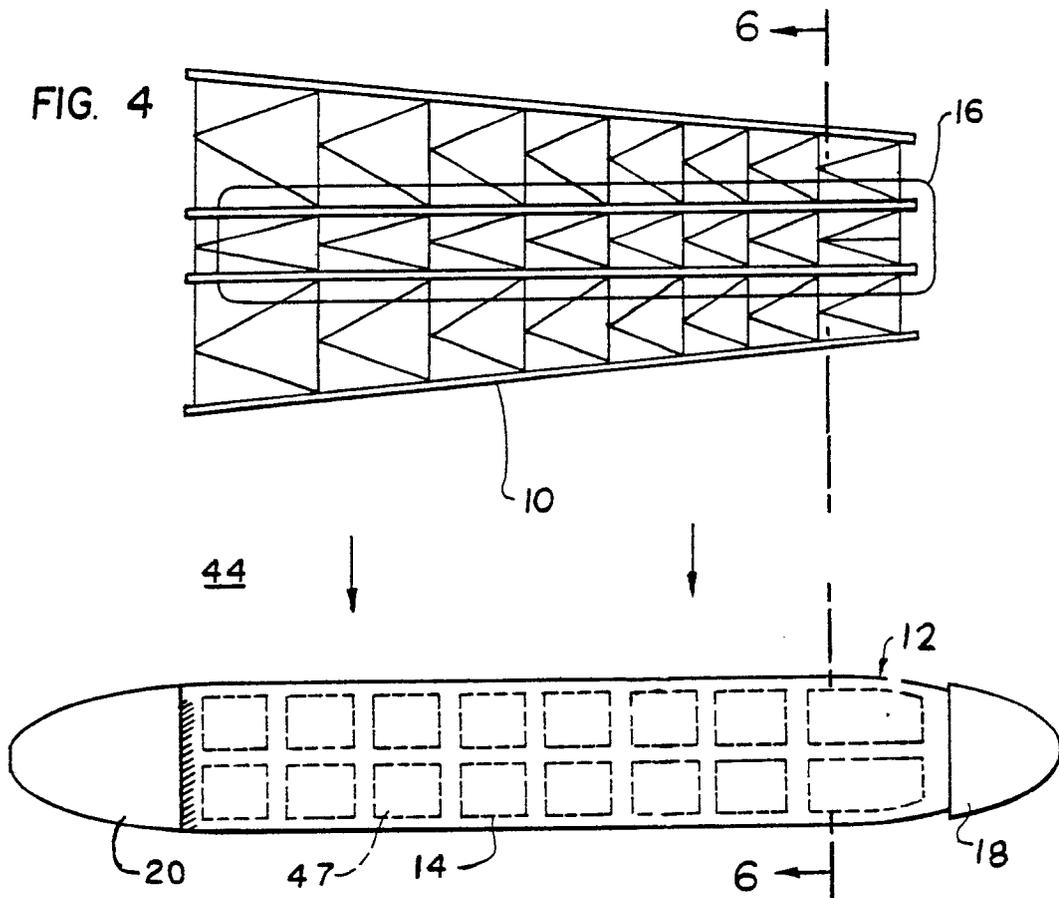
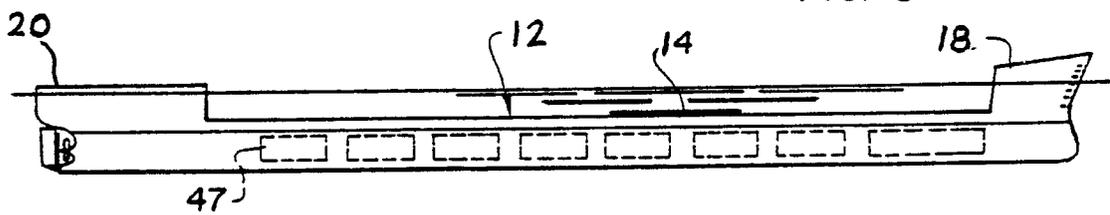
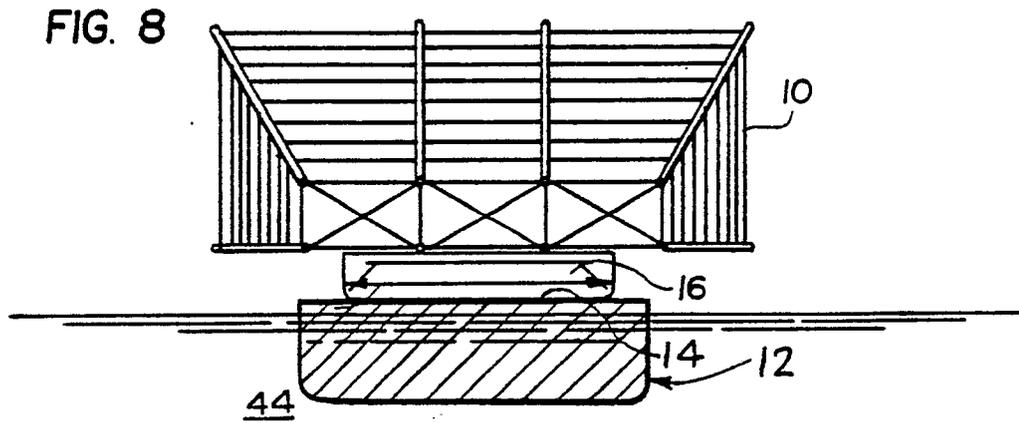
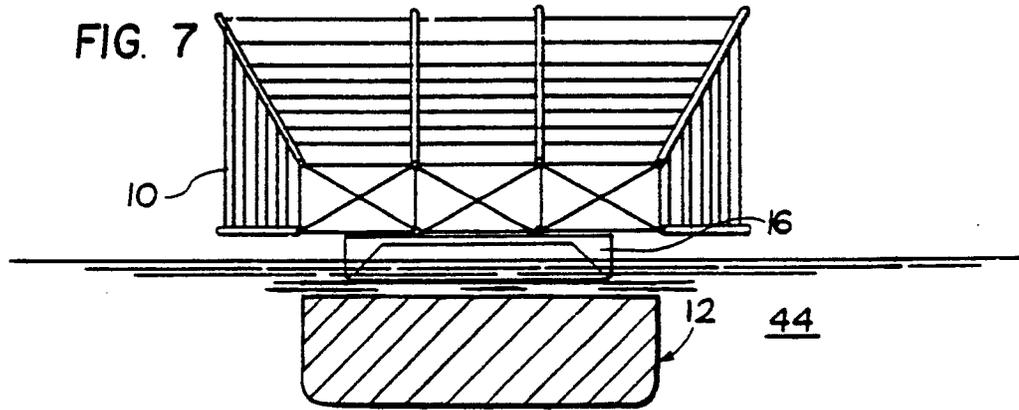
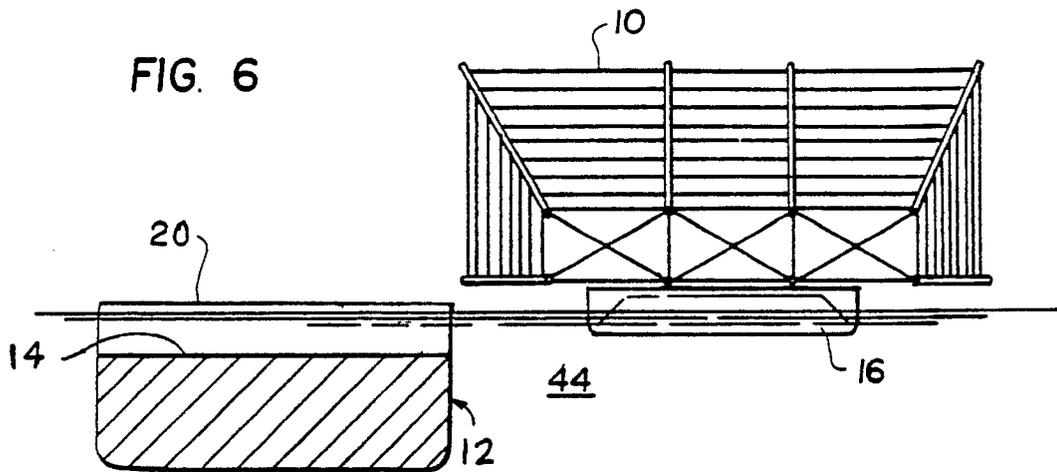
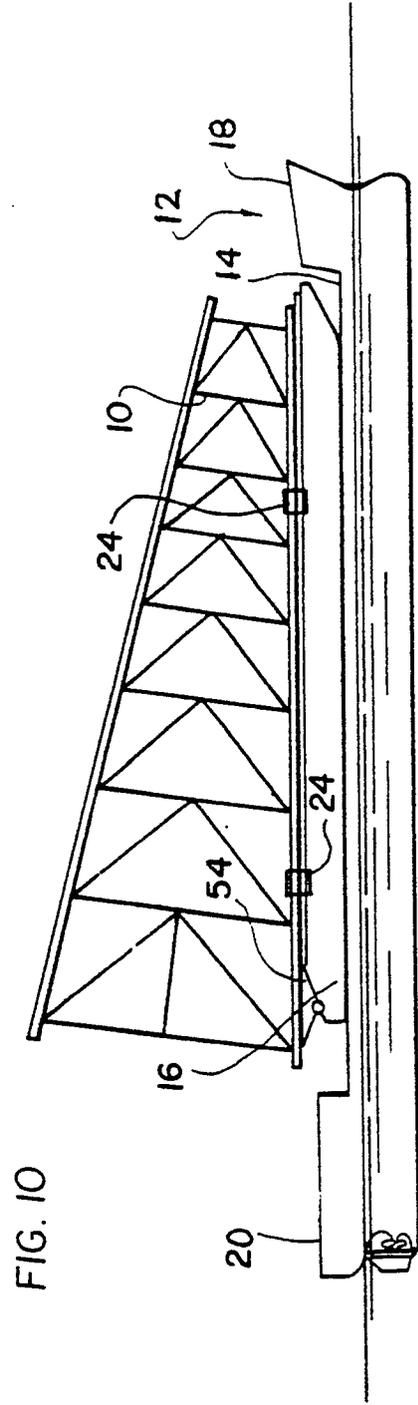
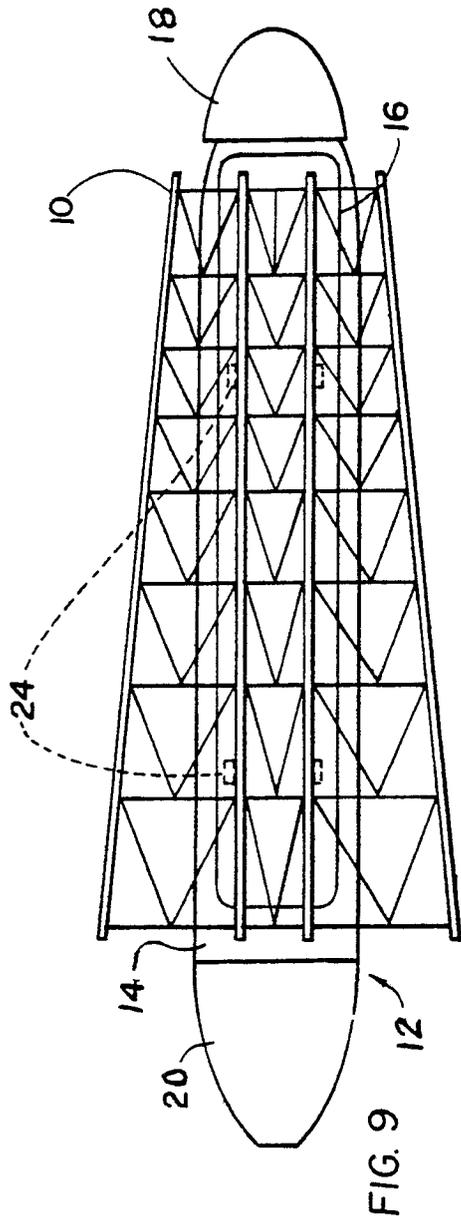
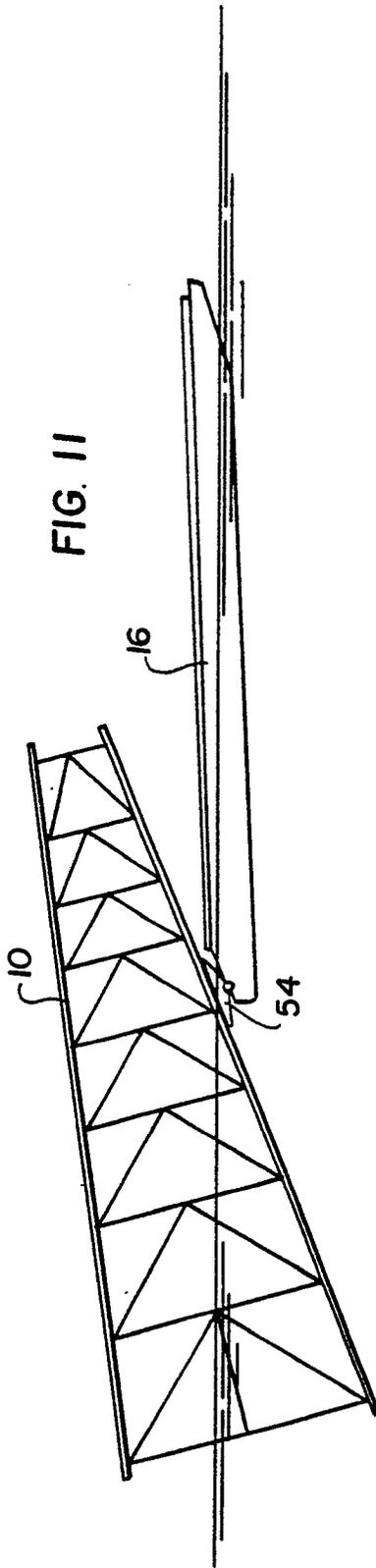


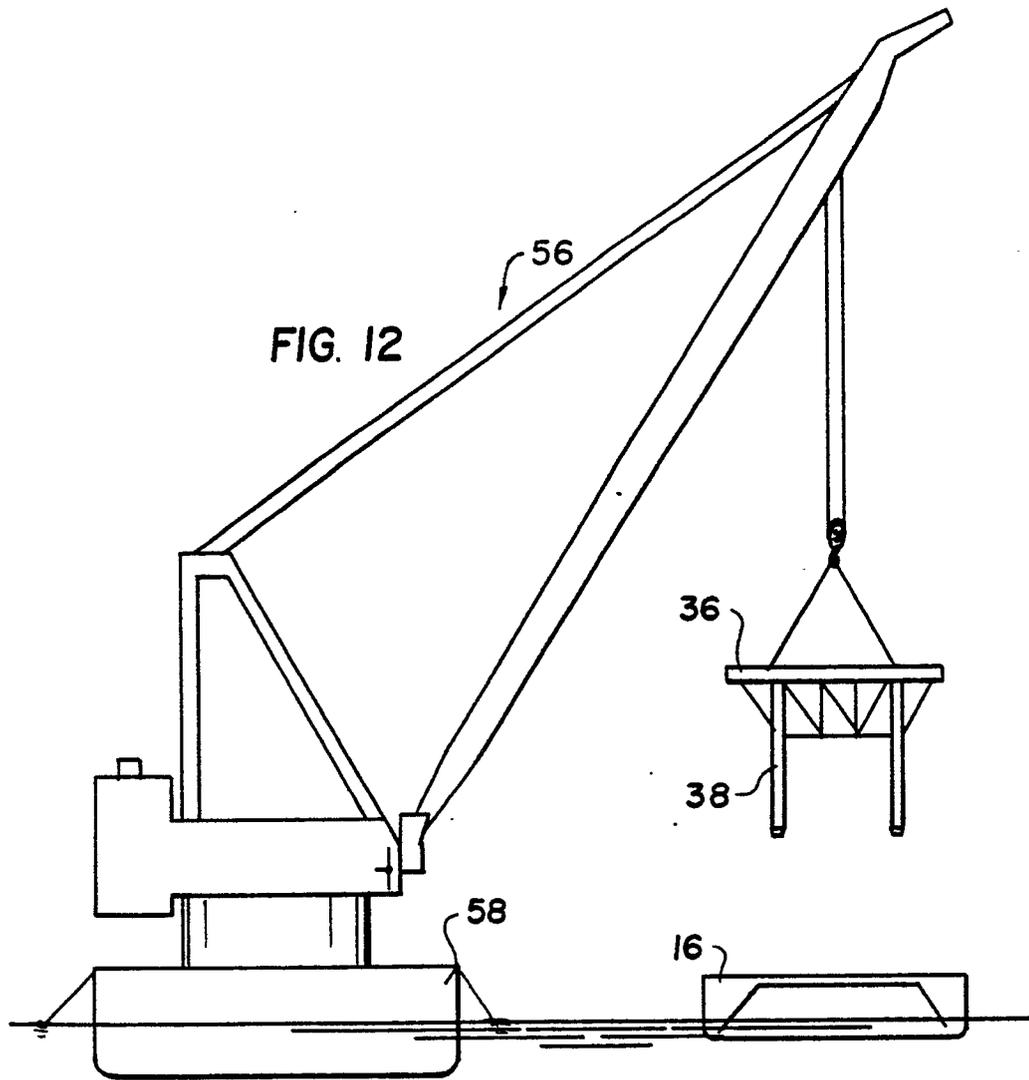
FIG. 5











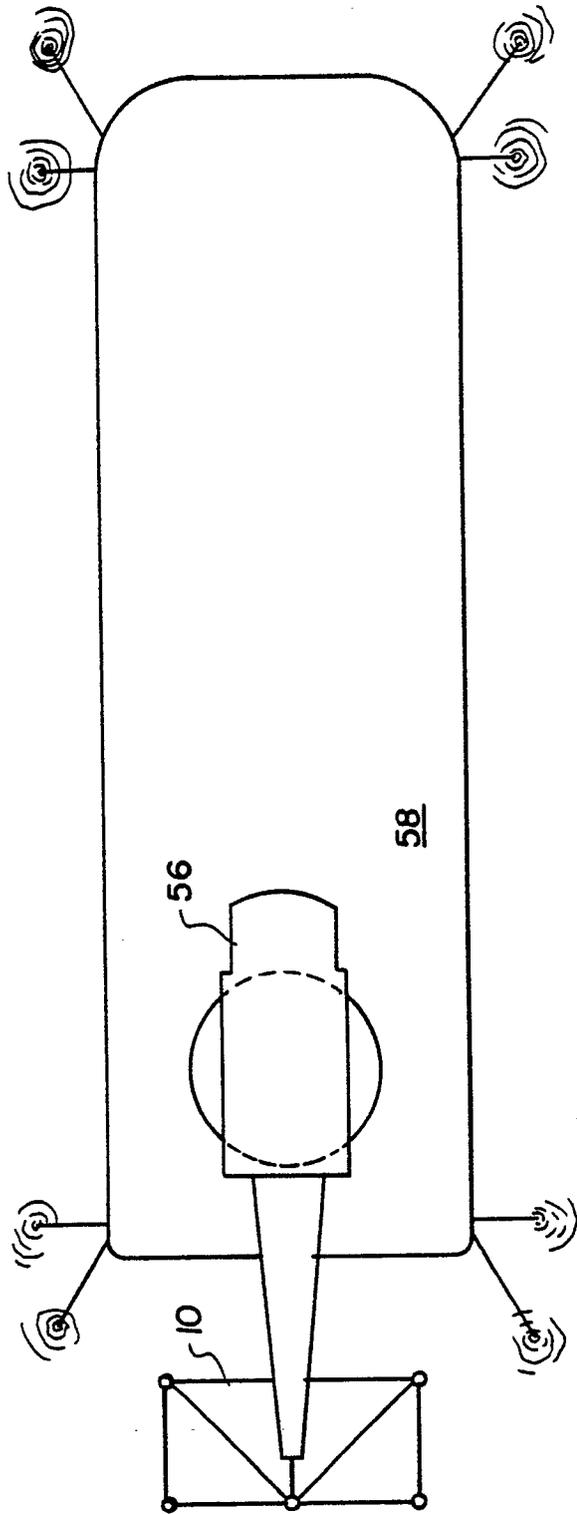


FIG. 13

