IN THE CIRCUIT COURT IN AND FOR ESCAMBIA COUNTY, FLORIDA

DEEPGULF, INC. and
TOKE OIL AND GAS, S.A.
Plaintiffs,
vs.
MARC M. MOSZKOWSKI
Defendant.

Case No.: 2018 CA 000543
Division: "E

DEFENDANT'S RESPONSE TO PLAINTIFFS' AMENDED MOTION FOR SUMMARY JUDGMENT

COMES NOW Defendant, Marc M. Moszkowski, and in response to Plaintiffs' Motion for Summary Judgment and Memorandum of Law in Support states as follows:

OBJECTION TO STATEMENT OF UNDISPUTED FACTS

Of the 24 statements in Plaintiff's Statement of Undisputed Facts, 9 are trivialities or truisms, three are subject to comments, and 12 are firmly opposed by Defendant.

Defendant's objections to Plaintiff's statements being too numerous to show in the body of this Response, please kindly refer to the ***Defendant's***

Response to Plaintiff's Statement of Undisputed Facts filed this same day.

ARGUMENT

I. Summary judgment should not be granted for Count I, that all of the patents and/or inventions should be declared to be owned by Plaintiff, DeepGulf, Inc.

Count I of Plaintiffs' Complaint is self-contradictory and Plaintiff Deepgulf, Inc. himself indicates it is moot, while the relief demanded by Plaintiff Deepgulf, Inc. is legally impossible to grant.

Plaintiff Deepgulf, Inc. reports in the very body of Count I that Defendant already assigned his patent interest to Plaintiff Deepgulf, Inc. 20 years ago, 13 years before this lawsuit was filed (paragraph 16 of the complaint: "*I hereby assign all rights including, but not limited to, rights to inventions, patentable subject matter, copyrights and trademarks, …*"), and Plaintiff Deepgulf, Inc. is suing Defendant for the exclusive ownership of property which was not uniquely his before he assigned to Plaintiff Deepgulf, Inc. his own interest in the property: to wit, there exists for each one of the patents a co-inventor (see **Exhibit "N"**), unrelated to Plaintiff Deepgulf, Inc., whose existence is well known to Plaintiff Deepgulf, Inc., since his identity clearly appears on each of the patents cited in Count I.

Said co-inventor has not assigned his interests to Plaintiff Deepgulf, Inc.. Hence, the Court cannot "*declare that the intellectual property described in Paragraph 17 is owned by DeepGulf*" without Plaintiff Deepgulf, Inc. having been already assigned the co-inventor's interest, which is reportedly not for sale. All Plaintiff Deepgulf, Inc. can obtain is Defendant's assignment of his interest in the patents, which he already assigned to Plaintiff Deepgulf, Inc. twenty years ago, in 2005 (paragraph 16 of the complaint, cited above).

Remarkably, one patent, *Flex J-Lay Tower*, which was the patent on which Plaintiff Deepgulf, Inc. was founded [1] and was assigned to Plaintiff Deepgulf, Inc. by the co-inventor in 2007, in addition to Defendant's interest, lapsed and then expired on 17 August 2016 because Plaintiff Deepgulf, Inc. neglected to pay to the United States Patent and Trademark Office (USPTO) the maintenance fee due in relation to the patent, thus depriving the company of its most valuable intellectual asset. The same happened to the *Dual gradient pipeline evacuation method* patent, which also lapsed and then expired on 3 April 2016 due to a failure to pay the maintenance fee. Plaintiff Deepgulf, Inc. is therefore suing frivolously for patents which it has already caused to lapse. (See **Exhibit "P"** [2]).

Likewise, had the above-mentioned co-inventor not paid in 2021 the

[1] See also paragraph 31 in Count III of Plaintiffs' complaint.

[2] The patent expired due to nonpayment of maintenance fees under 37 CFR § 1.362

maintenance fee for the first patent on Plaintiff Deepgulf, Inc.'s list ($1,250 for patent 9644792), that patent would also have lapsed. (See **Exhibit "Q"**).

In addition, Plaintiff Deepgulf, Inc. demands for other intellectual property have been more than satisfied, since all professional information related to Plaintiff Deepgulf, Inc. had been transmitted by Defendant by July 2019, in more than 35,000 electronic messages and attachments.

There subsists in Defendant's hands no hardware, or software, or "customer list" that could possibly belong to Plaintiff Deepgulf, Inc..

Therefore, Plaintiffs' Motion for Summary Judgment as to Count I is due to be denied based in part upon the facts that Claim I is:

a) Self-contradictory;
b) Plaintiff Deepgulf, Inc. itself indicates it is moot;
c) The relief demanded by Plaintiff Deepgulf, Inc. would be impossible to grant legally;
d) Two of the patents lapsed because Plaintiff neglected to pay fees to the U.S. Patent and Trademark Office;
e) The patent which did not lapse only did so because the co-inventor did pay the fees himself.

II. Summary Judgment should not be granted as to Plaintiffs' Claim that Defendant be enjoined by utilizing intellectual property owned by Plaintiff DeepGulf, Inc. and other relief asserted in Count II.

Defendant leases from a web hosting provider a hosting server, and domain names from various registrars. Plaintiff Deepgulf, Inc. demands access to Defendant's personal property without producing a scintilla of evidence as to its claim of ownership, nor providing any plausible explanation as to why Plaintiff Deepgulf, Inc. was not, and is not, paying itself annual recurrent fees for the property, if it belonged to Plaintiff Deepgulf, Inc.. In addition, deep-gulf.com was personally purchased by Defendant before Plaintiff Deepgulf, Inc. was even incorporated [3] .

As for the deep-gulf.com and deepgulf.net domains, they are used exclusively for email purposes since the end of 2017, 7 years ago, as a visit to the webpages would show. The domains have been for 15 years the primary email domains for Defendant, including for all private correspondence regarding this dispute and other litigation, and can therefore not be trusted to the Plaintiff, since the risk is considerable for Defendant that the Plaintiff would not only have instant access to all his

[3] See also the futility of the claim at 108 of Count XI that "*The domain names, passwords, and electronic data and information are all critical to the ongoing business of Plaintiff, DeepGulf, Inc.*" especially when considering that Plaintiff Deepgulf, Inc. has no "*ongoing business*" that Defendant knows of, and, if it had any, Defendant demands to know the exact nature of that business, since he is the owner of nearly 50% of Plaintiff Deepgulf, Inc. which owes him at least 8 years of unpaid salaries. Moreover, Plaintiff Deepgulf, Inc. has consistently refused to produce any financial statement since 2019, when he was compelled by the U.S. Court to produce some.

personal correspondence, but would also impersonate him at will, since no mechanism exists to prevent a new domain manager from using any address he chooses.

Had Defendant not consistently paid registrars over the years for those domain names, which are by the way not subject to copyright, they would have become the property of others. Since he is registered as the lawful owner, and has been for years, and he has consistently paid registrars over the years for those domain names and web hosting providers for the hosting server, on which he keeps several other private domains, they are unmistakably his.

Finally, the control of a domain name is certainly not a simplistic question of "passwords" only, which indicates a probable lack of understanding of the matter on the part of the Plaintiff, since on one particular hosting server there can exist no individual "password" for one specific domain among others.

In conclusion, Plaintiffs' Motion for Summary Judgment as to Count II is due to be denied.

Further, Defendant would respectfully venture that this Court probably lacks authority to exercise jurisdiction over, and mandate compliance from,

"www.hostgator.com". As such, Plaintiffs' request is improper and unsupported.

Moreover, Defendant has not maintained any business relationship with Hostgator since at least June 2021.

III. Summary Judgment should not be granted as to Plaintiffs' claim that Defendant converted the property of DeepGulf, Inc. in Count V.

Plaintiffs' argue, in support of their claim for summary judgment as to Count V of the Complaint, that Defendant violated his obligation to not have a conflict of interest as a Director of DeepGulf, Inc. under both Florida Law and the Non-Compete Agreement by converting the sum of $345,000.00 from DeepGulf, Inc. to his own use. (Plaintiff's Motion for Summary Judgment, p. 19).

In response, Defendant would assert that Plaintiffs are not entitled to summary judgment for several reasons. First, Defendant did not violate any of his obligations under Florida Law or the Non-Compete. Second, Plaintiffs have not met the element of ownership or entitlement to funds necessary to succeed under an action for conversion. Thus, Defendant did not convert the sum of $345,000.00 from DeepGulf, Inc. to his own use. Third, even if the necessary elements were met, Plaintiffs' claim for conversion is barred

by the applicable statute of limitations. As such, Plaintiffs' Motion for Summary Judgment as to Count V is due to be denied.

Defendant's actions in becoming President Director General of Toke Oil and Gas did not conflict with any obligations or objectives as outlined by the Non-Compete or Florida Law. As noted by Plaintiffs (Plaintiff's Motion for Summary Judgment, p. 19), pursuant to Fl. Stat. 607.0830(1)(c), Defendant owed a duty to act in a manner that he believed to be in the best interest of DeepGulf, Inc. Defendant did just that.

Defendant held his position at Toke for the benefit of DeepGulf, Inc. in that although no DeepGulf technology was used to carry out any of the three Toke projects, Defendant negotiated a 10% commission be paid to DeepGulf from each project. (Deposition Rustin Howard 129: 10-15 (19 July 2019)). What's more, Defendant actually negotiated additional commissions totaling approximately 13%, (as evidenced by the numbers in the Toke Oil and Gas spreadsheets [detailing payments made to DeepGulf by Toke prior to DeepGulf's acquisition of Toke]) resulting in substantially more revenue having been paid to DeepGulf. It was pursuant to Defendant's position of authority with Toke Oil and Gas that DeepGulf received substantial income throughout Toke's three major projects.

Plaintiffs cite to Florida law which deals with a corporate officer acting as an agent of the corporation, and the requirement that said agent fully

disclose all facts, within his knowledge pertaining to the transaction. (Plaintiff's Motion for Summary Judgment, p. 7 and 8). However, in negotiating commissions paid to DeepGulf, and in negotiating his own salary as President Director General for Toke Oil and Gas, Defendant was not acting in his capacity as an agent of DeepGulf, Inc. But, regardless, Defendant consistently acted with DeepGulf's best interests in mind.

The money paid to Defendant by Toke Oil and Gas was not in any way property of DeepGulf, Inc. DeepGulf was a recipient of commissions as a result of Defendant's negotiations- which Toke Oil and Gas paid as a separate entity. DeepGulf, Inc. did not have any ownership interest in Toke for most of the time said commissions were paid, nor was there any Director other than Defendant and two Timorese nationals on the board of Toke at the time Defendant was paid the sum of $345,000.00 in salary for his role as President Director General. Thus, DeepGulf has no way to establish that it was in any way entitled to the $345,000.00 received by Defendant for services rendered in his capacity *outside of* his employment with DeepGulf. Defendant would reiterate that his actions only benefitted DeepGulf, Inc., as such resulted in substantial revenue generated by DeepGulf for work done solely by Defendant. Further, Plaintiff DeepGulf, Inc. was not harmed in any way by Defendant being compensated for his service as Toke's President

Director General a position, as mentioned, which was necessary to negotiate the multitude of payments received by DeepGulf.

Further, Defendant did in fact disclose all salaries paid to him by Toke in email correspondence directly to Rustin Howard (DeepGulf Chairman) and Jennifer Cabbage (DeepGulf employee) dated 6 March 2014 (Defendant's Motion for Summary Judgment, **Exhibit "F"**) and again, Defendant confirmed salaries had been paid to him by Toke in emails to the same Plaintiff representatives dated 8 April 2014. Thus, Defendant complied with all obligations and duties required under the Non-Compete Agreement and under Florida law. Plaintiffs make statements within their conversion argument which are supported solely by the Affidavit testimony of Rustin Howard, and not by any additional facts or corroborating evidence (specifically concerning DeepGulf's understanding that the entity in East Timor would be formed on behalf of DeepGulf, and that said entity would utilize DeepGulf's technology and intellectual property.) (Plaintiff's Motion for Summary Judgment, p. 20). Defendant disputes the validity of these statements and would reassert his challenge to the credibility of the Affidavit of Rustin Howard as outlined in his Objection to Plaintiffs' Statement of Undisputed Facts, above.

Defendant would note, for the Court's clarity, that the Toke group of companies existed prior to Defendant's traveling to East Timor at the

invitation of Toke. Two of the three original shareholders reached out to Defendant about establishing a new Toke, called Toke Oil and Gas, S.A., and invited him to serve as President Director General. Defendant accepted, on his own behalf, a position that was not in competition and further allowed him to benefit DeepGulf with his position of authority (hence DeepGulf being the only recipient of commissions from the Toke Oil and Gas, S.A. projects.) (Deposition Marc M. Moszkowski, 70:6-25, 71:21-23, 75:21-25, 76:1-23 (17 July 2019)).

Plaintiffs cite additionally to caselaw concerning improperly disbursed escrow funds. (Plaintiff's Motion for Summary Judgment, p. 20). However, the instant situation does not deal with escrow funds and thus, said caselaw in inapplicable.

As mentioned above, even if there was a breach of duty on Defendant's behalf, Plaintiffs could not succeed under the theory of conversion. Under Florida case law, conversion is defined as the wrongful control of another person's property, assets or money. *Seymour v. Adams*, 638 So.2d 1044 (Fla. 5th DCA 1994). The essence of the tort of conversion is the exercise of wrongful dominion or control over property, assets or money to the detriment of the rights of the actual owner. *Goodwin v. Alexatos*, 584 So.2d 1007 (Fla.5th DCA 1991)(emphasis added).

Plaintiffs have not, and cannot, demonstrate that the monies which were paid out as “director salaries” was money that belonged to Plaintiffs. DeepGulf was not entitled to any of Toke’s revenue beyond the contractually agreed upon commissions, nor was DeepGulf entitled to monies that Toke paid to its directors. Had $345,000.00 of director’s salaries not been paid to Defendant, those funds would have been paid to other Toke Directors.

Plaintiffs cannot show that said monies would have been paid to, or somehow belonged to, DeepGulf. As such, the key element of ownership under a claim for conversion is not met, and Plaintiffs’ claim under Count V fails.

Finally, Plaintiffs’ Motion for Summary Judgment under Count V of the Complaint is due to be denied because it is barred by the Statute of Limitations. The statute of limitations for conversion is 4 (four) years from the time of incident or discovery of the wrong. *See* Fla. Sta. § 95.11(3)(h)-(3)(i) (2011). Count V is clearly barred by the statute of limitations. Plaintiffs were sent an email by Defendant dated 6 March 2014 recapitulating all monies personally received by Defendant in France from Toke (Defendant's Motion for Summary Judgment, **Exhibit "F"**) and then again the receipt of information concerning salaries paid to Defendant by Toke was confirmed by Plaintiffs in emails dated 8 April 2014. This action was filed 3 April 2018,

more than 4 years after the alleged conversion was or should have been discovered, or occurred.

Thus, Plaintiffs are barred by the statute of limitations from asserting conversion under Count V.

In conclusion, Plaintiffs' Motion for Summary Judgment as to Count V is due to be denied.

IV. Summary Judgment should not be granted as to Plaintiffs' claim for declaratory relief under Count VIII.

Plaintiffs request that DeepGulf, Inc. be declared the sole owner of Toke Oil and Gas, S.A. However, questions of fact exist as to whether Toke Oil and Gas, S.A. is actually a wholly owned subsidiary of DeepGulf, Inc., and as to the corporate existence of Toke Oil and Gas, S.A. These questions of fact, which effectively preclude summary judgment, are evidenced in the record in testimony by Defendant, disputing that DeepGulf is the sole owner of Toke based upon an incomplete purchase (Deposition Marc M. Moszkowski, 160:1-7 (17 July 2019)) and then disputing Toke's existence. (Deposition Marc M. Moszkowski, 178:21-22 (17 July 2019)).

These questions of fact are also evidenced in the record in testimony by the Plaintiffs, wherein Rustin Howard confirmed that he made no efforts to verify Toke's existence prior to filing the instant lawsuit and then further

confirming that he did not take any steps to ensure Toke had a current and/or valid business license prior to filing suit. (Deposition Rustin Howard 143:21-144:3 (19 July 2019)).

Based upon the foregoing, there exist genuine issues of material fact and thus, Plaintiffs' Motion for Summary Judgment as to Count VIII is due to be denied.

V. Summary Judgment should not be granted as to Plaintiffs' claim that Defendant should account to Plaintiffs for the use of its assets under Count IX.

Plaintiffs claim an equitable accounting should be ordered by this Court, mandating Defendant to account for monies spent by Toke Oil and Gas before it allegedly became a subsidiary of DeepGulf, Inc.

As noted by Plaintiffs [4], The 11th Circuit has ruled that an accounting is only a remedy attached to an independent cause of action. First, Defendant would object to an accounting ordered pursuant to Plaintiffs' Count IX because the request does not clearly attach to any one claim asserted. Thus, it is indecipherable as to whether a remedy at law is an inadequate such that an accounting is the only adequate remedy. "Of course, as a theoretical matter, it is accurate to say that equitable relief may

[4] *See Becker v. Davis*, 491 F.3d 1292, 1305 (11th Cir. 2007, abrogated on other grounds by *Arthur Andersen v. Carlisle*, 556 U.S. 624 (2009)).

only be granted in the absence of an adequate remedy at law." *Zaki Kulaibee Establishment v. McFliker*, 771 F.3d 1301, 1314 n.25 (11th Cir. 2014)(citing *Dairy Queen, Inc. v. Wood*, 369 U.S. 469, 478, 82 S. Ct. 894, 900, 8 L. Ed. 2d 44 (1962)). Plaintiffs cannot establish the absence of a genuine issue of material fact when procedurally, it is unclear as to whether Plaintiffs are entitled to an accounting or whether there is an adequate remedy at law for whatever cause of action to which Plaintiffs contend the accounting request attaches.

Defendant would assert next that Plaintiffs are not entitled to an accounting based on the fact that they cannot establish a fiduciary duty or complex transaction. *See Zaki Kulaibee Establishment v. McFliker*, 771 F.3d 1301, 1311 n.22 (11th Cir. 2014)(citing *Am. United Life Ins. Co. v. Martinez*, 480 F.3d 1043, 1071 (11th Cir. 2007) ("Under Florida law, a party that seeks an equitable accounting must show that: 1) the parties share a fiduciary relationship or that the questioned transactions are complex, and 2) a remedy at law is inadequate.")

The fiduciary relationship between Defendant and DeepGulf, Inc. is inapplicable to Plaintiffs' request for an accounting from Toke Oil and Gas prior to DeepGulf's alleged acquisition. An accounting of funds expended by Defendant on behalf of a third party corporation (which has never been established as having been created on behalf of, or the property of

DeepGulf, during the time frame of the requested accounting) [5] prior to any involvement by DeepGulf, aside from the contracted commission payments, would be inappropriate.

A fiduciary relationship is one in which "one person is under a duty to act for the benefit of another on matters within the scope of the relationship." Black's Law Dictionary 1402 (9th ed. 2009). The fiduciary relationship applicable to a request for an accounting of Toke Oil and Gas prior to the alleged acquisition would be between Defendant and Toke Oil and Gas, S.A. (which, again, during the time frame of the requested accounting was a corporation independent from DeepGulf- leaving the only fiduciary relationship involving Defendant outside of the scope of this litigation).

Plaintiffs cannot demand an equitable accounting based upon a fiduciary relationship to which they were not a party. [6]

Plaintiffs also aver the existence of complex transactions. (Plaintiff's Motion for Summary Judgment, p. 23). However, Plaintiffs' only support for

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[5] Plaintiffs have only stated that they "believed" Toke Oil and Gas was being held in his name for the benefit of DeepGulf. (Plaintiff's Motion for Summary Judgment, p.5). Plaintiffs have yet to establish that DeepGulf had any right to Toke's profits prior to the alleged acquisition which did not occur until 2012.

[6] "Under Florida law, a party that seeks an equitable accounting must show that (1) a fiduciary relationship exists between the parties…" *Zaki Kulaibee Establishment v. McFliker,*788 F. Supp. 2d 1363 (S.D. Fla. 2011), rev'd and remanded on other grounds, 771 F.3d 1301, 1314 n.25 (11th Cir. 2014).

this assertion is a conclusory statement. Plaintiffs seem to attempt to lead this Court to believe that Defendant admitted that spreadsheets referred to in Defendant's second deposition were "complex." However, Plaintiffs' citation to Defendant's deposition is simply an acknowledgement that some of the questions Defendant would be asked would concern the spreadsheets at issue. Defendant has never admitted that they were complex. In fact, the spreadsheets are only a few pages in length and the transactions at issue [7] as evidenced by the spreadsheets (and also clarified in emails received by Plaintiffs dated 6 March 2014 and 8 April 2014) are very simple and have not been concealed by Defendant. Thus, Plaintiffs have failed to show the complexity of the transactions at issue.

Also, Defendant would note that the only financial records available to him from the then independent entity of Toke Oil and Gas, S.A. have been disclosed. Defendant cannot account for monies spent by Toke beyond what has already been produced, in light of the fact that Defendant was not in charge of the accounting for Toke, nor did he draft the spreadsheets at issue. (Deposition Marc M. Moszkowski, 25:15-17 (21 October 2019)). Thus, Defendant is unsure what remedy a Court ordered accounting would

[7] The only relevant transactions to Plaintiffs claims are the limited entries concerning Toke's payment to Defendant.

provide, and again would assert that the same would be unwarranted in light of the foregoing.

Thus, Plaintiffs' Motion for Summary Judgment as to Count IX is due to be denied.

VI. Summary Judgment should not be granted as to Plaintiffs' claim that Defendant breached the Noncompete Contract pursuant To Count X.

The opportunity never existed for tiny un-capitalized U.S. company DeepGulf, Inc. to do business on its own with the Government of East Timor, where the Defendant had been invited by two local businessmen and introduced to members of the Government, including the President and the Prime Minister. It defies common sense to even start to believe that the business could have been gifted by these two gentlemen to an unknown foreign corporation without a cent of capital at the time.

The opportunity never existed for DeepGulf, Inc. to be an owner. Again, it must be kept in mind that the Defendant had been invited by two local businessmen to join the company, whose name was decided by the local owners and was evidently established by them, not by the Defendant, not only a foreigner, but devoid of a business visa and work permit at the

time. The idea that Defendant could have "*named himself*", or "*caused payments*" is totally absurd and even ludicrous.

When time came to form a company in East Timor, the only opportunity that was ever offered was for the Defendant to join as an individual. The U.S. concern was never considered by the local businessmen as a partner, especially when considering that DeepGulf, Inc. was totally un-capitalized at the time, since, despite Defendant's alarmed remonstrations to Mr. Howard for his lack of funding activity (see sample in **Exhibit "AA"**), Plaintiff started seeking investors only **after** the first contract had been finalized and signed with the Government of East Timor and the first payment had been effected.

Furthermore, it would have been unforgivably reckless for infant, yet totally un-capitalized, DeepGulf, Inc. to get embroiled directly in a country which had been in a civil war for more than twenty years.

Instead, in order to protect DeepGulf, Inc., Defendant took the risk to shoulder personally the dangerous responsibility of operating in a country in violent turmoil with no guarantee that payments would be ever made. He did so indeed "*for the benefit*" of DeepGulf, Inc., although he meant by that phrase that protecting DeepGulf, Inc. would be *beneficial* to the U.S. entity.

However, if the phrase "*to the benefit of*" were to be taken in a purely accounting sense, in reality, rather than the **33.33% share of profits** that was due to the 33.33% ownership which the Defendant kept indeed for the

benefit of DeepGulf, Inc. (as was further evidenced later when he turned it over to DeepGulf, Inc. without consideration), the Defendant caused Toke Oil & Gas S.A. to pay DeepGulf, Inc. **50.3%** of all company **cash flow**, which is considerably more than the expected 33.33% of **profit** only.

Thus, Plaintiffs' Motion for Summary Judgment as to Count IX is due to be denied.

VII. Summary Judgment should not be granted as to Plaintiffs' claim that an injunctive relief against Defendant should be granted pursuant to Count XI.

Defendant leases from a web hosting provider a hosting server, and domain names from various registrars. Plaintiff Deepgulf, Inc. demands access to Defendant's personal property without producing a scintilla of evidence as to its claim of ownership, nor providing any plausible explanation as to why Plaintiff Deepgulf, Inc. was not, and is not, paying itself annual recurrent fees for the property, if it belonged to Plaintiff Deepgulf, Inc., while Defendant did pay in a personal capacity on a monthly and yearly basis during the first 5 years and the past 10 all fees and expenses incurred for the domains and their hosting. In addition, deep-

gulf.com was personally purchased by Defendant before Plaintiff Deepgulf, Inc. was even incorporated [8] .

As for the deep-gulf.com and deepgulf.net domains, they are used exclusively for email purposes since the end of 2017, 7 years ago, as a visit to the webpage would show. The domains have been for 15 years the primary email domains for Defendant, including for all private correspondence regarding this dispute and other litigation, and it can therefore not be trusted to the Plaintiff, since the risk is considerable for Defendant that the Plaintiff would not only have instant access to all his personal correspondence, but would also impersonate him at will, since no mechanism exists to prevent a new domain manager from using any address he chooses.

Had Defendant not consistently paid registrars over the years for those domain names, which are by the way not subject to copyright, they

[8] See also the futility of the claim at 108 of Count XI that "*The domain names, passwords, and electronic data and information* ***are all critical to the ongoing business of Plaintiff****, DeepGulf, Inc.*" especially when considering that Plaintiff Deepgulf, Inc. has no "*ongoing business*" that Defendant knows of, and, if it had any, Defendant demands to know forthwith the exact nature of that business, since he is a Director and the owner of nearly 50% of Plaintiff Deepgulf, Inc. which owes him at least 8 years of unpaid salaries. Moreover, **Plaintiff** Deepgulf, Inc. **has consistently refused to produce any financial statement since 2019**, when he was compelled by the U.S. Court to produce some.

would have become the property of others. Since he is registered as the lawful owner, and has been for years, and he has consistently paid registrars over the years for those domain names and web hosting providers for the hosting server, on which he keeps several other private domains, they are unmistakably his.

Finally, the control of a domain name is certainly not a simplistic question of "passwords" only, which indicates a probable lack of understanding of the matter on the part of the Plaintiffs, since on one particular hosting server there can exist no individual "password" for one specific domain among others.

Thus, Plaintiffs' Motion for Summary Judgment as to Count XI is due to be denied.

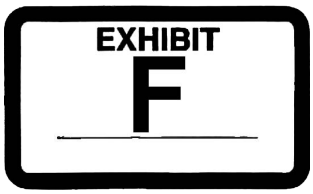
WHEREFORE, Defendant would request this Honorable Court enter an Order denying Plaintiffs' Motion for Summary Judgment, and that Defendant be granted whatever further or different relief to which the Court deems appropriate.

Respectfully submitted this 21st day of January 2025.

Marc Moszkowski, Pro Se
Email: m.moszkowski@deepgulf.net
Phone: +1(850)316 8462
Le Verdos
83300 Châteaudouble, France

CERTIFICATE OF SERVICE

I hereby certify that, on this 21st day of January 2025, a copy of this response has been furnished to Braden K. Ball, Jr., attorney for the plaintiffs, through the Florida Courts E-Filing Portal.



From: Marc Moszkowski <m.moszkowski@deep-gulf.com>
Sent: Thursday, March 06, 2014 4:58 PM
To: 'Rustin Howard'; Jen Cabbage
Subject: Emailing: releve_00050136739_20110221.pdf, releve_00050136739_20110621.pdf, releve_00050136739_20111122.pdf, releve_00050136739_20120721.pdf, Copy of Recapitulatif crédits exceptionnels.xlsx, releve_00050136739_20100721.pdf
Attachments: Copy of Recapitulatif crédits exceptionnels.xlsx; SG-12 Jan 10.pdf; SG-24 Jun 10.pdf; SG-08 Feb 11.pdf; SG-27 May 11.pdf; SG-21 Nov 11.pdf

Your message is ready to be sent with the following file or link attachments:

releve_00050136739_20110221.pdf
releve_00050136739_20110621.pdf
releve_00050136739_20111122.pdf
releve_00050136739_20120721.pdf
Copy of Recapitulatif crédits exceptionnels.xlsx releve_00050136739_20100721.pdf

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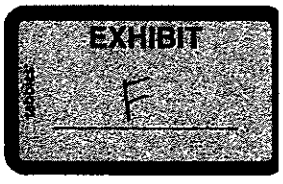

2011	21/11/2011	21/11/2011	VIR RECU 321R48805 DE. VICENTE XIMENES VILA VERDE MOTIF: SALARY MONTANT RECU: 59975,00 USD TAUX CHANGE: EUR/USD 1,35570 ORIGINE: 60000,00 USD			44 239,14		21-Nov-11	$60,000
2011	27/05/2011	27/05/2011	VIR RECU 145R54813 DE: VICENTE XIMENES VILA VERDE MOTIF: PAY TO MARC ACCOUNT MONTANT RECU: 74975,00 USD TAUX CHANGE: EUR/USD 1,41540 ORIGINE: 75000,00 USD			52 970,89		27-May-11	$75,000
2011	08/02		VIR RECU 035R55931 DE: TOKE OIL AND GAD SA HOTEL DILI SUITE 1 56 RUA DOS MOTIF: PAYMENT OF SERVICES MONTANT RECU: 50000,00 USD TAUX CHANGE: EUR/USD 1,37200			36 443,15	*+239 051,39*	08/02/11	08-Feb-11	$50,000
2010	24/06		VIR RECU 173R48601 DE: 1011179780001 TOKE OIL AND GAS SA MOTIF: DIRECTOR FEE MONTANT RECU: 59965,00 USD TAUX CHANGE: EUR/USD 1,23830			48 425,26	*+317 648,88*	24/00/10	24-Jun-10	$60,000
2010	12/01		VIR RECU 008R42486 DE: 1011179780001 TOKE OIL AND GAS DILI EAST TIMOR MONTANT RECU: 99965,00 USD TAUX CHANGE: EUR/USD 1,44150			69 347,90	*+454 892,40*	12/01/10	12-Jan-10	$100,000

SOCIETE GENERALE

RELEVE D'IDENTITE BANCAIRE

TITULAIRE DU COMPTE
M. MARC MOSZKOWSKI

DOMICILIATION AGENCE SOCIETE GENERALE
[redacted]
Tél. : [redacted]

REFERENCES BANCAIRES

Banque	Agence	Numéro de compte	Clé
[redacted]			

IDENTIFICATION INTERNATIONALE
IBAN : [redacted]
BIC-ADRESSE SWIFT : **SOGEFRPP**

A remettre à tout organisme demandant vos références bancaires

GENERALE

RELEVE DE COMPTE
en euros

[redacted]

du 23 12 2009 au 21 01 2010

M. MARC MOSZKOWSKI
LE VERDOS
83300 CHATEAUDOUBLE

envoi n° 1 **page 1/2**

Toute l'équipe de votre Agence se joint à moi afin de vous présenter
*** nos MEILLEURS VOEUX pour l'année 2010. ***
Votre Conseiller.

Date	Nature de l'opération	Débit	Crédit	Contre-valeur en francs(1)	Valeur
	SOLDE PRECEDENT		**180,83**	***+1.186,17***	
	***** SOLDE AU 31/12/2009 +180 ,83 *****				
12/01	VIR RECU 008R42486 DE: 1011179780001 TOKE OIL AND GAS DILI EAST TIMOR MONTANT RECU: 99965,00 USD TAUX CHANGE: EUR/USD 1,44150		69 347,90	*+454 892,40*	12/01/10
12/01	VIREMENT VIRT FAV.50138438 REG DECOUVERT	5 000,00		*-32 797,85*	12/01/10
12/01	> FRAIS SUR VIR INTL RECU 008R42486 REF 0082091 1 VIREMENT(S) POUR: 16,50 1 COMMISSION DE CHANGE POUR: 34,67	51,17 *		*-335,65*	12/01/10
15/01	000001 VIR EUROPEEN EMIS AGENCE POUR: ARTHUR MOSZKOWSKI REF: 0139531500006 MOTIF: VIRT RECU MARC MOSZKOWSKI LIB: VIRT FAV.ARTHUR MOSZKOWSKI LIB: ORDRE FAX	4 000,00		*-26 238,28*	15/01/10
15/01	000001 VIR EUROPEEN EMIS AGENCE POUR: BERGEREAU JACQUELINE REF: 0139531500004 MOTIF: VIRT RECU MARC MOSZKOWSKI LIB: VIRT FAV.JACQUELINE BERGEREAU LIB: ORDRE FAX	6 000,00		*-39 357,42*	15/01/10
16/01	> FRAIS SUR VIR EUROPEEN EMIS DE 6 000,00 E DU 15/01/2010	3,20 *		*-20,99*	16/01/10
16/01	> FRAIS SUR VIR EUROPEEN EMIS DE 4 000,00 E DU 15/01/2010	3,20 *		*-20,99*	16/01/10
18/01	VIREMENT VIRT FAV.50138438 ORDRE FAX	38 052,00		*-249 604,76*	18/01/10
20/01	> COTISATION JAZZ	7,80 *		*-51,16*	20/01/10
	TOTAUX DES MOUVEMENTS	**53.117,37**	**69.347,90**		

AGENCE : [redacted]
TITULAIRE DU COMPTE
M. MARC MOSZKOWSKI

GENERALE

RELEVE DE COMPTE
en euros

[redacted]

du 23 12 2009 au 21 01 2010

Date	Nature de l'opération	Débit	Crédit	Contre-valeur en francs(1)	Valeur
	NOUVEAU SOLDE		**16.411,36**	***+107.651,46***	

Les écritures précédées du signe > désignent les frais sur vos opérations bancaires courantes relatives à la convention de compte de dépôt, ou leur remboursement.

(1) Les contre-valeurs en francs ont été calculées sur la base de 1 euro = 6,55957 francs. Les montants d'opérations exprimés en francs n'ont qu'une valeur indicative. Le solde en francs est la contre-valeur du solde en euros après application des règles de conversion et d'arrondis.

Votre code client figurant ci-dessous, complété par votre code secret personnalisable, vous permet d'utiliser l'ensemble des services de Banque à Distance : Internet, Internet Mobile et [redacted]

Code Client : M. MARC MOSZKOWSKI [redacted]

Si vous ne connaissez pas votre code secret Banque à Distance, contactez votre Conseiller en Agence ou appelez le [redacted] touche #.

* Depuis l'étranger : (+33) 1 76 77 3933 - Tarif au 01/01/2009 : 0,34€ TTC/min depuis une ligne fixe France Télécom, en France métropolitaine. Depuis un autre opérateur en France ou à l'étranger, tarification selon l'opérateur.

En cas d'utilisation de votre découvert autorisé, le taux qui vous sera appliqué pour le calcul des intérêts s'établit à 17,95%
(Taux effectif global 19,66% équivalent au Taux journalier de 0,0492%),
à compter du 01/01/2010.
Pour tout besoin de trésorerie, consultez votre conseiller de clientèle.

Filigrane — LE FIL ROUGE DE VOTRE FIDÉLITÉ

N° d'adhérent JAZZ : 04608277 **Votre situation au : 31/12/2009**

36303 solde précédent	+	588 points acquis	-	0 points utilisés	-	12584 points annulés	=	24307 * nouveau solde

***dont 7741 points à utiliser avant le 31/12/2010.**

Avec JAZZ, votre fidélité est récompensée !
Pour en savoir plus sur vos points ou les transformer en cadeaux, connectez-vous sur www.particuliers.societegenerale.fr ou contactez le 09 69 36 7000

SOCIETE GENERALE

RELEVE D'IDENTITE BANCAIRE

TITULAIRE DU COMPTE
M. MARC MOSZKOWSKI

DOMICILIATION AGENCE SOCIETE GENERALE
[redacted]
Tél. : [redacted]

REFERENCES BANCAIRES

Banque	Agence	Numéro de compte	Clé
[redacted]			

IDENTIFICATION INTERNATIONALE
IBAN : [redacted]
BIC-ADRESSE SWIFT : **SOGEFRPP**

A remettre à tout organisme demandant vos références bancaires

RELEVE DE COMPTE
en euros

n° [redacted]

du 23 06 2010 au 21 07 2010

M. MARC MOSZKOWSKI
LE VERDOS
83300 CHATEAUDOUBLE

BDB

envoi n° 7 **page 1/2**

Date	Nature de l'opération	Débit	Crédit	Contre-valeur en francs(1)	Valeur
	SOLDE PRECEDENT	**-463,79**		*-3.042,26*	
24/06	VIR RECU 173R48601		48 425,26	*+317 648,88*	24/06/10
	DE: 1011179780001				
	TOKE OIL AND GAS SA				
	MOTIF: DIRECTOR FEE				
	MONTANT RECU: 59965,00 USD				
	TAUX CHANGE: EUR/USD 1,23830				
24/06	➢ FRAIS SUR VIR INTL RECU 173R48601	40,71*		*-267,04*	24/06/10
	REF 1733420				
	1 VIREMENT(S) POUR: 16,50				
	1 COMMISSION DE CHANGE POUR: 24,21				
	***** SOLDE AU 30/06/2010 +47 920 ,76 *****				
02/07	VIREMENT 50138438	40 000,00		*-262 382,80*	02/07/10
02/07	CARTE X7272 27/05 VINCIPARK NICE	4,80		*-31,49*	02/07/10
02/07	CARTE X7272 27/05 ORANGE WIFI	9,90		*-64,94*	02/07/10
	COMMERCE ELECTRONIQUE				
02/07	CARTE X7272 27/05 MAC DONALD GASSIN	10,50		*-68,88*	02/07/10
02/07	CARTE X7272 27/05 LE SAFARI	54,50		*-357,50*	02/07/10
02/07	CARTE X7272 28/05 ANCA BORNE PARC	4,00		*-26,24*	02/07/10
02/07	CARTE X7272 28/05 IVAC	11,25		*-73,80*	02/07/10
02/07	CARTE X7272 28/05 ESCOT 2705-3005	21,50		*-141,03*	02/07/10
02/07	CARTE X7272 28/05 TOTAL PUGET THENIER	79,79		*-523,39*	02/07/10
02/07	CARTE X7272 29/05 A.R.E.A.	20,60		*-135,13*	02/07/10
02/07	CARTE X7272 03/06 SUPER U	7,99		*-52,41*	02/07/10
02/07	CARTE X7272 04/06 OSCARO.COM	15,86		*-104,03*	02/07/10
	COMMERCE ELECTRONIQUE				
02/07	CARTE X7272 04/06 BOUYG TEL	108,99		*-714,93*	02/07/10
	COMMERCE ELECTRONIQUE				
02/07	CARTE X7272 07/06 REL.ELF DU DORON	65,86		*-432,01*	02/07/10
02/07	CARTE X7272 14/06 ESCOT 1406-1606	4,90		*-32,14*	02/07/10
02/07	CARTE X7272 14/06 A.R.E.A.	10,80		*-70,84*	02/07/10
02/07	CARTE X7272 14/06 MC DONALD'S	11,65		*-76,42*	02/07/10
02/07	CARTE X7272 16/06 LECLERC	64,32		*-421,91*	02/07/10
02/07	CARTE X7272 17/06 GEANT CG835	52,10		*-341,75*	02/07/10
02/07	CARTE X7272 18/06 PASCAL COSTE	20,50		*-134,47*	02/07/10
02/07	CARTE X7272 21/06 ESCOT 2106-2306	7,20		*-47,23*	02/07/10
02/07	CARTE X7272 21/06 R.BREGUIERES SUD	58,10		*-381,11*	02/07/10
17/07	➢ COTISATION JAZZ	8,00*		*-52,48*	17/07/10
	TOTAUX DES MOUVEMENTS	**40.693,82**	**48.425,26**		

AGENCE : **NICE MUSICIENS**
TITULAIRE DU COMPTE
M. MARC MOSZKOWSKI

GENERALE

RELEVE DE COMPTE
en euros
n° [redacted]

du 23 06 2010 au 21 07 2010

BDB **envoi n° 7** **page 2/2**

Date	Nature de l'opération	Débit	Crédit	Contre-valeur en francs(1)	Valeur
	NOUVEAU SOLDE		**7.267,65**	***+47.672,66***	

Les écritures précédées du signe ➢ désignent les frais sur vos opérations bancaires courantes relatives à la convention de compte de dépôt, ou leur remboursement.

(1) Les contre-valeurs en francs ont été calculées sur la base de 1 euro = 6,55957 francs. Les montants d'opérations exprimés en francs n'ont qu'une valeur indicative. Le solde en francs est la contre-valeur du solde en euros après application des règles de conversion et d'arrondis.

Votre code client figurant ci-dessous, complété par votre code secret personnalisable, vous permet d'utiliser l'ensemble des services de Banque à Distance : Internet, Internet Mobile et [redacted]

Code Client : M. MARC MOSZKOWSKI [redacted]

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* Depuis l'étranger : (+33) 1 76 77 3933 - Tarif au 01/01/2009 : 0.34€ TTC/mn depuis une ligne fixe France Télécom, en France métropolitaine. Depuis un autre opérateur en France ou à l'étranger, tarification selon l'opérateur.

En cas d'utilisation de votre découvert autorisé, le taux qui vous sera appliqué pour le calcul des intérêts s'établit à 17,60%
(Taux effectif global 19,24% équivalent au Taux journalier de 0,0482%),
à compter du 01/07/2010.
Pour tout besoin de trésorerie, consultez votre conseiller de clientèle.

Filigrane — LE FIL ROUGE DE VOTRE FIDÉLITÉ

N° d'adhérent JAZZ : 04608277 **Votre situation au : 30/06/2010**

29376 solde précédent	+	455 points acquis	-	0 points utilisés	-	0 points annulés	=	29831 * nouveau solde

***dont 7741 points à utiliser avant le 31/12/2010.**

Depuis le 1er juin 2010, Nouveau barème de points Filigrane !
Retrouvez-le et commandez vos cadeaux sur www.particuliers.societegenerale.fr, E
Service Clientèle Filigrane : 09 69 36 7000 appel non surtaxé

SOCIETE GENERALE

RELEVE D'IDENTITE BANCAIRE

TITULAIRE DU COMPTE
M. MARC MOSZKOWSKI

DOMICILIATION AGENCE SOCIETE GENERALE
[redacted]
Tél. : [redacted]

REFERENCES BANCAIRES

Banque	Agence	Numéro de compte	Clé
[redacted]			

IDENTIFICATION INTERNATIONALE
IBAN : [redacted]
BIC-ADRESSE SWIFT : **SOGEFRPP**

A remettre à tout organisme demandant vos références bancaires

RELEVE DE COMPTE
en euros

n° [redacted]

du 22 01 2011 au 21 02 2011

M. MARC MOSZKOWSKI
LE VERDOS
83300 CHATEAUDOUBLE

BDB

Date	Nature de l'opération	Débit	Crédit	Contre-valeur en francs(1)	Valeur
	SOLDE PRECEDENT		**432,61**	*+2.837,74*	
25/01	CARTE X5147 RETRAIT DAB 22/01 20H54 CA DES SAVOIE 04842124	40,00		*-262,38*	25/01/11
26/01	CARTE X5147 RETRAIT DAB 25/01 14H20 CA DES SAVOIE 04842124	40,00		*-262,38*	26/01/11
	***** SOLDE AU 31/01/2011 +352 ,61 *****				
01/02	CARTE X5147 31/12 DISSERKOI	69,00		*-452,61*	01/02/11
01/02	CARTE X5147 02/01 GGE DU GD PONT	0,19		*-1,25*	01/02/11
01/02	CARTE X5147 02/01 LAGODA	42,06		*-275,90*	01/02/11
01/02	CARTE X5147 03/01 GGE DU GD PONT	25,02		*-164,12*	01/02/11
01/02	CARTE X5147 12/01 LA POYA	81,60		*-535,26*	01/02/11
01/02	CARTE X5147 16/01 SULPICE TELE COMMERCE ELECTRONIQUE	10,80		*-70,84*	01/02/11
01/02	CARTE X5147 19/01 LAGODA	25,87		*-169,70*	01/02/11
01/02	CARTE X5147 21/01 EUROSPORT COMMERCE ELECTRONIQUE	4,90		*-32,14*	01/02/11
01/02	CARTE X5147 22/01 LE CANADA	29,25		*-191,87*	01/02/11
01/02	CARTE X5147 23/01 CHAL BOUQUETIN	68,30		*-448,02*	01/02/11
08/02	VIR RECU 035R55931 DE: TOKE OIL AND GAD SA HOTEL DILI SUITE 1 56 RUA DOS MOTIF: PAYMENT OF SERVICES MONTANT RECU: 50000,00 USD TAUX CHANGE: EUR/USD 1,37200		36 443,15	*+239 051,39*	08/02/11
08/02	➢ FRAIS SUR VIR INTL RECU 035R55931 REF 0358003 1 VIREMENT(S) POUR: 16,50 1 COMMISSION DE CHANGE POUR: 18,22	34,72*		*-227,75*	08/02/11
14/02	VIR RECU 041R49088 DE: MARC MICHEL MOSZKOWSKI 10440 DEERWOOD RD 337 MONTANT RECU: 5400,00 USD TAUX CHANGE: EUR/USD 1,37370		3 930,99	*+25 785,60*	14/02/11
14/02	VIREMENT VIRT FAV.01395/00050138438 ORDRE FAX	39 000,00		*-255 823,23*	14/02/11
14/02	➢ FRAIS SUR VIR INTL RECU 041R49088 REF 0415353 1 VIREMENT(S) POUR: 16,50 1 COMMISSION DE CHANGE POUR: 14,00	30,50*		*-200,07*	14/02/11
	TOTAUX DES MOUVEMENTS	**39.502,21**	**40.374,14**		

AGENCE : NICE MUSICIENS
TITULAIRE DU COMPTE
M. MARC MOSZKOWSKI

GENERALE

RELEVE DE COMPTE
en euros

n° [redacted]

du 22 01 2011 au 21 02 2011

BDB **envoi n° 2** **page 2/2**

Date	Nature de l'opération	Débit	Crédit	Contre-valeur en francs(1)	Valeur
	NOUVEAU SOLDE		**1.304,54**	***+8.557,22***	

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Votre code client figurant ci-dessous, complété par votre code secret personnalisable, vous permet d'utiliser l'ensemble des services de Banque à Distance : Internet, Internet Mobile et [redacted]

Code Client : M. MARC MOSZKOWSKI [redacted]

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* Depuis l'étranger : (+33) 1 76 77 3933 - Tarif au 01/01/2009 - 0,34€ TTC/min depuis une ligne fixe France Télécom, en France métropolitaine. Depuis un autre opérateur en France ou à l'étranger, tarification selon l'opérateur.

SOCIETE GENERALE

RELEVÉ DE COMPTE

COMPTE DE PARTICULIER - en euros

n° [redacted]

du 21/05/2011 au 21/06/2011
envoi n°6 Page 1/2

VOS CONTACTS

Votre Banque à Distance, 24 h/24

Code client
M. MARC MOSZKOWSKI [redacted]
Internet : [redacted]
Internet mobile : [redacted]
Téléphone : [redacted]

Votre agence NICE MUSICIENS

Par messagerie dans votre Espace Client
[redacted]
Téléphone : [redacted]
Fax : [redacted]

Votre Conseiller en agence

[redacted]
Téléphone : [redacted]

BDB

M. MARC MOSZKOWSKI
LE VERDOS
83300 CHATEAUDOUBLE

RELEVÉ DES OPÉRATIONS

Contre-valeur indicative 1 euro = 6.55957 francs

Date	Valeur	Nature de l'opération	Débit	Crédit
		SOLDE PRÉCÉDENT AU 20/05/2011	**219,72**	
23/05/2011	23/05/2011	CARTE X5147 RETRAIT DAB 21/05 11H25 HSBC FRANCE DRAGUIGNAN 771641	20,00	
27/05/2011	27/05/2011	VIR RECU 145R54813 DE: VICENTE XIMENES VILA VERDE MOTIF: PAY TO MARC ACCOUNT MONTANT RECU: 74975,00 USD TAUX CHANGE: EUR/USD 1,41540 ORIGINE: 75000,00 USD		52.970,89
27/05/2011	27/05/2011	>- FRAIS SUR VIR INTL RECU 145R54813 REF 1454002 1 COMMISSION DE CHANGE POUR: 26,49	26,49*	
		***** SOLDE AU 31/05/2011 + 52.704,68 *****		
01/06/2011	01/06/2011	CARTE X5147 03/05 ESCOT 0205-0405	5,00	
01/06/2011	01/06/2011	CARTE X5147 03/05 A.R.E.A.	11,10	
01/06/2011	01/06/2011	CARTE X5147 03/05 REL.ELF DU DORON	77,70	
01/06/2011	01/06/2011	CARTE X5147 04/05 MC DONALD'S/TRANS	7,80	
01/06/2011	01/06/2011	CARTE X5147 06/05 SPF DL	62,37	
01/06/2011	01/06/2011	CARTE X5147 06/05 CARREFOUR DRAGUI	106,63	
01/06/2011	01/06/2011	CARTE X5147 13/05 CARREFOUR MARKET	35,87	
01/06/2011	01/06/2011	CARTE X5147 16/05 INTERMARCHE	63,17	
01/06/2011	01/06/2011	CARTE X5147 19/05 LECLERC STATION	79,60	
01/06/2011	01/06/2011	CARTE X5147 20/05 ESCOT 1905-2205	4,60	
01/06/2011	01/06/2011	CARTE X5147 20/05 MAISON DE LA BOU	19,96	
01/06/2011	01/06/2011	CARTE X5147 20/05 CARREFOUR TRANS	73,03	
01/06/2011	01/06/2011	CARTE X5147 21/05 SPF DL	45,36	
01/06/2011	01/06/2011	CARTE X5147 29/04 Agip Suisse SA 220 30,89 EUR SUISSE	30,89	

1 Depuis l'étranger : (+33) 1 76 77 3933 - Tarif au 01/01/2011 : 0,34 eur TTC/min depuis une ligne fixe France Télécom, en France métropolitaine.
Depuis un autre opérateur en France ou à l'étranger, tarification selon l'opérateur.

X R44-01A

SOCIETE GENERALE

RELEVÉ DE COMPTE

COMPTE DE PARTICULIER - en euros

n° [redacted]

du 21/05/2011 au 21/06/2011
envoi n°6 Page 2/2

Date	Valeur	Nature de l'opération	Débit	Crédit
01/06/2011	01/06/2011	CARTE X5147 30/04 Restaurant Le Sonalon 70,80 CHF SUISSE 1 EUR=1,2861 CHF	55,05	
04/06/2011	04/06/2011	≻ FRAIS PAIEMENT HORS ZONE EURO 1 PAIEMENT A 1,00 EUR NT 55,05 EUR A 2,70%	2,49*	
04/06/2011	04/06/2011	≻ FRAIS PAIEMENT HORS ZONE EURO 1 PAIEMENT A 1,00 EUR NT 30,89 EUR A 2,70%	1,83*	
06/06/2011	06/06/2011	VIREMENT	45.000,00	
18/06/2011	18/06/2011	≻ COTISATION JAZZ	7,50*	
18/06/2011	18/06/2011	≻ OPTION TRANQUILLITE	0,50*	
		TOTAUX DES MOUVEMENTS	**45.736,94**	**52.970,89**

NOUVEAU SOLDE AU 21/06/2011 **+ 7.014,23**

Soit pour information, solde en francs de + 46.010,33 F

Les écritures précédées du signe ≻ désignent les frais sur vos opérations bancaires courantes relatives à la convention de compte de dépôt, ou leur remboursement.

Filigrane — LE FIL ROUGE DE VOTRE FIDÉLITÉ

N° d'adhérent JAZZ : 04608277

Votre situation au : 31/05/2011

24964 solde précédent	+	319 points acquis	-	0 points utilisés	-	0 points annulés	=	**25283*** **nouveau solde**

*** dont 8839 points à utiliser avant le 31/12/2011**

Avec JAZZ, votre fidélité est récompensée !
Pour en savoir plus sur vos points ou les transformer en cadeaux, connectez-vous sur www.particuliers.societegenerale.fr ou contactez le 09 69 36 7000

Société Générale
S.A. au capital de 933 027 038,75 Eur

552 120 222 RCS Paris
Siège Social
29, bd Haussmann 75009 Paris

US006776560B2

(12) **United States Patent**
Moszkowski et al.

(10) **Patent No.: US 6,776,560 B2**
(45) **Date of Patent: Aug. 17, 2004**

(54) **FLEX J-LAY TOWER**

(76) Inventors: **Mark Moszkowski**, 1902 Ashford Hollow, Harris County, TX (US) 77077; **Benton F. Baugh**, 14626 Oak Bend, Harris County, TX (US) 77079-6441

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/167,891**

(22) Filed: **Jun. 13, 2002**

(65) **Prior Publication Data**

US 2003/0231931 A1 Dec. 18, 2003

(51) **Int. Cl.**[7] **F16L 1/12**
(52) **U.S. Cl.** **405/166**; 405/170
(58) **Field of Search** 405/158, 166, 405/169, 170, 168.1, 167

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FOREIGN PATENT DOCUMENTS

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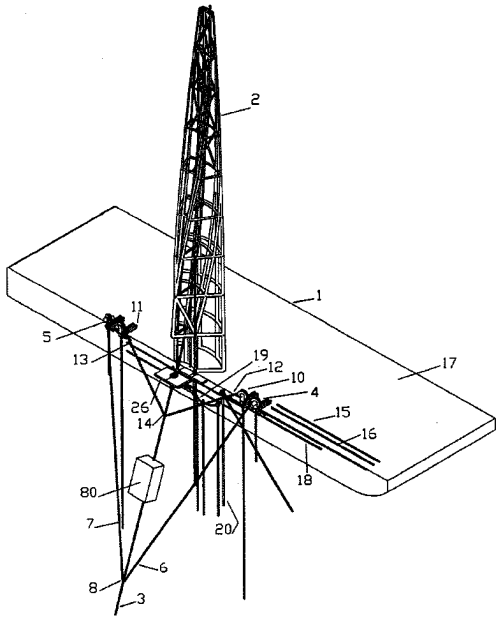
* cited by examiner

Primary Examiner—Michael Safavi

(57) **ABSTRACT**

A method for j-laying a pipeline from an offshore vessel to the floor of the ocean comprising a multiplicity of winches for supporting the upper end of the pipeline at its natural hanging angle, a mast in a fixed angle to the vessel, holding new pipe section in the mast for welding to the upper end of the pipeline, and flexing the lower end of the new pipe section into alignment with the upper end of the pipeline to allow welding to the pipeline and flexing the remainder of the new pipe section to remain within the mast.

27 Claims, 4 Drawing Sheets



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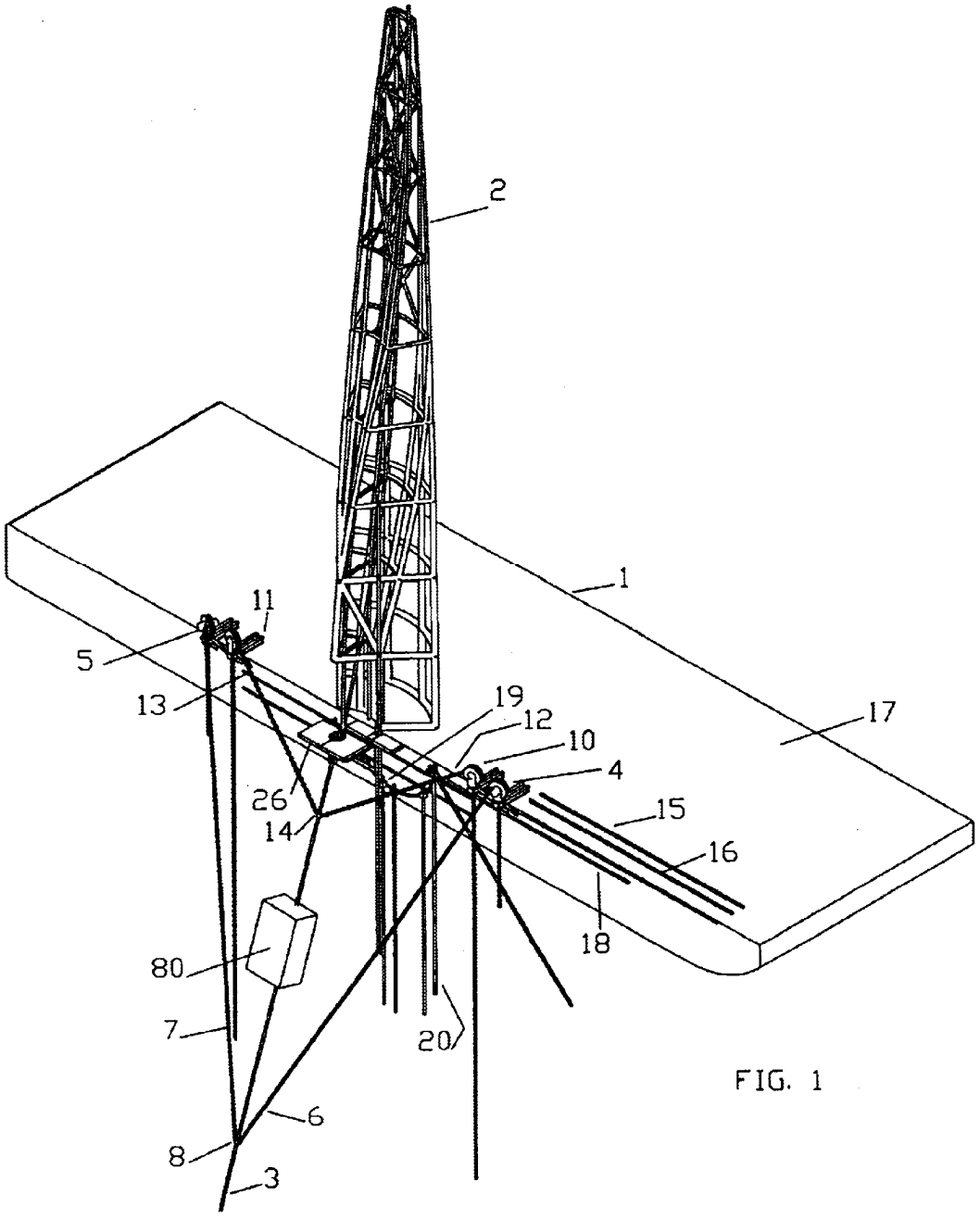

FIG. 1

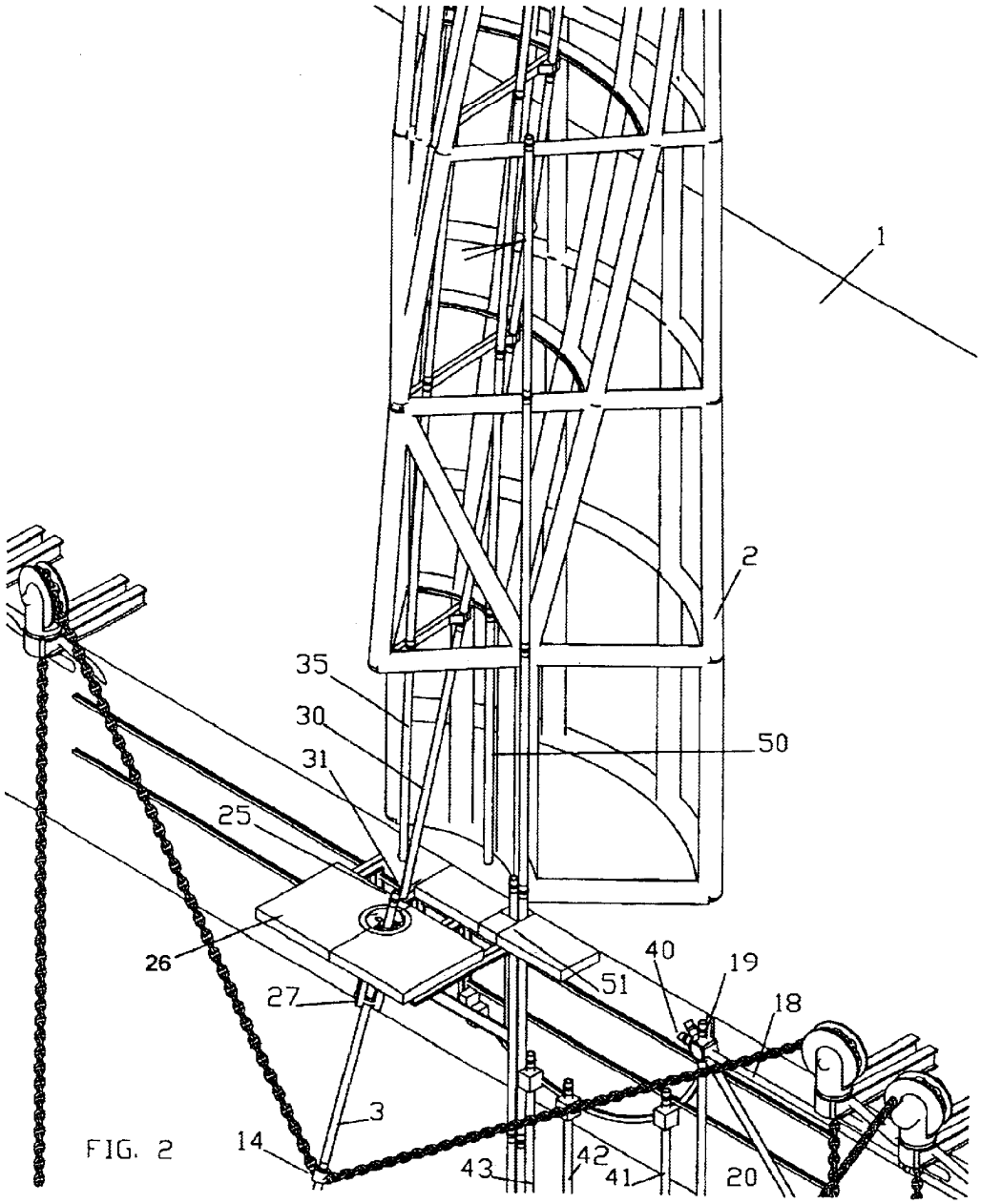

FIG. 2

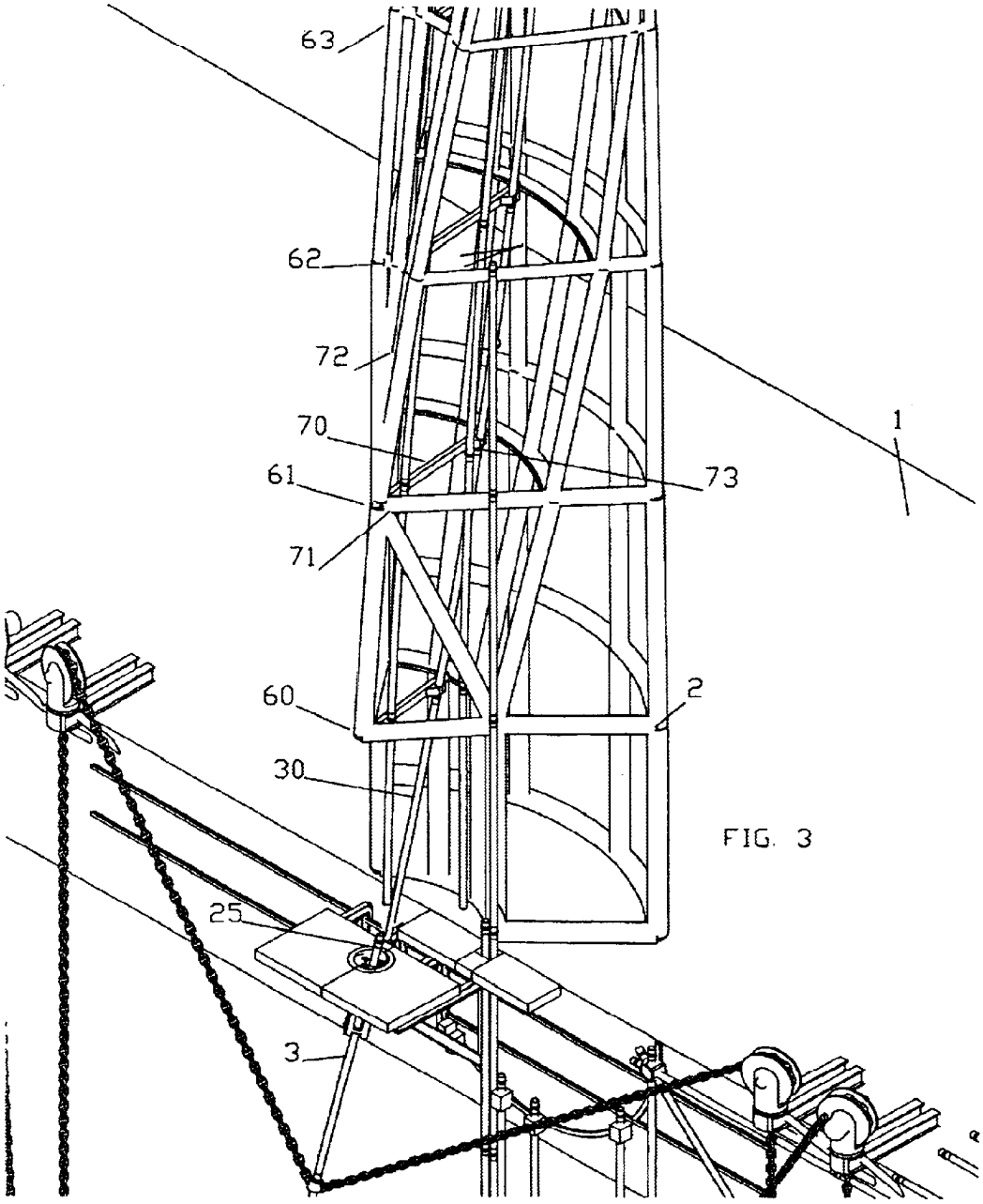

FIG. 3

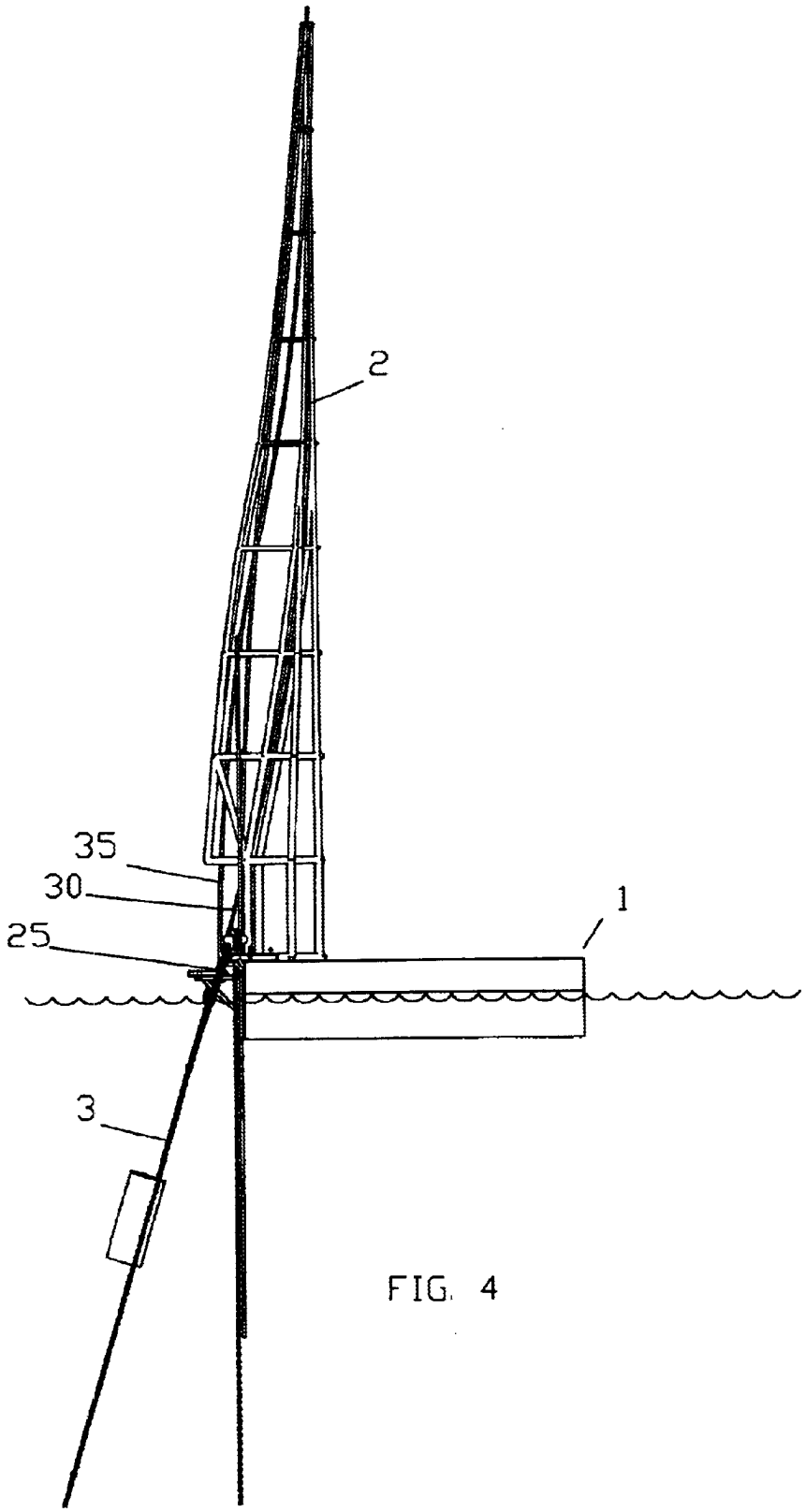

FIG. 4

FLEX J-LAY TOWER

BACKGROUND OF THE INVENTION

Underwater pipelines can be continuously laid from a surface vessel employing S-Lay, Natural J-Lay or Forced Vertical J-Lay mechanical arrangements. Each of these methods have the pipeline being laid approaching the ocean floor in a catenary curve.

S-Lay systems have the pipeline bent back from its near catenary curve to an almost horizontal position where strings of pipes can be added on a vessel deck. Natural J-Lay systems (called J-Lay systems in short) keep the pipeline in its natural near catenary attitude. New pipes have to be brought up at a slanting angle to match the angle of the upper end of the pipeline in the water. Forced Vertical J-Lay systems have the top end of the pipeline bent further from the near catenary curve so as to bring it to a vertical position where new pipes can to be added in a vertical tower.

Both the first and the third type use so-called "stingers" to bend the pipeline to the desired attitude for welding new pipe sections. The second type requires a pipe clamping device sometimes also called improperly a "stinger".

S-Lay arrangements offer the definite advantage of a near horizontal pipeline on vessel deck, allowing in-line multiple welding, testing and coating stations but require long and, in deep water, deep, expensive and relatively fragile stingers to bend the pipe from its natural no moment angle in the water to the near horizontal on the vessel deck.

Forced Vertical J-Lay systems allow the use of fixed vertical pipe laying towers but also require a sometimes very deep stinger. In addition, keeping the stingers within reasonable dimensions sometimes induce plastic deformation of the pipe, or permanent plastic deformation. In large diameter pipelines, the moment required to handle the upper end of the pipeline can be substantial.

Natural J-Lay systems do not require genuine stingers, strictly speaking, but at the cost of a neither horizontal nor vertical laying attitude, thus involving complex articulated towers. Current natural J-Lay arrangements demand the provision of complex upending or erecting strongback arms to bring new pipes or strings of pipes to a non horizontal variable position where they are jointed to the existing deployed pipeline.

The three kinds of arrangements require that the pipeline total weight be supported above deck in clamps or friction tensioners, the weight of the pipe being held back from the bottom or the top of the systems. Whether J-Laying or S-Laying, that provision is a real drawback when the job calls for the installation of large manifolds inline, as the size of the manifold is bound to be limited by the dimensions of the tensioning or weight holding device. In addition, near vertical J-Lay arrangements where the weight of the deployed pipeline is supported from the top of the tower require very strong structures, thus limiting the overall capacity of the system.

Natural J-Lay Systems have historically been designed as modified onshore drilling rigs. Little of the specific marine environment taken into consideration and all operations are carried on above vessel deck level until the pipeline is eventually lowered into the water. Those systems use drawworks, ram-rig type cylinders or near vertical friction pipe tensioners to hold back the weight of the deployed pipeline, strongback pipe erectors to upend new strings of pipe and rotating articulated masts to allow for a variable pipe angle at water level. In addition, some designs integrate mechanical gimballing of the whole system to compensate for weathervaning vessel rotation.

SUMMARY OF THE INVENTION

The object of this invention is to provide a system for laying pipeline from a vessel with a tower at a fixed angle, but allowing the lower end of the new pipe sections to be aligned with the suspended pipeline by flexing the new pipe sections.

A second object of the present invention is to suspend the pipeline with a multiplicity of winches.

A third object of the present invention is to allow weathervaning of the vessel around the suspended pipeline.

Another object of the invention is to suspend the load of the pipeline below the deck of the vessel rather than above the deck of the vessel.

Another object of the invention is to allow for handling of relatively large subsea packages in the work area while handling the load of the pipeline below the working table area.

Another object of the invention is to provide an area to feed relatively short pipe sections into the tower for welding together in the tower.

Another object of the present invention is to provide the ability to lay pipelines at a variety of angles from a fixed angle tower, without requiring the inducement of a moment on the top of the pipeline.

Another object of the invention is to do the required pipe bending on the portion of the pipeline which is not under tension.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a system of this invention.

FIG. **2** is a perspective view of the work table area.

FIG. **3** is a perspective view of the lower section of the mast.

FIG. **4** is a view of the mast from the front of the vessel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. **1**, a vessel **1** is shown having mast **2** rigidly attached. A pipeline **3** is suspended into the seawater by winches **4** and **5** cooperating with chains **6** and **7** and with connector **8**. The pipeline **3** is also suspended by winches **10** and **11** cooperating with chains **12** and **13** and with connector **14**. Connectors **8** and **14** are releasable types as are well known in the industry. The pipeline **3** is lowered by releasing one connector, i.e. **8** and lowering chains **12** and **13** by winches **10** and **11** respectively. While the pipeline **3** is being lowered, the winches **4** and **5** pull chains **6** and **7** up along with connector **8** to the top of its stroke. At that time connector **8** will be relocked and connector **14** will be released and the process repeated. In this type of "hand over hand" operation, the pipeline will be lowered.

New pipe sections **15** and **16** are shown on the deck **17** of vessel **1**. New pipe section **18** has been moved to engage a track **19** and is shown swung down into the water as new pipe section **20**.

Referring now to FIG. **2**, the upper end **25** of pipeline **3** is shown going thru a split work table **26** and thru a split stinger **27**. Stingers of conventional designs are usually utilized to assist in bending of the upper end of the pipeline under high tension to allow its alignment with the new pipe

section above. In contrast, stinger **27** is utilized only to stabilize the upper end **25** of pipeline **3** for welding. New pipe section **30** has a lower end **31** for welding to the upper end **25** of pipeline **3**. As will be discussed later, the new pipe section **30** is flexed to align with the natural position of the upper end **20** of pipeline **3**.

New pipe section **35** is shown in an alternate position to new pipe section **30**, illustrating the degree of movement which the flexing of the new pipe sections of this invention allows.

Pipe section **18** is shown attached to track **19** and swung down as new pipe section **20** using a connector **40**. The new pipe section **20** moves around the track **19** at positions **41**, **42**, and **43**. Finally, the new pipe section is pulled up into the mast **2** as new pipe section **50**. When the mast **2** can handle longer new pipe sections than the vessel **1** can weld together from shorter pipe sections, shorter sections can be pulled up into the mast in sequence and welded together generally in the area indicated as **51**. In special cases such as when the deck of the vessel can only deliver doubles of pipe and the tower can handle sextuples, 2 preparation welds can be required for every actual pipeline weld. This means that 2 separate pipe stations would be required at **51**, or alternately a second weld station can be established part way up the mast **2**.

Referring now to FIG. **3**, several flexing sections **60**, **61**, **62**, and **63** are shown engaging the new pipe section **30**. In flexing section **61**, arm **70** engages a pivot point **71** near the front and a circular track **72** at the rear. The arm **70** has a connector **73** attached which can move along the length of arm **70**. The movement of arm **70** and connector **73** are remotely controlled to flex the new pipe section **30** to be axially aligned with the upper end **25** of new pipe section **3** and within the area of the tower.

Referring now to FIG. **4**, in a conventional tower the upper section of the suspended pipeline is bent to align with the mast. In this invention, the upper end **25** of the pipeline **3** is not bent to align with the mast **2**, but rather remains in its natural angle. In the variety of angles available for the pipeline, the upper end of the new pipe section **30** would tend to be a large cone. For a sextuple new pipe section, it would be a very large cone. In this invention, rather than accommodating a very large cone, the mast and the associated arms bends the new pipe section such that the top of the new pipe section is always in the same location. The top of the mast **2** is actually very small rather than a very large cone. This is facilitated because to bend the pipeline under tension below the support point is very difficult. To bend or flex the new pipe section while it is not under tension is much easier.

Referring again to FIG. **1**, skid **80** is shown mounted above the support connector **8**. This means that the skid **80** can be welded into the pipeline **3** while above the split work table **26**. The split work table **26** can be separated along tracks **81** and the skid **80** lowered. The connector **14** can be reattached to the pipeline above the skid **80** allowing the connector **8** to be released and reattached above the skid **80**. This process greatly simplifies the process of handling mid-pipeline skids such as **80**.

The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

We claim:

1. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast in a fixed position relative to said vessel, said mast holding a new pipe section,

a pipeline suspended from said vessel at an angle with respect to said mast such that the upper end of said pipeline is not axially aligned with said mast,

alternately welding said new pipe sections onto said upper end of said pipeline to become part of said pipeline and lowering the combination of said pipeline and said new pipe section,

said new pipe section being flexed such that said lower end of said new pipe section is axially aligned with said upper end of said pipeline,

wherein said pipeline is suspended from said vessel with winches, and

wherein a first pair of winches cooperate with a first connector to support said pipeline while a second connector is released for movement and alternately a second pair of winches cooperate with said second connector to support said pipeline while said first connector is moved in order to lower said pipeline.

2. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast in a fixed position relative to said vessel, said mast holding a new pipe section,

a pipeline suspended from said vessel at an angle with respect to said mast such that the upper end of said pipeline is not axially aligned with said mast,

alternately welding said new pipe sections onto said upper end of said pipeline to become part of said pipeline and lowering the combination of said pipeline and said new pipe section,

said new pipe section being flexed such that said lower end of said new pipe section is axially aligned with said upper end of said pipeline,

wherein a multiplicity of arms are provided to flex said new pipe section, and

wherein said arms are mounted on circular tracks for movement around said mast.

3. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast in a fixed position relative to said vessel, said mast holding a new pipe section,

a pipeline suspended from said vessel at an angle with respect to said mast such that the upper end of said pipeline is not axially aligned with said mast,

alternately welding said new nine sections onto said upper end of said pipeline to become part of said pipeline and lowering the combination of said pipeline and said new pipe section,

said new pipe section being flexed such that said lower end of said new pipe section is axially aligned with said upper end of said pipeline, and

wherein said new pipe section is brought to the mast for attachment to the upper end of said pipeline by lowering into the water and pulling up into said mast.

4. The invention of claim **3**, wherein said new pipe section is brought to said mast in 2 or more pipe pieces for welding together to form said new pipe section.

5. The invention of claim 4, wherein said 2 or more pipe pieces are formed of pipe joints welded together on the deck of said vessel.

6. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

suspending the upper end of a pipeline below a vessel on a multiplicity of flexible lines from winches and controlling said winches to position said upper end of said pipeline below a mast,

said mast being mounted at a fixed angle with respect to said vessel,

suspending a new pipe section to be welded to the said upper end of said pipeline in said mast,

using a multiplicity of arms to flex said new pipe section such that the lower end of said new pipe section is axially aligned with said upper end of said pipeline,

welding said lower end of said new pipe section to said upper end of said pipeline, and

lowering said pipeline.

7. The invention of claim 6, wherein said pipeline is suspended from said vessel alternately with two sets of said winches.

8. The invention of claim 7, wherein said winches use chain to suspend said pipeline.

9. The invention of claim 6, wherein said multiplicity of arms are provided to flex said new pipe section.

10. The invention of claim 9, wherein said arms are mounted on circular tracks for movement around said mast.

11. The invention of claim 6, wherein said new pipe sections are keelhauled below said vessel to deliver them to said mast.

12. The invention of claim 6, further comprising weathervaning said vessel about said pipeline, using said multiplicity of arms to keep the lower end of said new pipe section aligned with said upper end of said pipeline.

13. The invention of claim 6, wherein the first pair of said winches connected to a first connector support said pipeline while the second pair of said winches connected to a second connector adjusts to a different holding position.

14. The invention of claim 6, wherein the first pair of said winches are connected to a first connector supporting said pipeline while the second pair of said winches are connected to a second connector to be released from said pipeline to pass an object larger than said pipeline.

15. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast mounted on a floating vessel,

suspending pipe sections in the water,

bringing said suspended pipe sections up out of the water and into said mast,

welding 2 or more said suspended pipe sections together to make a longer pipe section,

suspending a pipeline being laid from said vessel by a multiplicity of winches, said suspended pipeline having an upper end,

welding the lower end of said longer pipe section to said upper end of said pipeline, and

using said multiplicity of winches to lower said combination of said pipeline and said longer pipe section.

16. The invention of claim 15, wherein said mast is fixed relative to said vessel.

17. The invention of claim 15, wherein the first pair of said winches connected to a first connector support said pipeline while the second pair of said winches connected to a second connector adjusts to a different holding position.

18. The invention of claim 15, wherein the first pair of said winches are connected to a first connector supporting said pipeline while the second pair of said winches are connected to a second connector to be released from said pipeline to pass an object larger than said pipeline.

19. The invention of claim 15, wherein said a multiplicity of arms are provided to flex said new pipe section.

20. The invention of claim 19, wherein said arms are mounted on circular tracks for movement around said mast.

21. The invention of claim 15, wherein said new pipe sections are keelhauled below said vessel to deliver them to said mast.

22. The invention of claim 15, further comprising weathervaning said vessel about said pipeline and using said multiplicity of arms to keep the lower end of said new pipe section aligned with said upper end of said pipeline.

23. The invention of claim 15, wherein the first pair of said winches connected to a first connector support said pipeline while the second pair of said winches connected to a second connector adjusts to a different holding position.

24. The invention of claim 15, wherein the first pair of said winches are connected to a first connector supporting said pipeline while the second pair of said winches are connected to a second connector to be released from said pipeline to pass an object larger than said pipeline.

25. The invention of claim 15, wherein the welding together of said 2 or more pipe sections occurs proximate the base of said mast.

26. The invention of claim 15, wherein 2 or more weld stations are provided proximate the base of said mast for welding 2 or more new pipe sections together at the same time.

27. The invention of claim 15 wherein a first weld station is provided proximate the base of said mast and a second weld station is provided higher in said mast to allow two welds to be made on said new pipe section at the same time.

* * * * *

US009644792B2

(12) **United States Patent**
Moszkowski et al.

(10) **Patent No.: US 9,644,792 B2**
(45) **Date of Patent: May 9, 2017**

(54) **METHOD OF FULLY EXPELLING COMPRESSED GAS FROM A TANK**

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(72) Inventors: **Marc Moszkowski**, Pensacola, FL (US); **Benton Frederick Baugh**, Houston, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 21 days.

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(22) Filed: **Jun. 3, 2015**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
B65B 31/00 (2006.01)
F17C 5/06 (2006.01)

(52) **U.S. Cl.**
CPC ***F17C 5/06*** (2013.01); *F17C 2205/0323* (2013.01); *F17C 2205/0364* (2013.01); *F17C 2223/0123* (2013.01); *F17C 2223/036* (2013.01); *F17C 2225/0123* (2013.01); *F17C 2225/036* (2013.01); *F17C 2227/041* (2013.01); *F17C 2260/02* (2013.01); *F17C 2270/0105* (2013.01); *F17C 2270/0171* (2013.01)

(58) **Field of Classification Search**
CPC F17C 5/06; F17C 2223/0123; F17C 2225/036; F17C 2225/0123; F17C 2205/0364; F17C 2270/0105; F17C 2260/02; F17C 2227/04; F17C 2227/041; F17C 2227/042
See application file for complete search history.

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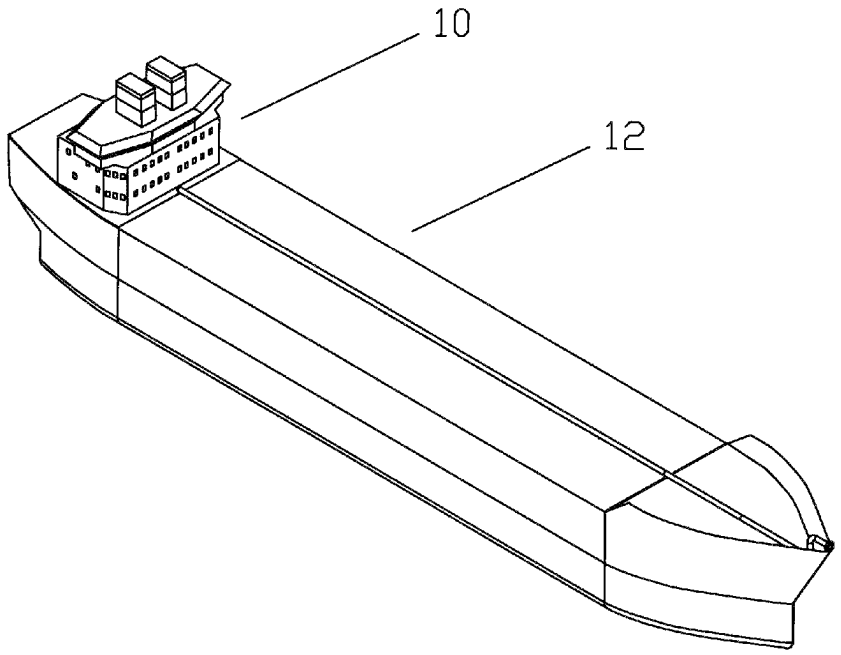
Primary Examiner — Jason K Niesz

(57) **ABSTRACT**

The method of transferring compressed gas at from a first tank to a second tank without decompressing the compressed gas and then re-pressuring the compressed gas comprising filling the second tank with a fluid, connecting a first fluid connection on the first tank to a second fluid connection on the second tank with a first line with one or more first valves, connecting a first gas connection on the first tank to a second gas connection on the second tank with a second line with one or more second valves, opening the first valves and the second valves to allow the compressed gas to pressurize the fluid, and pumping the fluid in the second tank into the first tank, thereby causing the compressed gas in the first tank to be displaced into the second tank.

34 Claims, 8 Drawing Sheets



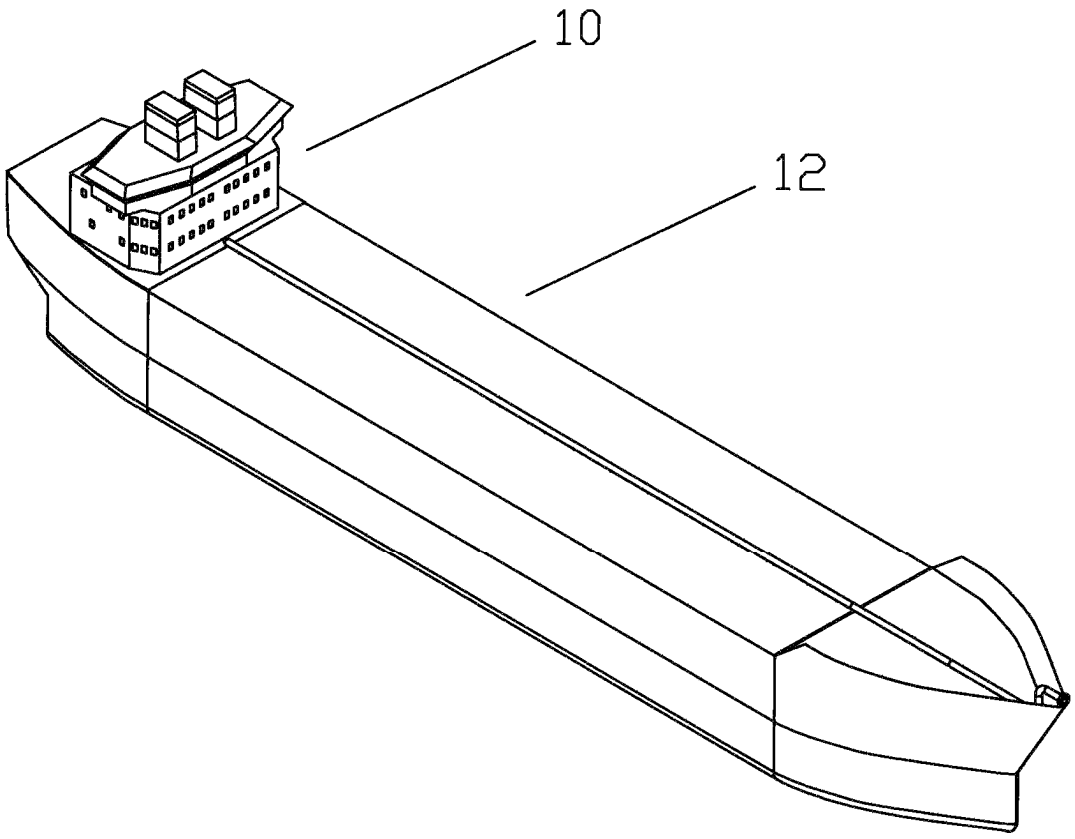


FIG. 1

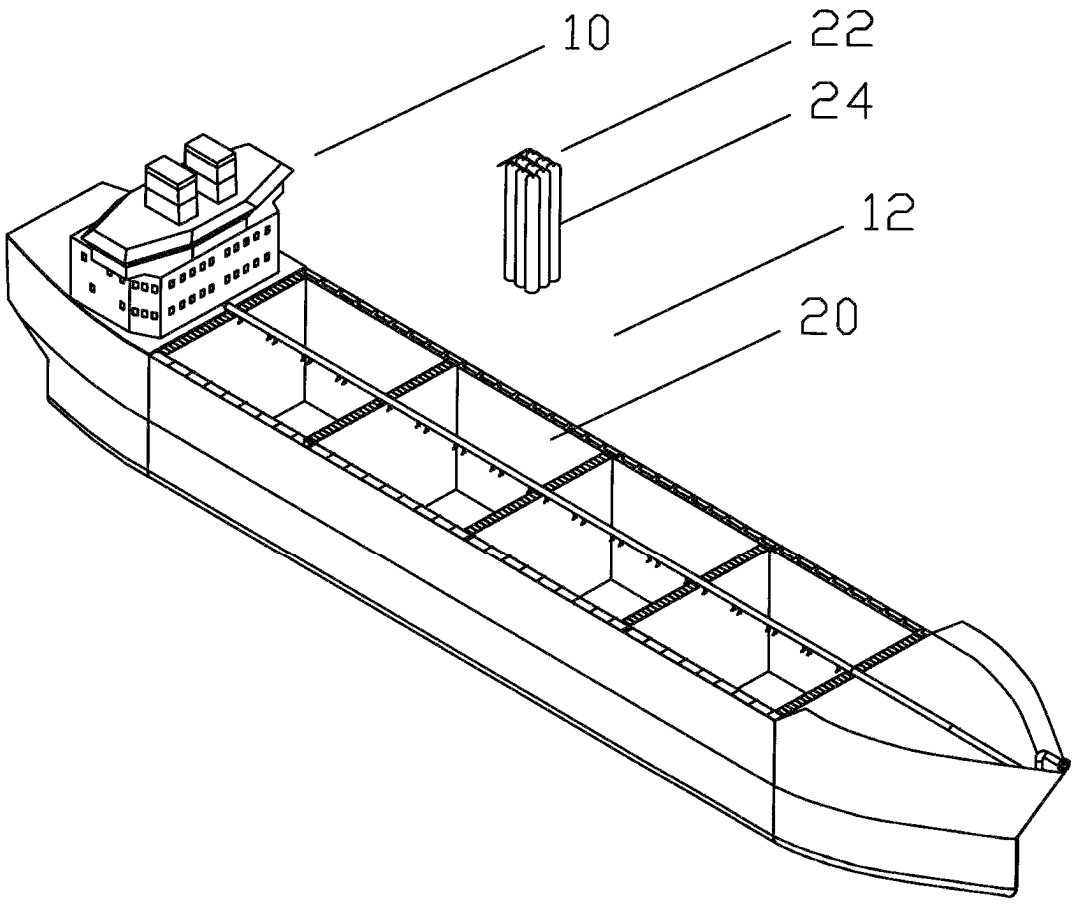


FIG. 2

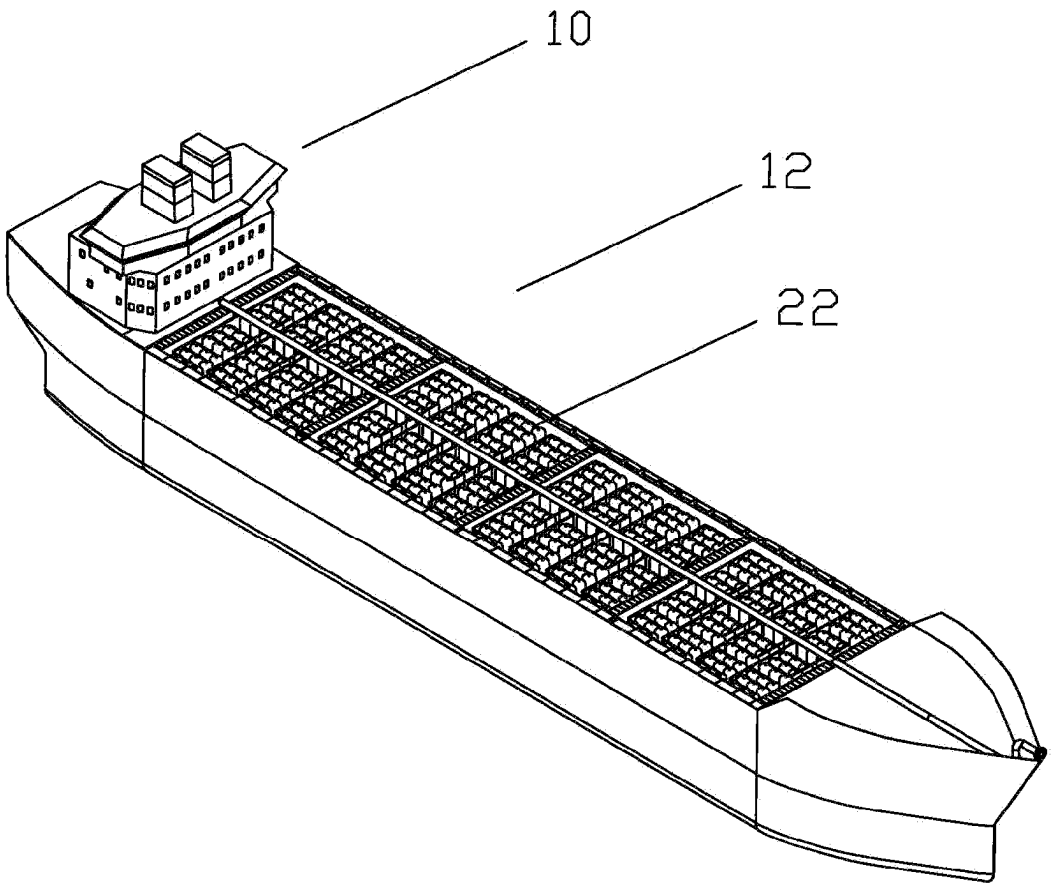


FIG. 3

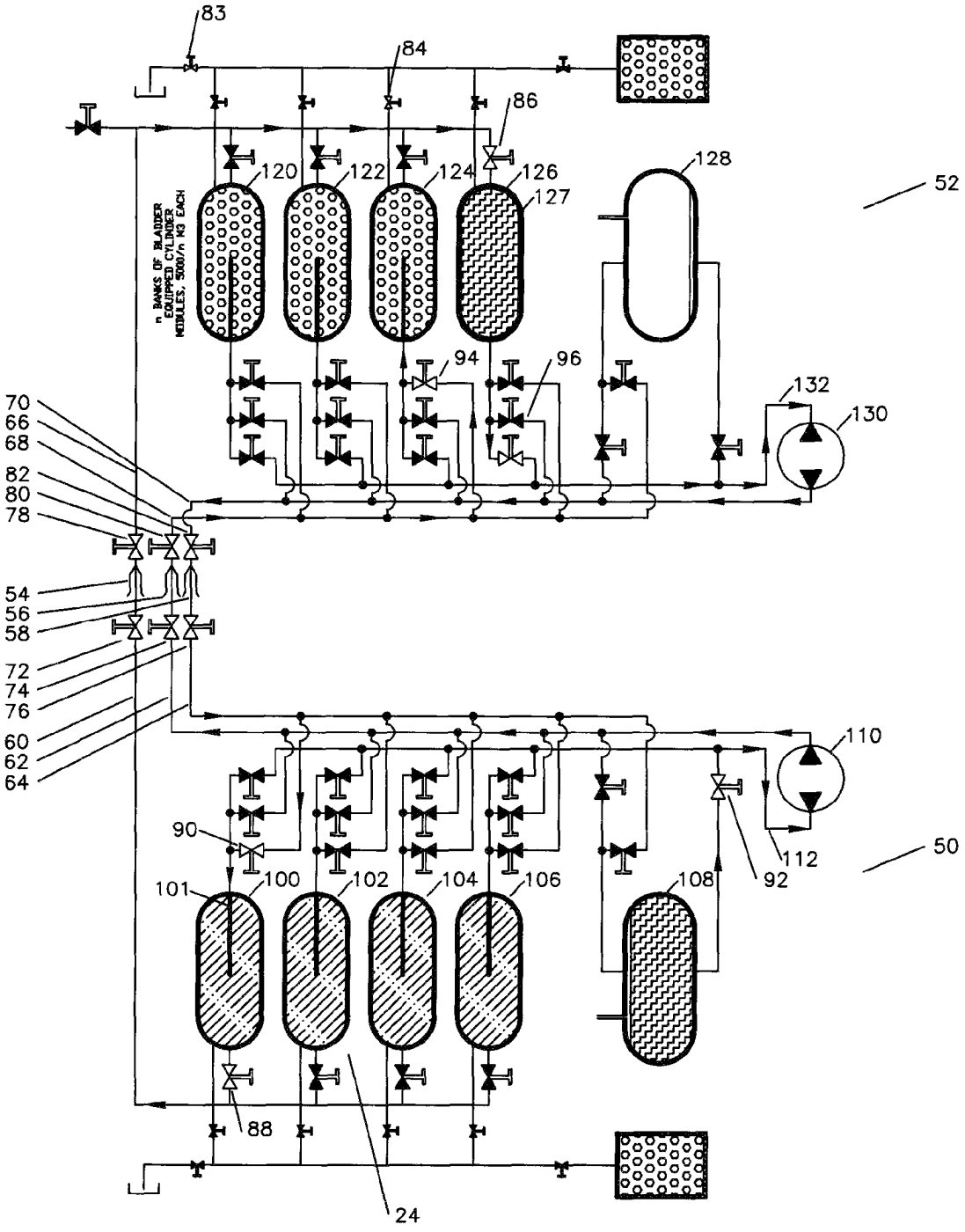

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FIG. 4

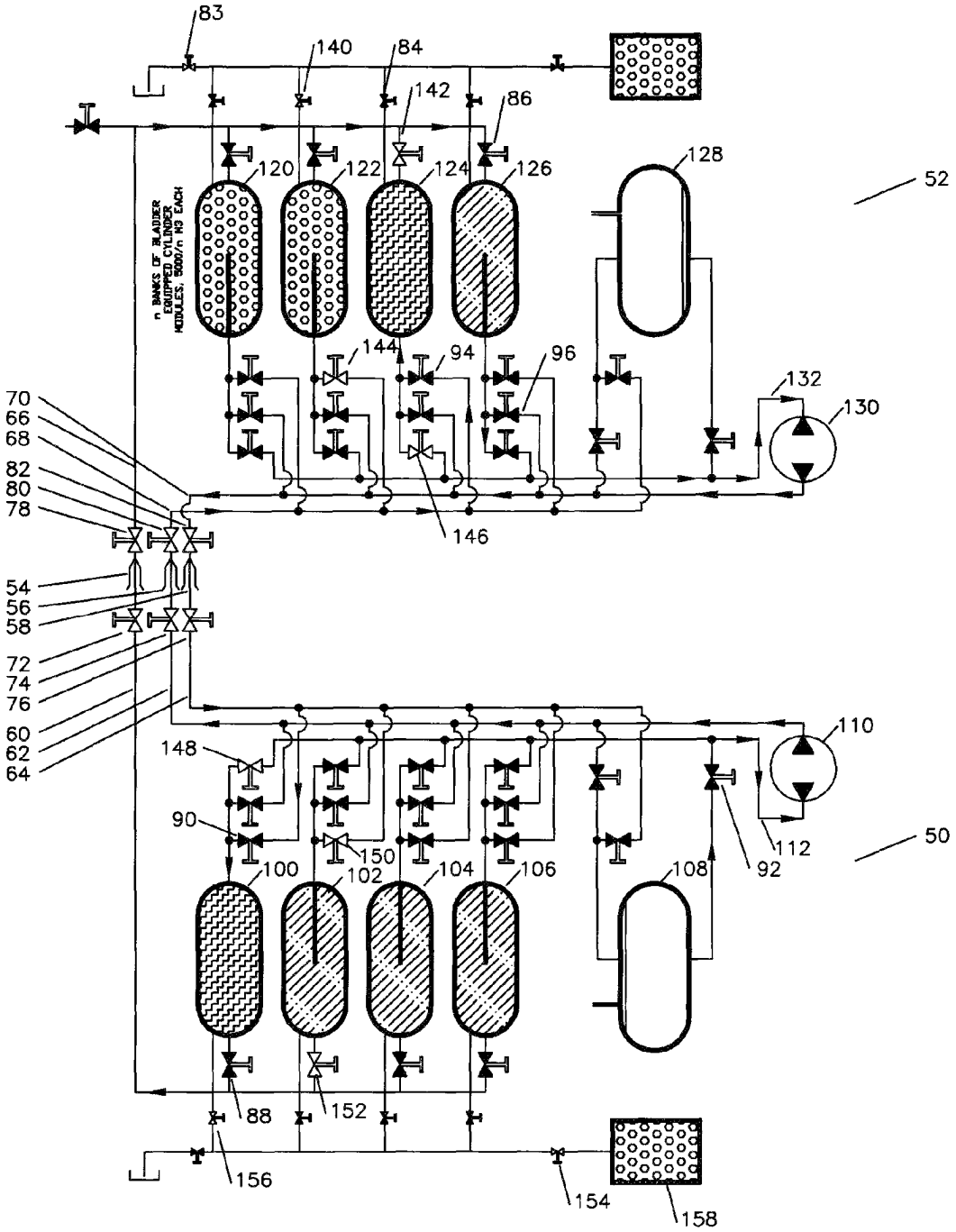
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FIG. 5

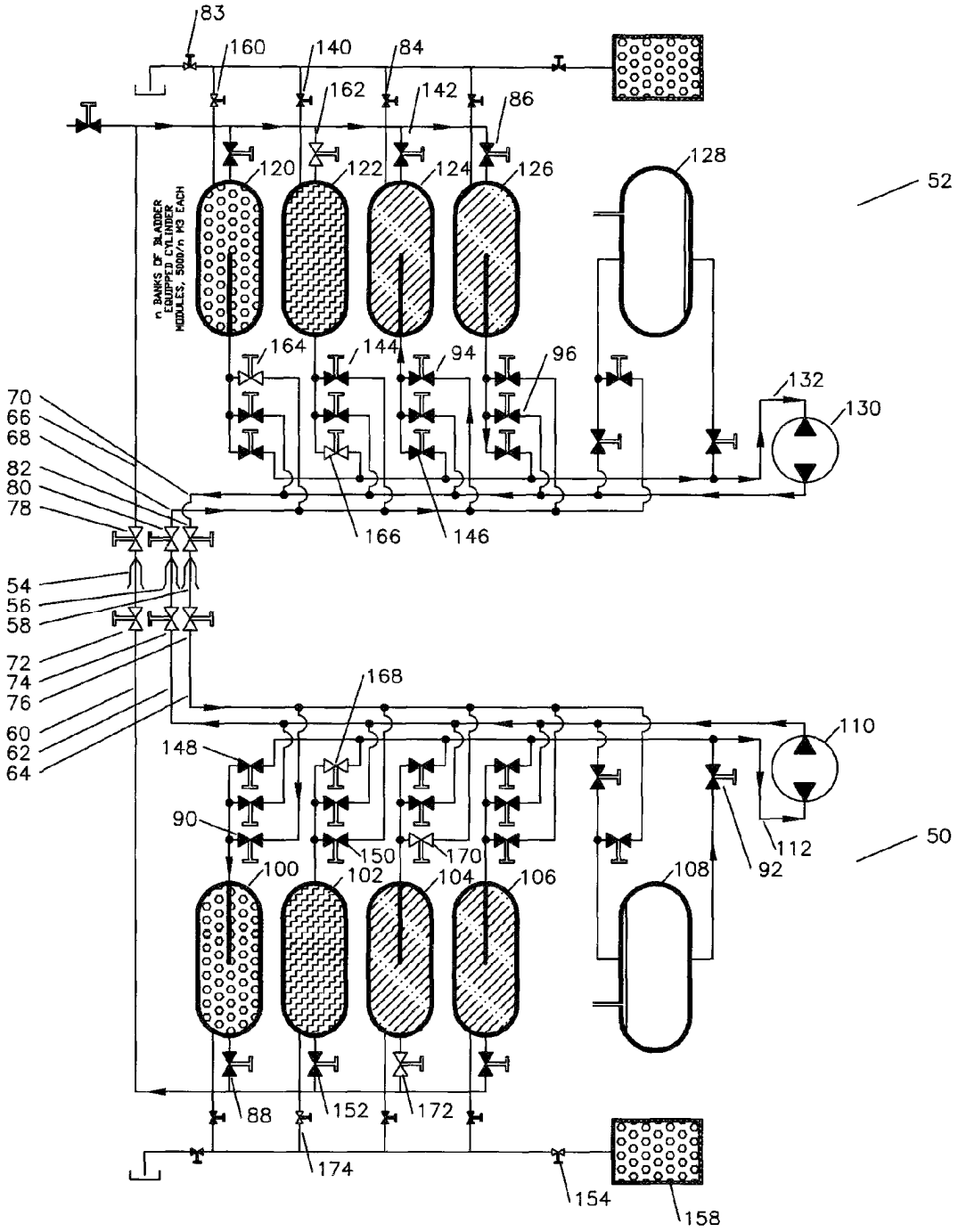
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FIG. 6

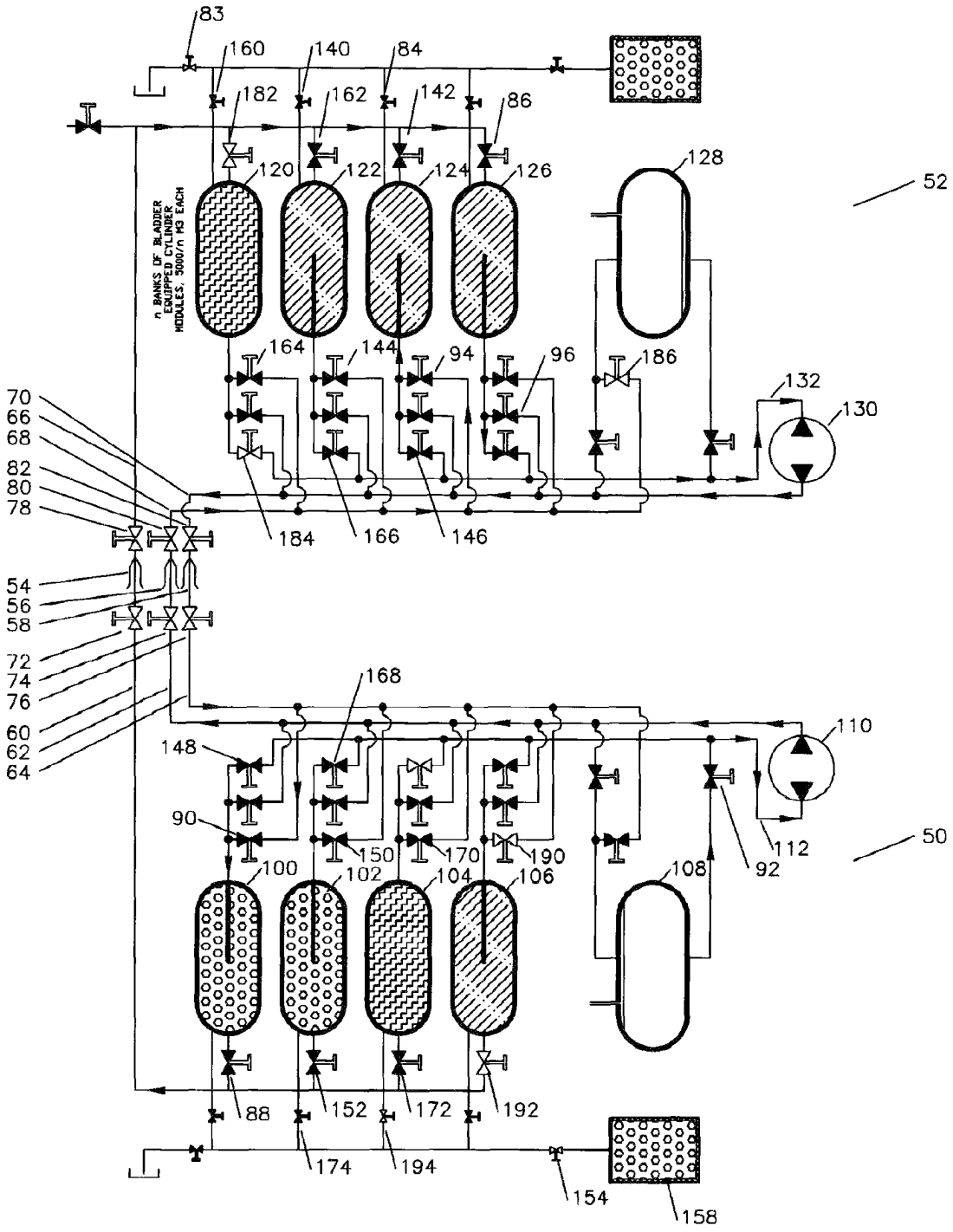
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FIG. 7

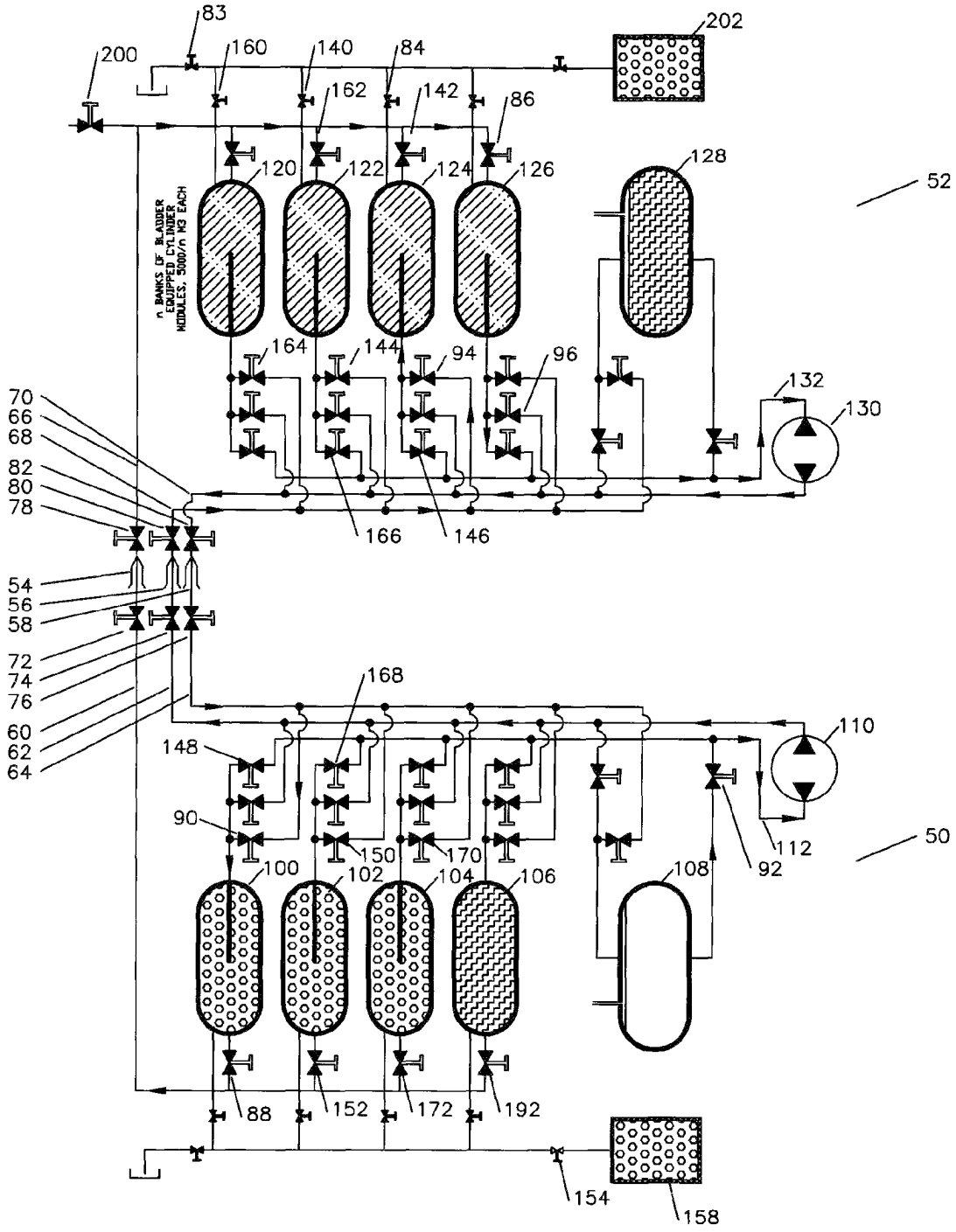
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FIG. 8

METHOD OF FULLY EXPELLING COMPRESSED GAS FROM A TANK

TECHNICAL FIELD

This invention relates to the method expelling compressed gas from one or more compressed gas tanks, especially as associated with the transportation and delivery of compressed natural gas.

BACKGROUND OF THE INVENTION

The transportation of natural gas from the supply location to the tanks at the market by ship or truck transportation tanks requires that the gas be highly compressed to make the transportation economic. The expense of high pressure transportation tanks (e.g. 3000 p.s.i.) rather than at atmospheric pressure (e.g. 0 p.s.i.) is more than offset by the fact that about 250 times as much gas product can be transported.

A second problem exists that if the tanks at the market have an intermediate pressure such as 600 p.s.i. When the 3000 p.s.i. high pressure transportation tanks are dumped into the market tanks, approximately 1780 p.s.i. will remain in the transportation tanks. This means that approximately 60% of the product transported remains undelivered.

Two choices have remained here in the art. First, you can simply leave the gas in the transportation tanks for the return trip and always be transporting this 60% of the volume back and forth from the supply location to the market location. Secondly you can provide gas compression pumps to pump the stranded gas from the ship or truck transportation tanks and deliver all the gas to market. The gas compressors are expensive and expensive to operate. However, the higher cost in many cases is the time tying up the access to the terminal while they are being pumped out. Especially in the case of ocean going ship terminals, the dock time is an expensive charge. However, because of the efficiency of the compressors, residual pressure never comes below about 600 p.s.i. or 20% of the original pressure.

Throughout the history of the transportation of natural gas, the balance between the transportation of the stranded gas in the transportation tanks and the cost to pump it out has been studied with various combinations of stranded gas and compression applied. In the case of trucks, the total volume of stranded gas is not large, however, in very large ocean going vessels, the amount of gas stranded by contemporary methods can be very large.

Another problem associated with conventional methods of transportation are nefarious thermal issues. If the receiving tank pressure is zero and the transportation tank pressure is 3,000 p.s.i., for example, the instantaneous temperature drop upon opening the valve would be 84 degrees K or 151 degrees F., with very bad consequences if there was any water or foreign gases or liquids in the transportation tank. In addition to substantial thermal risks, the 3000 p.s.i. on the transportation tank and 0 p.s.i. in the receiving tank will average out to be 1500 p.s.i. in both tanks, with half of the gas being delivered. At that point gas compressors would be employed with more and more time and money spent as the percentage of the transported gas is transferred, as was also indicated above.

BRIEF SUMMARY OF THE INVENTION

The object of this invention is to provide a method of transferring compressed gas from a transportation tank to a stationary tank with little or no gas in it and vice-versa without requiring the use of gas compressors.

A second objective of this invention to provide a method of transferring compressed gas from a transportation tank to a stationary tank with little or no gas in it and vice-versa without decompression and recompression.

A third objective of this invention is that all of the gas is expelled from the transportation tank so that all the product is delivered to market, rather than a lower pressure residual simply being carried back in the transportation tank for another trip.

Another objective of this invention is that as the tank can be totally purged, it can also be disconnected from the other tanks for maintenance, if required, which would be precluded by any residual natural gas in the tanks.

Another advantage of this invention is that the connectors can easily be backfilled with either a liquid or nitrogen before being safely disconnected.

Another objective of this invention is that there is no transfer of liquid between the two systems, the required power to pump the water would be 5,600 kW with an expenditure of 5.5 metric tons of gas. Gas usage would not really be a problem but power would, as well as regulation of the system.

Another objective of this invention is minimizing the transfer differential pressure so that it enables the installation of safety devices on the tanks so that in case of a collision when the piping on top of the tanks is ripped off or any other type of leakage, a safety mechanism can quickly shut down the flow of gas trying to exit the tank through the broken piping, substantially increasing the safety level of the system.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a view of a vessel having the filling method of this invention.

FIG. **2** is a view of the vessel of FIG. **1** with the top deck removed and showing a set of tanks about to be installed.

FIG. **3** is a view of the vessel of FIG. **2** with a full complement of storage bottles installed.

FIG. **4** is a schematic of method of the present invention as would be seen when the transportation vessel arrives at the delivery location, valves are opened, but pumping has not started.

FIG. **5** is a schematic of method of the present invention after a first tank of compressed natural gas has been transferred and valves are set up to deliver the second tank of compressed natural gas.

FIG. **6** is a schematic of method of the present invention after the second tank of compressed natural gas has been transferred and valves are set up to deliver the third tank of compressed natural gas

FIG. **7** is a schematic of method of the present invention after the third tank of compressed natural gas has been transferred and valves are set up to deliver the fourth tank of compressed natural gas.

FIG. **8** is a schematic of method of method of the present invention after the fourth tank of compressed natural gas has been transferred and all valves are closed.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. **1**, an offshore tanker **10** is shown which has a substantial central portion **12** which contains gas storage tanks.

Now referring to FIG. **2**, the offshore tanker **10** is shown with the top cover from the central portion **12** removed and showing a number of storage chambers **20**. A bank of storage bottles **22** is shown with one of the individual bottles identified as **24**. Individual bottles can be of a variety of sizes, for example 24 inches in diameter by 45 feet long.

Referring now to FIG. **3**, offshore tanker **10** is shown with more of the double wall covering from central portion **12** removed and a full set of bottles **22** installed. In this model **576** of the bottles **24** are shown.

Referring now to FIG. **4**, a graphic of the pumping system of this invention is shown. The lower portion of the graphic shows a transportation tank system **50** for transportation of the compressed gases and the upper portion shows a stationary tank system **52**. The transportation tank system **50** will likely be aboard a ship, but can be transported by a variety of means including barges, railroads, and trucks. The stationary tank system **52** is described following as the location to which the transportation tank system **50** delivers the compressed natural gas for distribution and use but can as well represent the location where the transportation tank system is efficiently loaded, whether from a shore based or offshore location.

Hose connectors **54**, **56**, and **58** connect hoses **60**, **62**, and **64** from the transportation tank system to piping **66**, **68**, and **70** on the stationary tank system. The connectors **54**, **56**, and **58** can be one of several styles which are well known in the art. Due to size they will likely be of the remotely hydraulically operated type. Valves **72**, **74**, and **76** and valves **78**, **80**, and **82** are on each side of hose connectors **54**, **56**, and **58** to close off the ends of the hoses or piping when a disconnection is done. Hoses **60**, **62**, and **64** can be neutrally buoyant with additional buoyancy added to float the valves **72**, **74**, and **76** also as they move to the shore installation for connection. Alternately the piping **66**, **68**, and **70** can be floating hoses, or both sides of the hose connectors **54**, **56**, and **58** can be floating hoses.

The floating gas hose would be rated for a working pressure of 4,250 p.s.i. (we plan to work at 2,133 p.s.i.), inside diameter 7 inch, outside diameter 11 inch, minimum dynamic bending radius 9 foot (7 foot static and 6 foot storage), weight 68 lbs. per ft. The liquid hoses would be the same, which enjoys a higher rating of 5,000 p.s.i. There would be 1 gas line and two liquid lines. The 3 hoses will be bundled, except at their end. Fluid flow needs to be 1,000 cubic meters per hour (4,400 GPM), but with little head if the fluid flows between the receiving and the loading station. The system is inherently safe as no pressure control needs to be applied. In some cases, the difficulty of handling the large high pressure hoses may be made more practical by handling them with a crane.

When a fully loaded transportation tank system comes into port for unloading, all valves in both the transportation tank system and the stationary tank system will be closed. After the hose connectors **54**, **56**, and **58** are connected, valves **72**, **74**, and **76** and valves **78**, **80**, and **82** are opened as shown. Additionally, valves **86**, **88**, **90**, **92**, **94**, and **96** are opened.

Tank **100** shows bladder **101** which is empty and collapsed to a flat position. Tank **126** shown bladder **127** which is fully expanded against the internal walls of tank **126**. The bladders are resilient balloon like members which separate the fluids and gases which will be in the tanks from time to time. Various means can be utilized to achieve this separation of fluids and gases such as floating piston. In some cases no separating method would be required if the fluid utilized did not tend to absorb the gasses and floats or sonar was used to monitor the level of the fluids in the tanks.

All valves in this description are shown as manual valves for simplicity. For rapid and controlled operations, all valves are likely to be remotely controlled.

By opening valves **86** and **88** the pressure of the gas in tank **100** will pressurize the fluid in tank **126**. Operating pump **130** will draw fluid out the bladder of tank **126** and pump it through hoses **132**, **70** and **64** and valve **90** to tank **100**. This will displace the compressed natural gas in tank **100** through valve **88** hoses **60** and **66**, through valve **86** and into the space outside the bladder in tank **126**. As the pressure in the two tanks was equalized, there will not be a head pressure to pump against, but rather simply flowing friction losses will be incurred.

When pump **110** is operated, fluid will be drawn from tank **108** through valve **92** and pumped through hoses **62** and **68** into the bladder of tank **124**. The nitrogen gas in tank **124** will be vented through valves **84** and **83**. As the fluid in tank **108** and the nitrogen gas in tank **124** are at atmospheric pressure, there will not be a head pressure to pump against, but rather a simple flowing friction loss will be incurred.

This means that the pressure of tanks **100** and **126** will be the same, and will remain the same during the entire gas transfer process at the high pressure of the compressed natural gas. The pressure in tanks **108** and **124** will be a relatively constant pressure at atmospheric pressure plus a small pumping flow loss. This means safety relief valves can be installed on closely controlled conditions rather than trying to compromise on varying pressures of a typical compression process. The ability this provides to quickly recognize a leakage condition or overpressure condition can substantially increase the safety of the systems.

Referring now to FIG. **5**, the results of the pumping in FIG. **4** is seen. Valves **84**, **86**, **88**, **90**, **92**, **94**, and **96** are now closed. Valves **140**, **142**, **144**, **146**, **148**, **150**, **152**, **154**, and **156** are opened.

Operating pump **130** will draw fluid out the bladder of tank **124** and pump it through valve **146**, hoses **132**, **70** and **64**, valve **150** and into the bladder of tank **102**. This will displace the compressed natural gas in tank **102** through valve **152**, hoses **60** and **66**, valve **142** and into the space outside the bladder in tank **124**.

When pump **110** is operated, fluid will be drawn from tank **100** through valve **148**, hoses **112**, **62** and **68**, valve **144** and into the bladder of tank **122**.

The nitrogen gas in tank **122** will be vented through valves **140** and **83**. Nitrogen plant **158** will generate nitrogen and pump it through valves **154** and **156** into the area outside the bladder in tank **100**.

Referring now to FIG. **6**, the results off the pumping in FIG. **5** is seen. Valves **140**, **142**, **144**, **146**, **148**, **150**, and **152** are now closed. Valves **160**, **162**, **164**, **166**, **168**, **170**, **172**, and **174** are opened.

Operating pump **130** will draw fluid out the bladder of tank **122** and pump it through valve **164**, hoses **132**, **70** and **64**, valve **170** and into the bladder of tank **104**. This will displace the compressed natural gas in tank **104** through valve **172**, hoses **60** and **66**, valve **164** and into the space outside the bladder in tank **122**.

When pump **110** is operated, fluid will be drawn from tank **102** through valve **168**, hoses **62** and **68**, valve **164** and into the bladder of tank **120**.

The nitrogen gas in tank **120** will be vented through valves **160** and **83**. Nitrogen plant **158** will generate nitrogen and pump it through valves **154** and **174** into the area outside the bladder in tank **102**.

Referring now to FIG. **7**, the results off the pumping in FIG. **6** is seen. Valves **160**, **162**, **164**, **166**, **168**, **170**, and **172** are now closed. Valves **182**, **184**, **186**, **188**, **190**, **192** and **194** are opened.

Operating pump **130** will draw fluid out the bladder of tank **120** and pump it through valve **184**, hoses **132**, **70** and **64**, valve **190** and into the bladder of tank **106**. This will displace the compressed natural gas in tank **106** through valve **192**, hoses **60** and **66**, valve **182** and into the space outside the bladder in tank **120**.

When pump **110** is operated, fluid will be drawn from tank **104** through valve **188**, hoses **112**, **62** and **68**, valve **186** and into tank **128**.

Nitrogen plant **158** will generate nitrogen and pump it through valves **154** and **194** into the area outside the bladder in tank **104**.

Referring now to FIG. **8**, as the compressed natural gas in tanks **120**, **122**, **124**, and **126** are exported to users through valve **200**, nitrogen from nitrogen plant **202** will be pumped into the space outside the bladders of tanks **120**, **122**, and **124** and fluids are pumped from tank **128** into the bladder of tank **126** to be prepared for a subsequent reloading.

As the transportation tank system **50** is in transit to the supply location, the fluids in the bladder of tank **106** are pumped into tank **108** and nitrogen from nitrogen plant **158** is pumped into the space outside the bladder of tank **106**. These final pumping operations will return the status of the transportation tank system **50** and the stationary tank system to the status as was shown in FIG. **4**.

Another advantage of this invention is minimizing of the transfer differential pressure is that it enables the installation of safety devices on the tanks. In case of a collision when the piping on top of the tanks is ripped off, a valve mechanism shuts down the flow of gas trying to exit the tank through the broken piping, activated by the differential pressure above a certain predetermined level.

The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

That which is claimed is:

1. The method of transferring compressed gas at from a set of delivery tanks to a set of receiving tanks without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

a first step of connecting a first fluid delivery connection on a first delivery tank of said set of delivery tanks to a first receiving fluid connection on a first receiving tank of said set of receiving tanks with a first fluid line with one or more first fluid valves,

said first delivery tank containing first fluid and said first receiving tank not containing a fluid,

opening said first valves and pumping said first fluid from said first delivery tank into said first receiving tank,

a second step of providing a second compressed gas filled tank associated with said delivery tanks and a second fluid filled tank associated with said receiving tanks,

connecting a second fluid delivery connection on a second delivery tank of said set of delivery tanks to a second receiving fluid connection on a second receiving tank of said set of receiving tanks with a second fluid line with one or more second fluid valves,

connecting a first gas delivery connection on said second delivery tank of said set of delivery tanks to a second gas receiving connection on said second receiving tank on said set of receiving tanks with a second line with one or more second gas valves,

said second delivery tank containing a first compressed gas and said second receiving tank containing a second fluid,

opening said second fluid valves to allow said first compressed gas to pressurize said second fluid,

opening said first gas valves and pumping said second fluid from said second receiving tank into said second delivery tank such that said first compressed gas will be displaced into said second receiving tank, and

repeating said first step and said second step with a third delivery tank filled with a second compressed gas taking the place of said second delivery tank, said first receiving tank taking the place of said second receiving tank for the exchange of a second fluid with a second gas, and said first delivery tank being replaced by said second delivery tank and a third receiving tank taking the place of said first receiving tank for transferring a second fluid from said delivery set of tanks to said receiving set of tanks.

2. The invention of claim **1** further comprising said set of tanks is on a moving vessel for transportation.

3. The invention of claim **2** further comprising said fluid in said moving vessel is a ship.

4. The invention of claim **2** further comprising said fluid in said moving vessel is a barge.

5. The invention of claim **2** further comprising said fluid in said moving vessel is a train.

6. The invention of claim **2** further comprising said fluid in said moving vessel is a truck.

7. The invention of claim **1** further comprising said set of tanks is on a moving vessel for transportation.

8. The invention of claim **7** further comprising said fluid in said moving vessel is a ship.

9. The invention of claim **7** further comprising said fluid in said moving vessel is a barge.

10. The invention of claim **7** further comprising said fluid in said moving vessel is a train.

11. The invention of claim **7** further comprising said fluid in said moving vessel is a truck.

12. The invention of claim **1** further comprising said first line and said second line have connectors intermediate their ends.

13. The invention of claim **12** further comprising said first line and said second line are neutrally buoyant for floating in seawater for connection.

14. The invention of claim **12** further comprising said first line and said second line can be flooded with an environmentally friendly fluid or gas prior to disconnection.

15. The method of transferring compressed gas at a first pressure and first temperature environmental conditions from a first tank to a second tank without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

said compressed as being above its boiling temperature in said environmental conditions within said tanks,

filling said second tank with a fluid, said fluid being below its boiling temperature in said environmental conditions,

connecting a first fluid connection on said first tank to a second fluid connection on said second tank with a first line with one or more first valves,

connecting a first gas connection on said first tank to a second gas connection on said second tank with a second line with one or more second valves,

opening said first valves and said second valves to allow said compressed gas to pressurize said fluid, and

pumping said fluid in said second tank into said first tank, thereby causing said compressed gas in said first tank to be displaced into said second tank.

16. The invention of claim **15** further comprising said first tank is on a moving vessel for transportation.

17. The invention of claim **16** further comprising said fluid in said moving vessel is a ship.

18. The invention of claim **16** further comprising said fluid in said moving vessel is a barge.

19. The invention of claim **16** further comprising said fluid in said moving vessel is a train.

20. The invention of claim **16** further comprising said fluid in said moving vessel is a truck.

21. The invention of claim **15** further comprising said second tank is on a moving vessel for transportation.

22. The invention of claim **21** further comprising said fluid in said moving vessel is a ship.

23. The invention of claim **21** further comprising said fluid in said moving vessel is a barge.

24. The invention of claim **21** further comprising said fluid in said moving vessel is a train.

25. The invention of claim **21** further comprising said fluid in said moving vessel is a truck.

26. The method of transferring compressed gas at from a first tank to a second tank without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

filling said second tank with a fluid,

connecting a first fluid connection on said first tank to a second fluid connection on said second tank with a first line with one or more first valves,

connecting a first gas connection on said first tank to a second gas connection on said second tank with a second line with one or more second valves,

opening said first valves and said second valves to allow said compressed gas pressurize said fluid,

pumping said fluid in said second tank into said first tank, thereby causing said compressed gas in said first tank to be displaced into said second tank, and

said first fluid connection is separated from said first gas connection in said first tank by a bladder.

27. The method of transferring compressed gas at from a first tank to a second tank without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

filling said second tank with a fluid,

connecting a first fluid connection on said first tank to a second fluid connection on said second tank with a first line with one or more first valves,

connecting a first gas connection on said first tank to a second gas connection on said second tank with a second line with one or more second valves,

opening said first valves and said second valves to allow said compressed gas to pressurize said fluid,

pumping said fluid in said second tank into said first tank, thereby causing said compressed gas in said first tank to be displaced into said second tank, and

said first fluid connection is separated from said first gas connection in said first tank by a piston.

28. The method of transferring compressed gas at from a first tank to a second tank without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

filling said second tank with a fluid,

connecting a first fluid connection on said first tank to a second fluid connection on said second tank with a first line with one or more first valves,

connecting a first gas connection on said first tank to a second gas connection on said second tank with a second line with one or more second valves,

opening said first valves and said second valves to allow said compressed gas to pressurize said fluid,

pumping said fluid in said second tank into said first tank, thereby causing said compressed gas in said first tank to be displaced into said second tank, and

said second fluid connection is separated from said second gas connection in said second tank by a bladder.

29. The method of transferring compressed gas at from a first tank to a second tank without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

filling said second tank with a fluid,

connecting a first fluid connection on said first tank to a second fluid connection on said second tank with a first line with one or more first valves,

connecting a first gas connection on said first tank to a second gas connection on said second tank with a second line with one or more second valves,

opening said first valves and said second valves to allow said compressed gas to pressurize said fluid,

pumping said fluid in said second tank into said first tank, thereby causing said compressed gas in said first tank to be displaced into said second tank, and

said second fluid connection is separated from said second gas connection in said second tank by a piston.

30. The invention of claim **15** further comprising said fluid is water.

31. The invention of claim **15** further comprising said fluid contains an additive to reduce the freezing temperature.

32. The method of transferring compressed gas at from a first tank to a second tank without decompressing said compressed gas and then re-pressuring said compressed gas comprising:

filling said second tank with a fluid,

connecting a first fluid connection on said first tank to a second fluid connection on said second tank with a first line with one or more first valves,

connecting a first gas connection on said first tank to a second gas connection on said second tank with a second line with one or more second valves,

opening said first valves and said second valves to allow said compressed gas to pressurize said fluid,

pumping said fluid in said second tank into said first tank, thereby causing said compressed gas in said first tank to be displaced into said second tank, and

said first line and said second line have connectors intermediate their ends.

33. The invention of claim **32** further comprising said first line and said second line are neutrally buoyant for floating in seawater for connection.

34. The invention of claim **32** further comprising said first line and said second line can be flooded with an environmentally friendly fluid or gas prior to disconnection.

* * * * *

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(12) **United States Patent**
Moszkowski et al.

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(45) **Date of Patent: Apr. 3, 2012**

(54) **DUAL GRADIENT PIPELINE EVACUATION METHOD**

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(58) **Field of Classification Search** 166/344, 166/351, 352, 357, 366, 368, 267, 400, 401, 166/339, 170, 177.3
See application file for complete search history.

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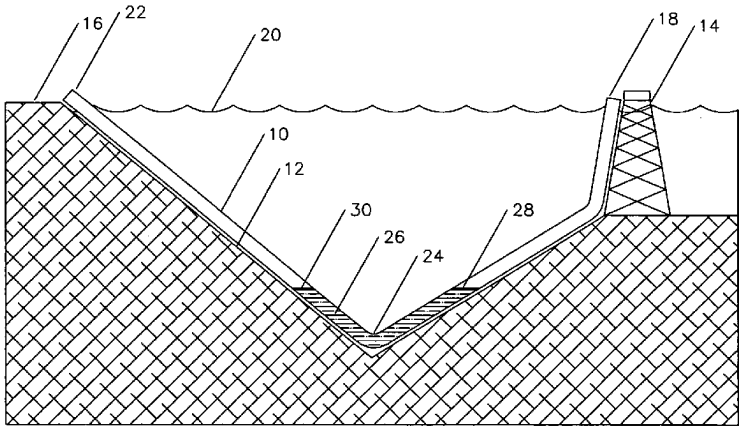
(57) **ABSTRACT**

The method of removing a first liquid from a subsea pipeline which has a central portion lower than each of the ends of the subsea pipeline by pumping a second lower density fluid into the pipeline and the either removing the second lower density fluid by either displacing it with gas or evaporating the second lower density fluid to a gas.

6 Claims, 4 Drawing Sheets



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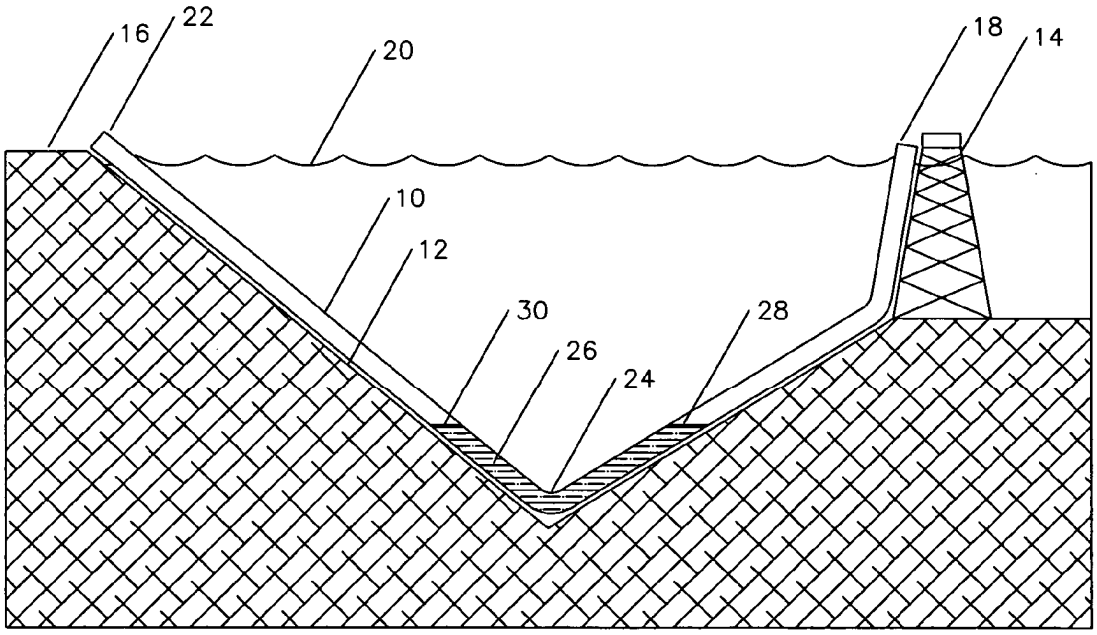

FIGURE 1

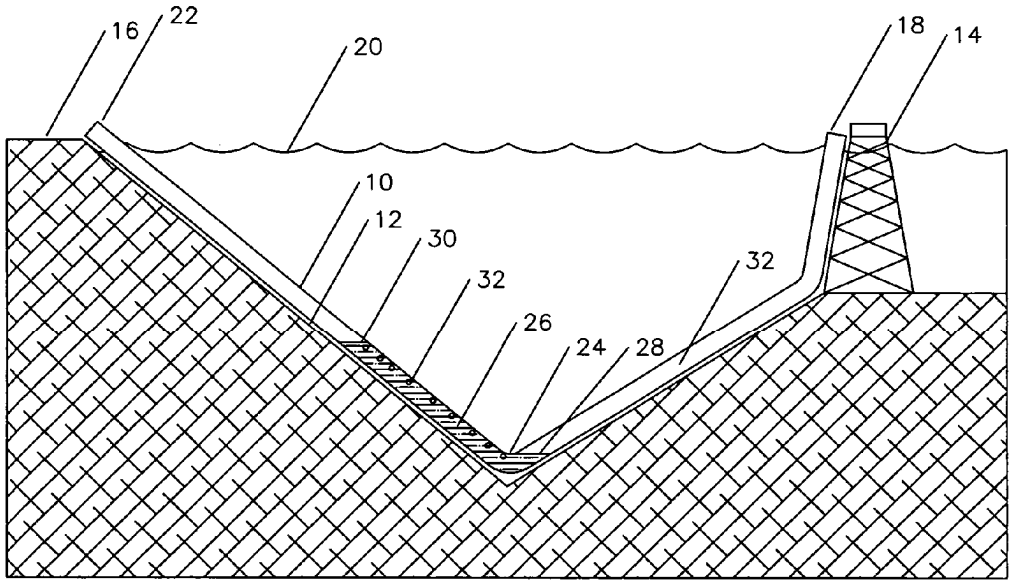

FIGURE 2

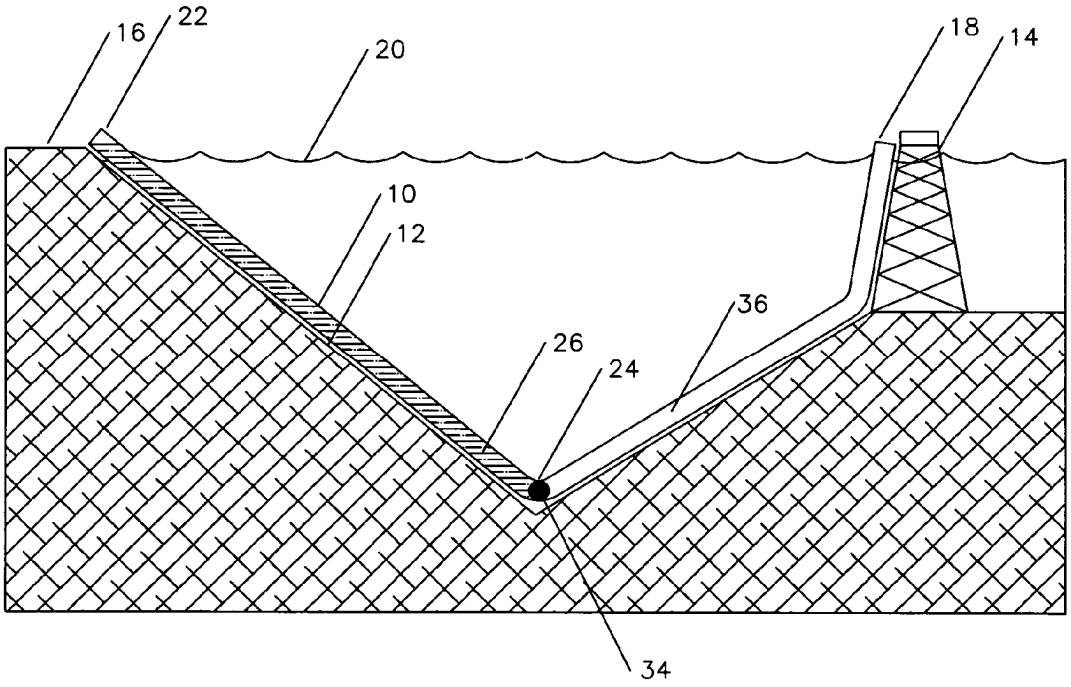

FIGURE 3

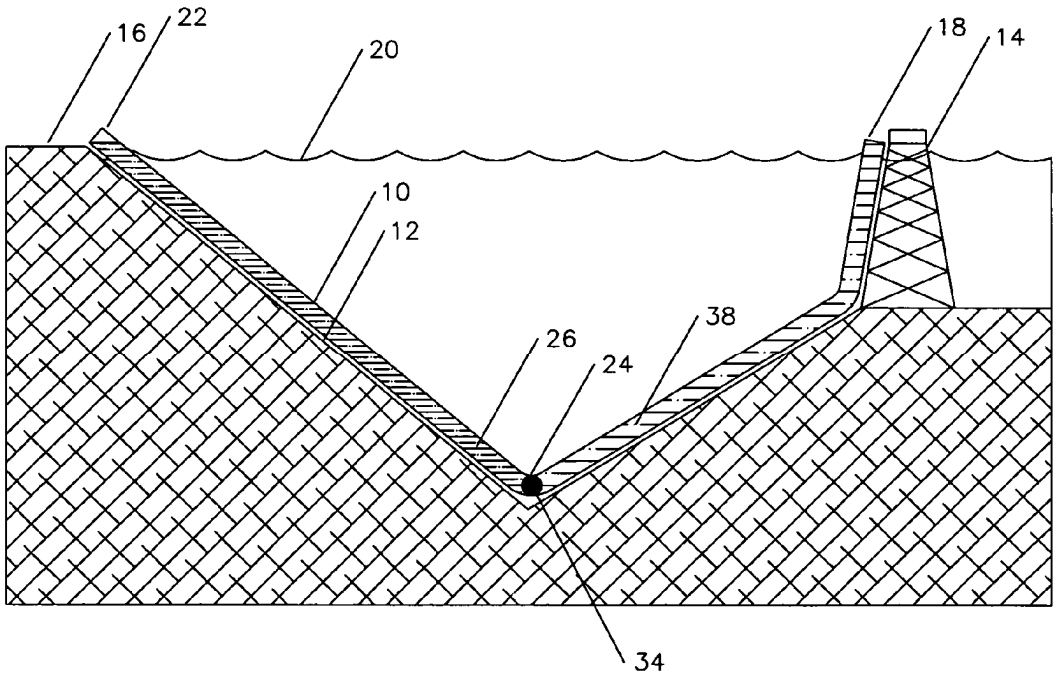

FIGURE 4

DUAL GRADIENT PIPELINE EVACUATION METHOD

TECHNICAL FIELD

This invention relates to the general subject of removing unwanted water from the lower areas of a deepwater subsea pipeline using alternate liquids of lower density.

CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable

REFERENCE TO A "MICROFICHE APPENDIX"

Not applicable

BACKGROUND OF THE INVENTION

The field of this invention is that of removing unwanted water from deepwater pipelines. In some cases methane and other desirable gases will be produced from subsea wells and brought to the surface for initial processing. A prime function of this pre-processing is to remove the water from the gas.

After processing, the gasses will be returned to and along a seafloor pipeline for delivery to a remote location, also at sea level. As the high volume of gasses are passed into the pipeline, some portion of liquids will also reach the pipeline. These liquids, primarily water, will accumulate in the lowest points of the pipelines.

There are pipelines which have each end above sea level, and go through seafloor valleys as deep at 11,000 ft. deep. If a small amount of water accumulates in the pipeline, flowing gasses will simply percolate thru the water. The gas will push the water down on the near side and up on the far side until gas reaches the lowest point. At this time gas passes under the lowest point inside the pipeline and percolates up the far side. If there is enough water in the pipeline to raise the elevation of the water on the downstream side up 100 feet, it will take about 46.5 p.s.i. in gas pressure to do this (salt water is about 0.465 p.s.i./ft.). If you have gas supply pressure of 2,000 p.s.i., it will lift the gas on the downstream side by 4301 feet. If the pipeline depth is greater than 4301 feet, the pipeline is effectively completely blocked. Accumulated salt water in the 11,000 foot deep pipeline would be able to block a pressure of 5,115 p.s.i. (0.465*11,000).

BRIEF SUMMARY OF THE INVENTION

The object of this invention is to provide a method of removing unwanted liquids from a subsea pipeline by displacing the unwanted fluids with a lower density fluid which can be more easily removed by pumping.

A second object of this invention is to provide a method of removing unwanted liquids from a subsea pipeline by displacing the unwanted fluids with a more desirable fluid which can be more easily removed by evaporation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a section of a pipeline extending from an offshore platform through a subsea valley and back up to the shore, having water at the low point in the pipeline.

FIG. **2** is a section of the pipeline of FIG. **1** showing the water displaced towards the downstream side of the low point by gas pressure from the upstream side and gas percolating through the water.

FIG. **3** is a section of the pipeline of FIGS. **1** and **2** showing water being displaced using gas and a pig.

FIG. **4** is a section of the pipeline of FIG. **3** using a low density liquid as the driving means to remove the water from the pipeline.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. **1**, a pipeline **10** is shown on the seafloor **12** between offshore platform **14** and the shore **16**. Upstream end **18** of pipeline **10** is approximately at sea level **20** as is the downstream end at **22**. The lowest point or "valley" in the pipeline **24** can be as deep as 11,000 feet deep. Water **26** is shown in the pipeline and is presently shown with its upstream end **28** at approximately at the same level as downstream end **30**.

Referring now to FIG. **2**, the upstream gas pressure **32** has been increased to force the water at the upstream end **28** down to the level of the upper side of the low point of the pipeline at **24**. The water at the downstream end **30** is pushed up enough that gas bubbles **32** are percolating through the water **26**. The differing head pressure of the water is the gas pressure differential required to accomplish this. Again, this head pressure is generally calculated by the difference in height times 0.465 p.s.i. per foot. Additional flows of gas in the pipeline will not remove the water, but simply pass through the water until enough water accumulates such that it will no longer flow at all.

Referring now to FIG. **3**, a pipeline pig **34** which seals against the bore of the pipeline has been pushed to the "valley" **24** by a working media **36**. As discussed above it would take approximately 5,115 p.s.i. gas to accomplish this if air is the working media.

The compression of gas to these pressures at high volumes associated with large diameter and long subsea pipelines is time consuming and expensive. Finding very large compressors in remote areas operating at that range of pressure would be problematic. The internal volume of a 32 inch diameter pipe **200** miles long is about 4.5 million cu. ft. which would represent an average standard air volume of about 750 million cu. ft. As air has substantial oxygen in it, it has more than a chance of auto-igniting or "dieseling" and generating high and damaging pressures. Nitrogen can be used in place of air without the danger of explosions, but would be very high in cost and supply in remote areas is unlikely.

Referring now to FIG. **4**, consider that instead of gas on the upstream side of the pig **34** a different liquid **38** is used. Liquefied propane/butane is a relatively incompressible liquid when subjected to a pressure of at least 28 psi for butane and 112 psi for propane at 68 degrees F. or lower, and is present as a "condensate" in most pipelines. When a liquid at that temperature, the density of butane is 58% that of sea water and that of propane is 50%.

If a 50/50 mixture of propane and butane were to be used as the media for pushing the dewatering pig, more than 50% of the head pressure necessary would be provided by the weight of the liquid mixture in the pipeline. An additional pressure of only 2,400 psi would be required. Further, to pump a liquid instead of a gas it is inherently a much more efficient operation. This means that instead of 5,115 p.s.i. of difficult gas compression, only 2400 p.s.i. of relatively easy liquid pumping would be required.

After the pipeline pig passes the valley and continues up the opposite side, the required pumping pressure would go from a maximum of 2400 p.s.i. to 0 p.s.i. when the mixture reached sea level at the outlet end. At that point as the pipeline if full of mixture, there are two methods of removing the mixture from the pipeline. As it is approximately ½ as heavy as the water was, adequate gas pressure may be available to simply pump it out using a second pig. Secondly, if the downstream end of the pipeline is simply vented at low pressure, the propane/butane mixture will simply evaporate, although it may take a while.

The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

That which is claimed is:

1. The method of removing a first liquid from a subsea gas pipeline which has an intermediate portion which is lower than the ends of said subsea pipeline, comprising:

displacing said first liquid from said subsea pipeline by pumping a second liquid into said pipeline, and

allowing at least a portion of said second liquid to evaporate to a gas.

2. The method of claim **1** further comprising said first liquid is water.

3. The method of claim **1** further comprising said second liquid is propane.

4. The method of claim **1** further comprising said second liquid is butane.

5. The method of claim **1** further comprising said second liquid is a propane/butane mixture.

6. The method of claim **1**, further comprising separating said first liquid from said second liquid during said pumping operations with a pig which seals in the bore of said subsea gas pipeline.

* * * * *

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(43) Pub. Date: Jan. 19, 2012

Baugh et al.

(54) METHOD OF PROVIDING AN OUTLET ON A SUBSEA PIPELINE

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(21) Appl. No.: **12/804,260**

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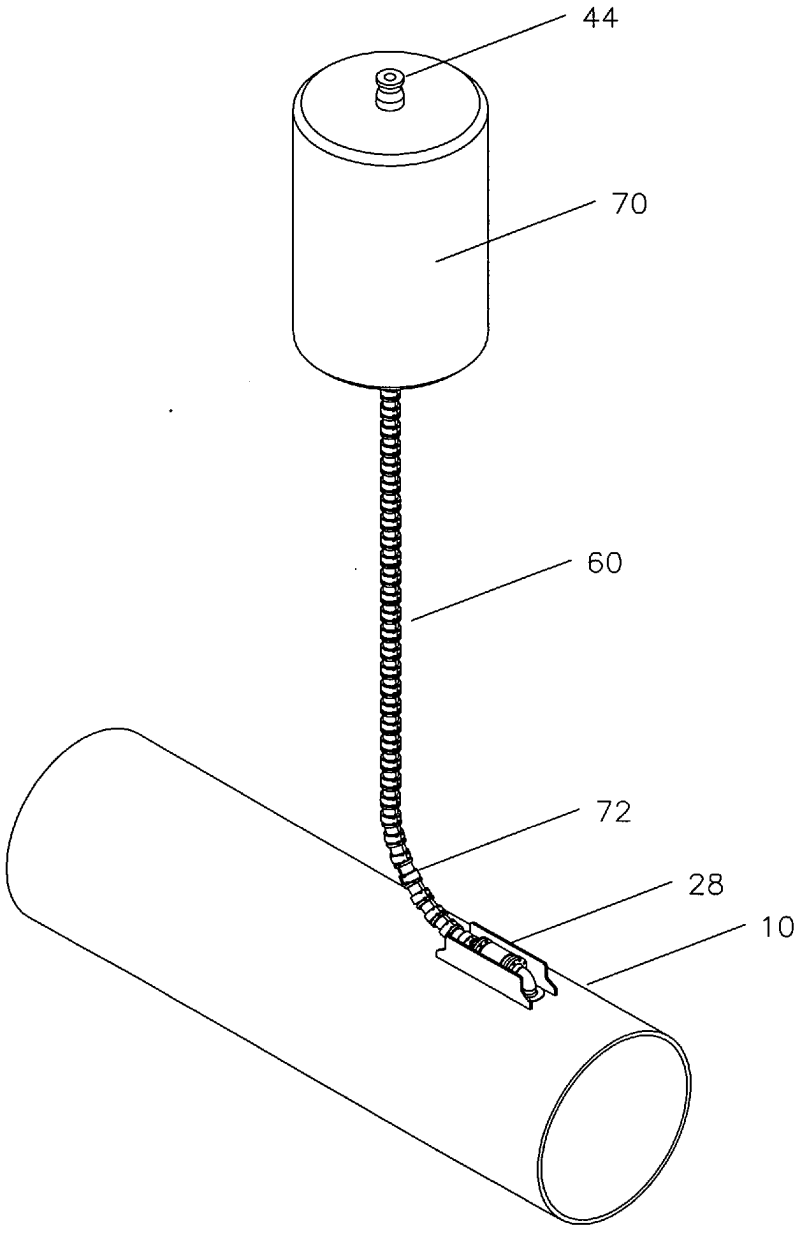
Publication Classification

(51) **Int. Cl.**
F16L 1/12 (2006.01)

(52) **U.S. Cl.** **405/169**

(57) **ABSTRACT**

The method of providing an accessible outlet on a subsea pipeline which has an unknown rotational orientation comprising connecting a first end of a flexible hose to the subsea pipeline, providing a multiplicity of connected bend restrictor sections around the flexible hose to restrict the bending of the hose, and providing buoyancy to the end of the hose such that the second end of the hose will remain accessible for future operations.



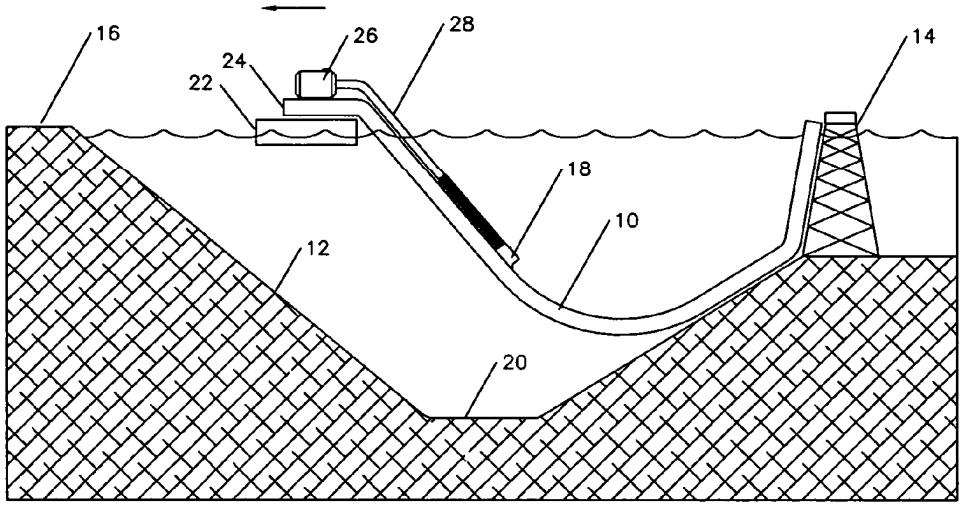


FIG. 1

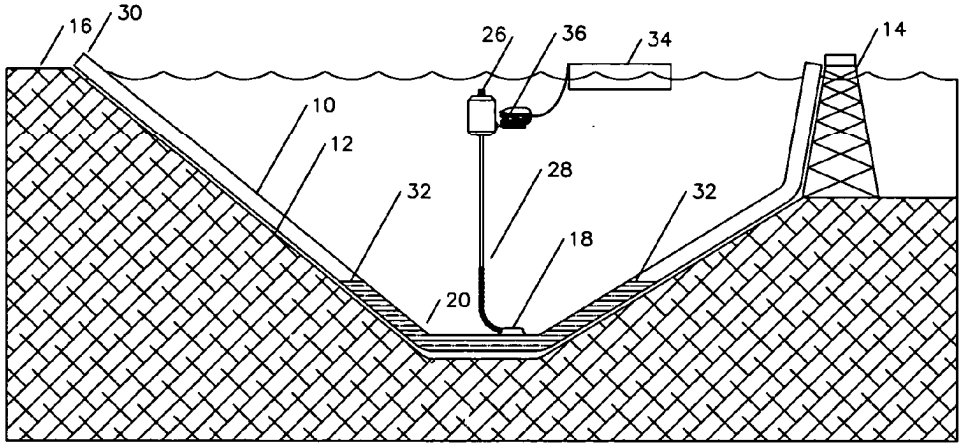


FIG. 2

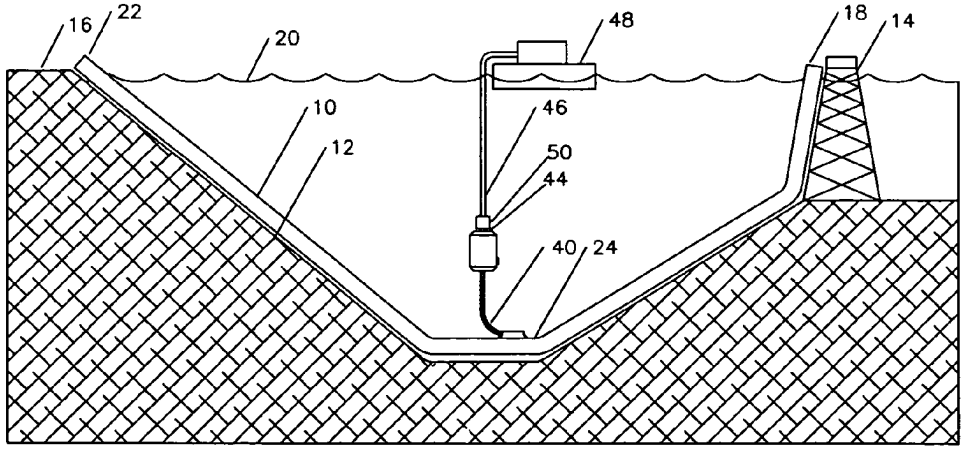


FIG. 3

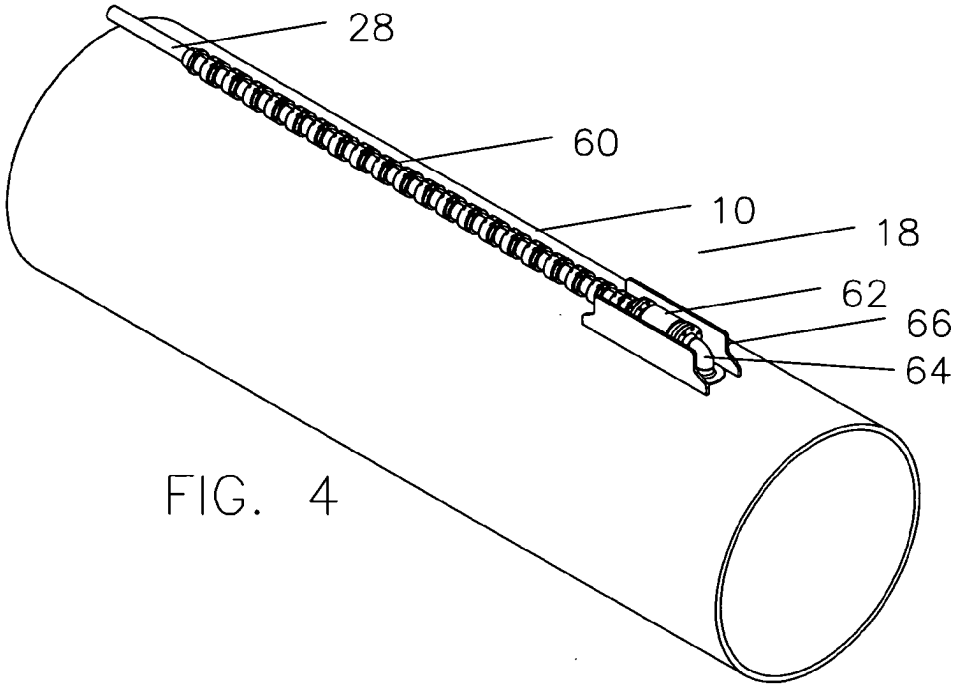


FIG. 4

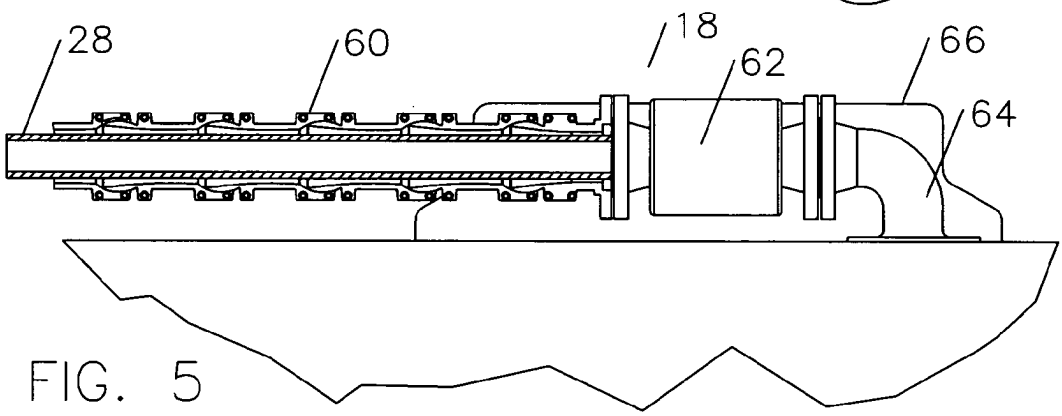


FIG. 5

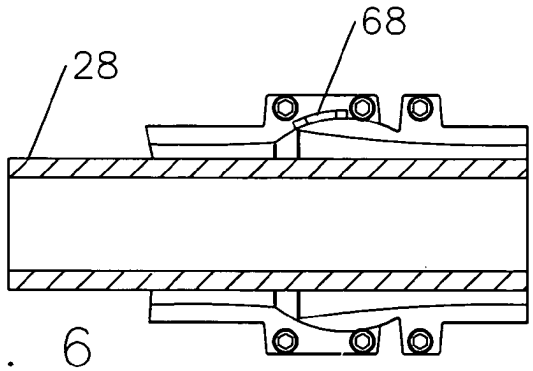


FIG. 6

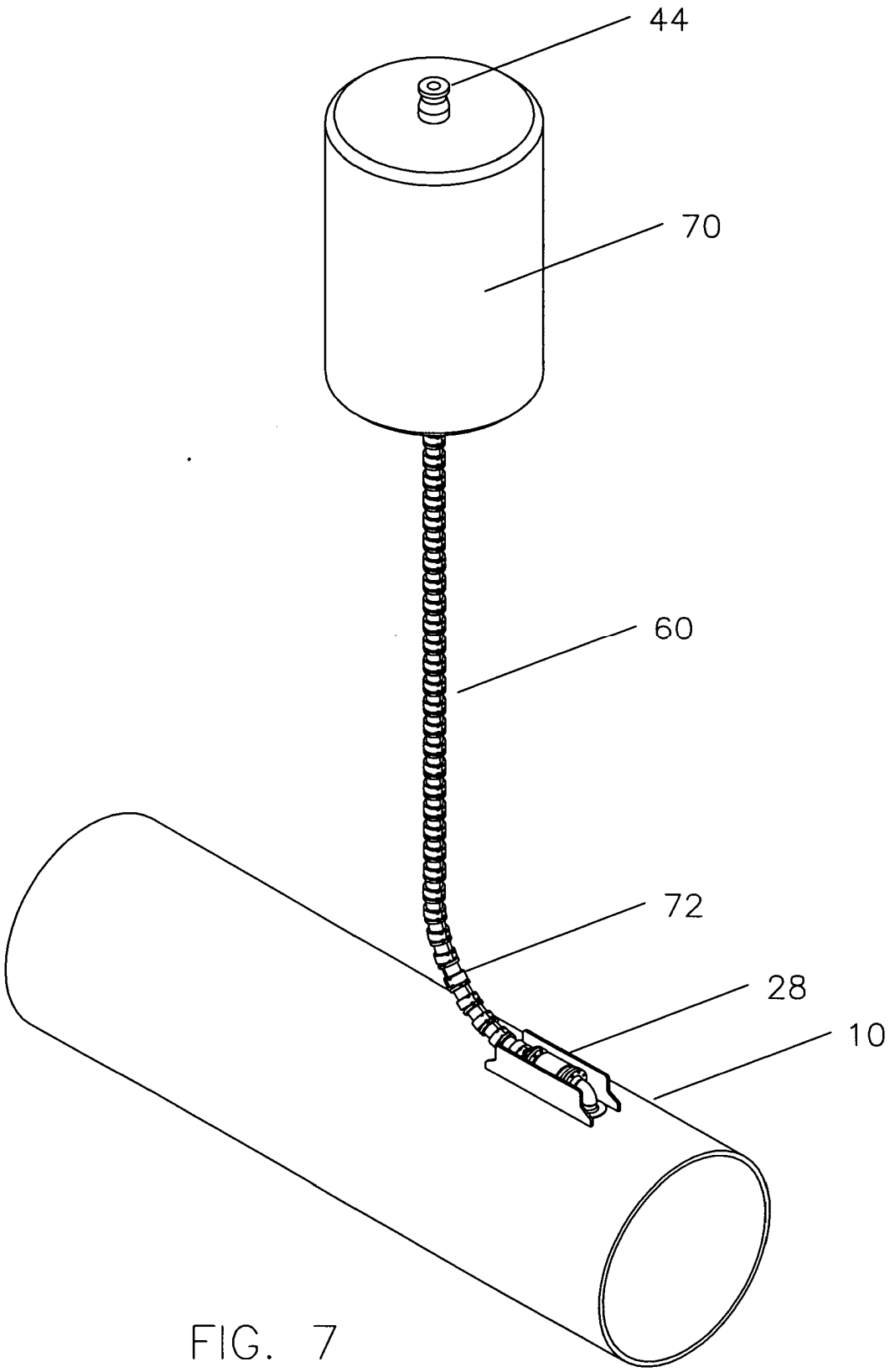


FIG. 7

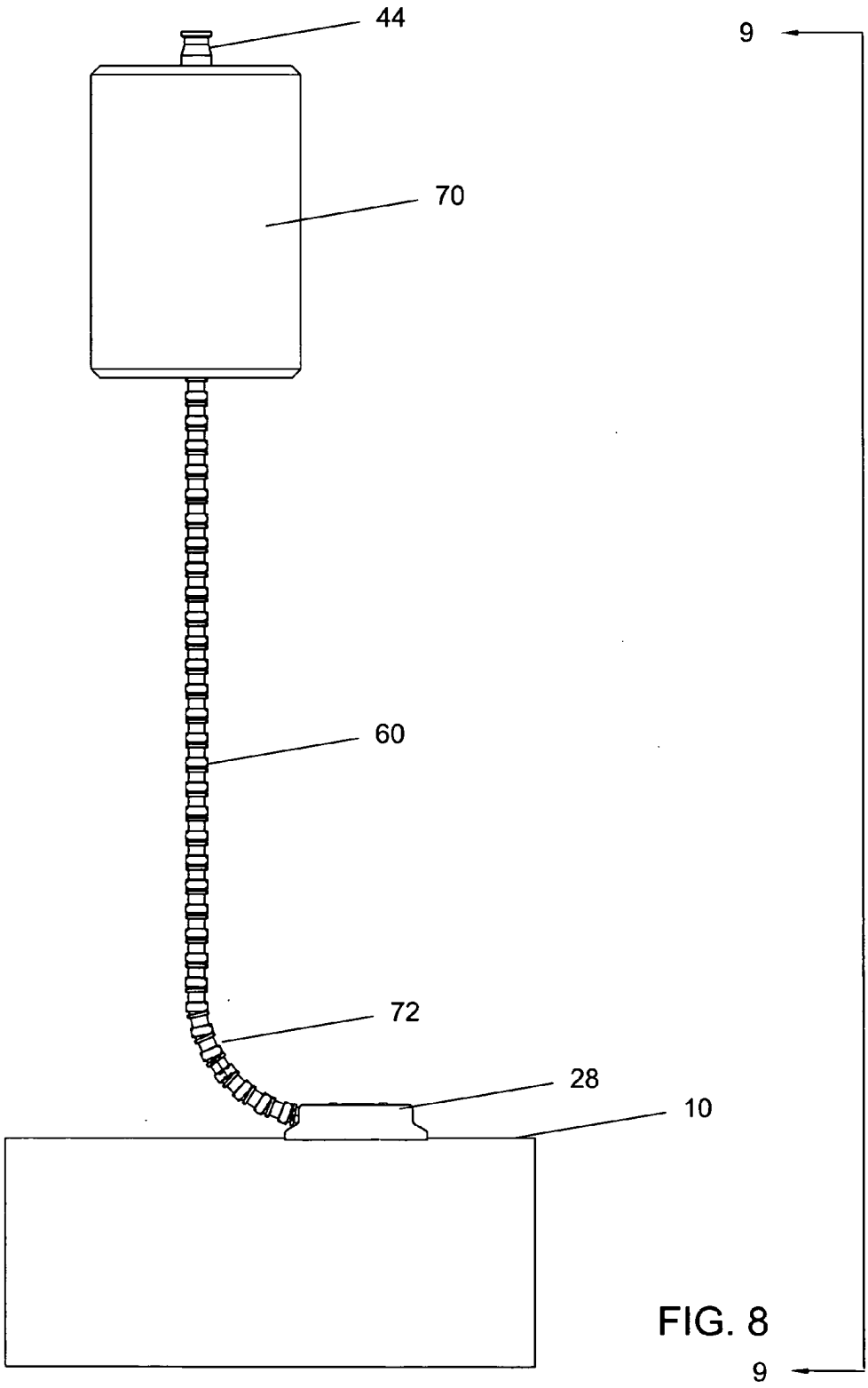


FIG. 8

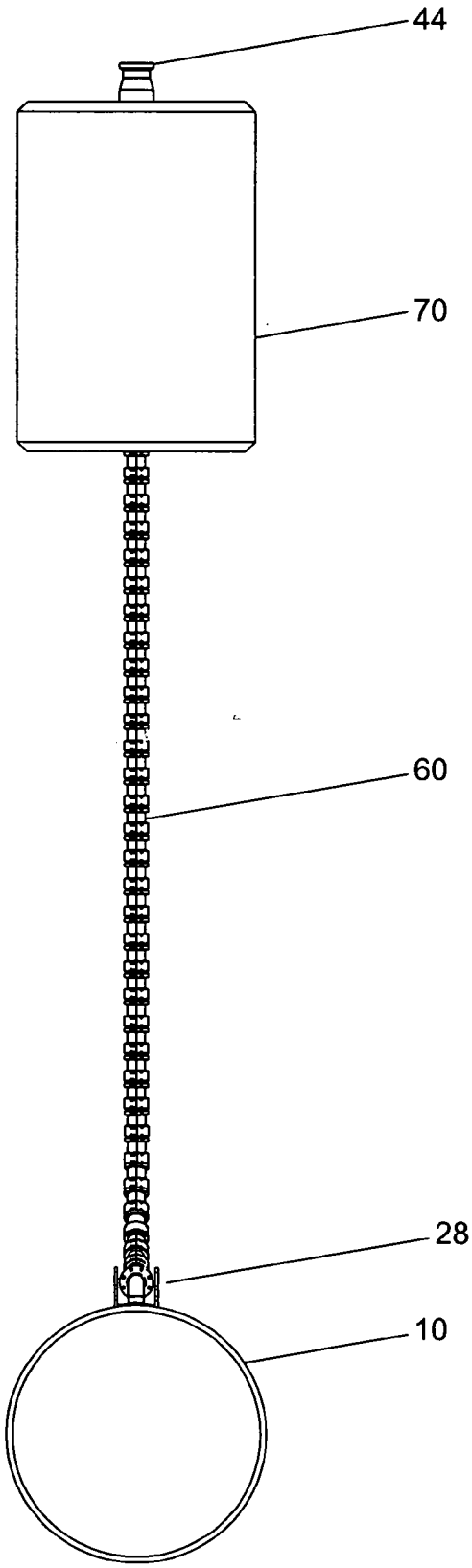


FIG. 9

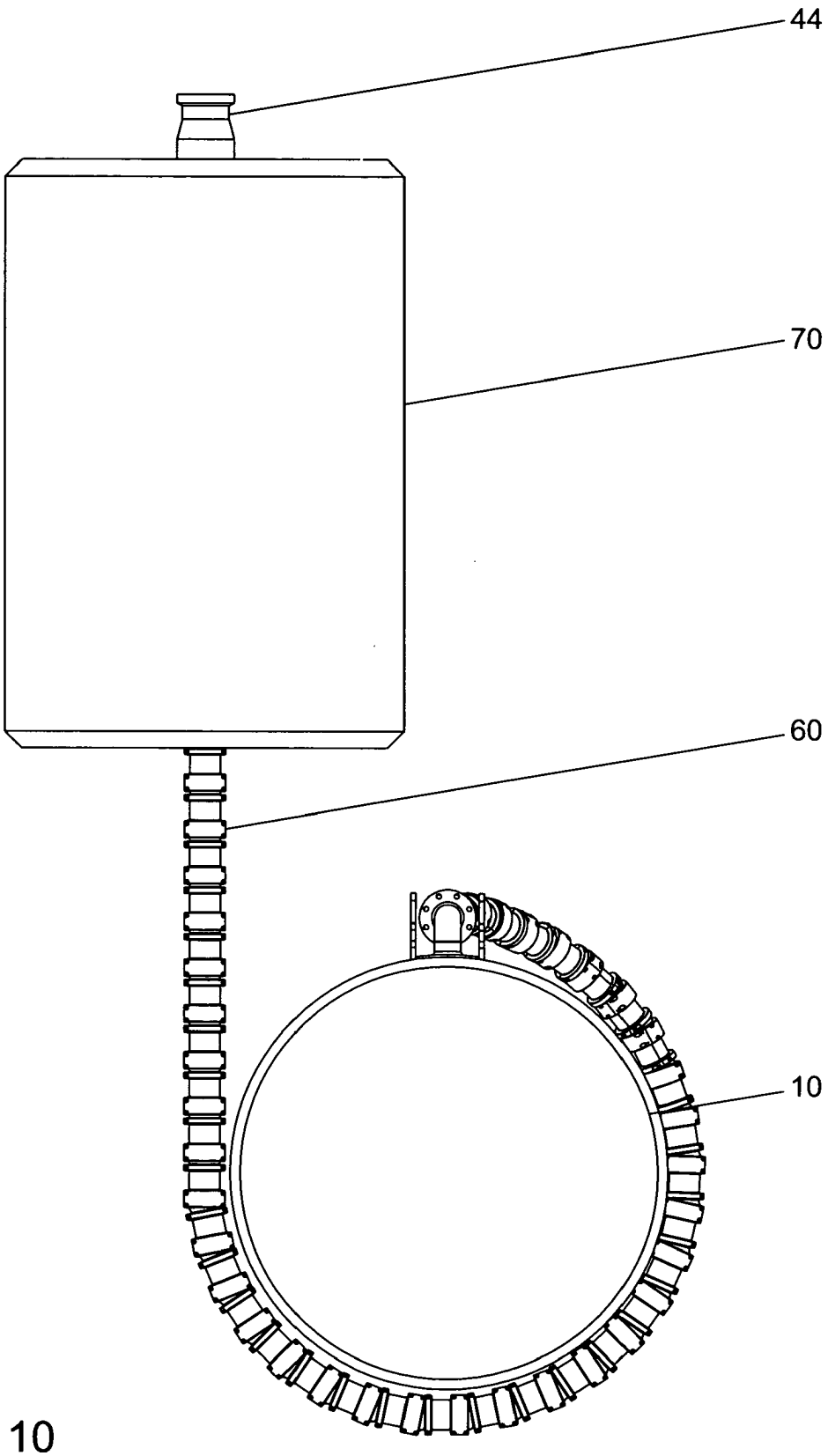


FIG. 10

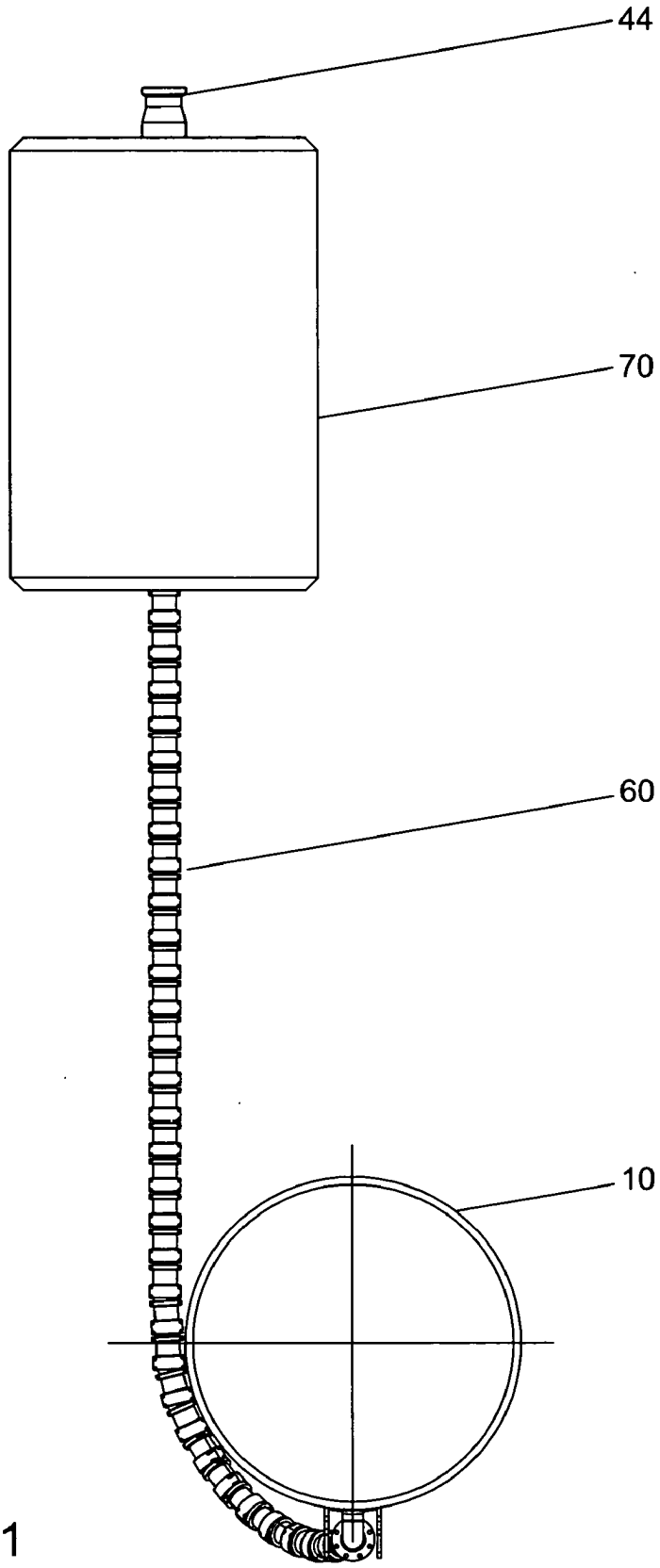


FIG. 11

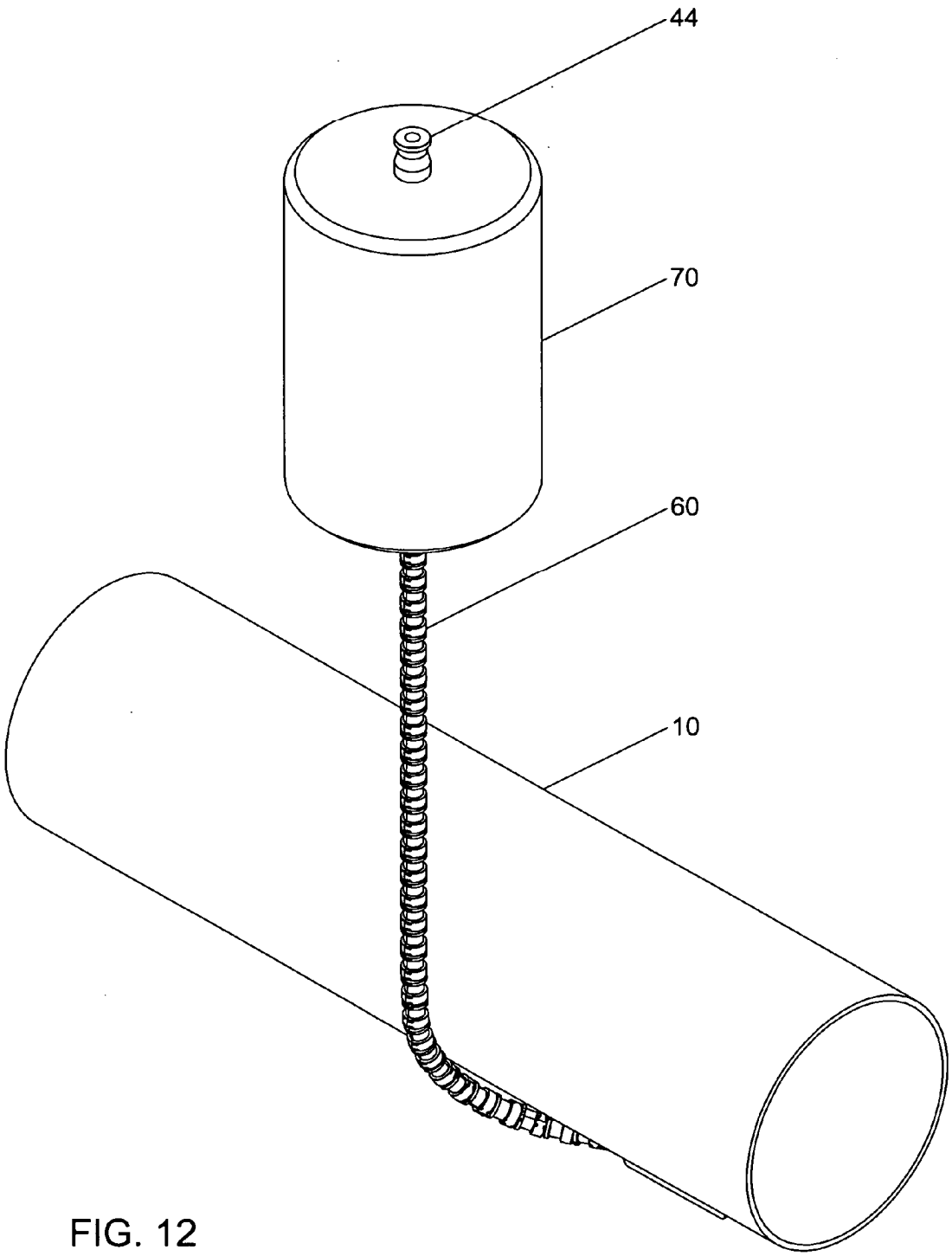


FIG. 12

METHOD OF PROVIDING AN OUTLET ON A SUBSEA PIPELINE

TECHNICAL FIELD

[0001] This invention relates to the general subject of providing outlets for fluid connection to subsea pipelines.

CROSS-REFERENCE TO RELATED APPLICATIONS

[0002] Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0003] Not applicable

REFERENCE TO A "MICROFICHE APPENDIX"

[0004] Not applicable

BACKGROUND OF THE INVENTION

[0005] The field of this invention is that of pipelines in deep water where the process of laying the pipeline involves substantial stresses in the pipeline which can leave the exact orientation of the pipeline unknown. In the worst case scenario, the outlets on the pipeline can be oriented straight down and be completely inaccessible. Any orientation other than straight to the side or straight up typically involve substantial complications to any future tie-ins.

[0006] Outlets are needed for a variety of reasons. The first is simply the immediate connection of another pipeline. The potential for future tie-ins also exists as when a pipeline is laid, the full extent of future tie-ins is not known. In some cases the original supply of gas planned for the pipeline can be depleted and other reservoir locations can be found to tie in to the pipeline, if appropriate connection points are available.

[0007] In relatively deep water, water can accumulate in gas pipelines, slowing and sometimes completely stopping the flow. Frequently the production of natural gas also produces some water. When this water accumulates at the low point in the pipeline, it blocks the flow of water until the gas pushes the water in the upstream side down to the lowest point, with all the water pushed up the downstream side. The historic solution for this is to install a "pig" in the pipeline which seals on the internal bore of the pipeline and pumping it through the pipeline. As the pig sweeps through the pipeline, it will push the water out the other end. If the gas pressure is not sufficient, it will simply not be able to push the water up the other side.

[0008] Another problem which exists is the tendency for gas pipelines to form hydrates when water is present. At the pressures and temperatures of deepwater subsea pipelines, hydrates can form and block pipelines for months. Hydrates are something similar to crushed ice which are a mixture of water and natural gas.

[0009] There has long been a need for a more flexible way to make connections to subsea pipelines and a way to remove water from the pipelines, to remove other liquids from the pipeline, or to inject flow into the pipeline. Due to the probability that a contemporary pipeline will have an unpredictable orientation when it is laid on the sea floor, connection points are rarely added to pipelines or when they are they are provided with a large stabilizing skid to force them into a specific orientation.

BRIEF SUMMARY OF THE INVENTION

[0010] The object of this invention is to provide a method of allowing pipelines to land in an unknown orientation when laid on the seafloor and still providing an outlet with a desired orientation.

[0011] A second object of this invention is to provide an outlet in a subsea pipeline capable of removing unwanted liquids from the pipeline.

[0012] A third object of this invention is to provide a method to allow the flow of gas or liquids from another subsea pipeline.

[0013] Another object of the present invention is to provide a method of flowing gases and/or liquids into a subsea pipeline from another pipeline.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. **1** is a view of a pipeline being laid with the outlet of this invention.

[0015] FIG. **2**. Is a view of the pipeline of FIG. **1** completely laid and being used to remove unwanted liquids from the pipeline.

[0016] FIG. **3** is a view of a pipeline outlet being connected for an auxiliary pipeline.

[0017] FIG. **4** is a perspective view of a portion of FIG. **1** showing the outlet exiting the pipeline as it is being laid from the vessel.

[0018] FIG. **5** is a partial section of the outlet showing the flexible hose and the surrounding bend restrictor.

[0019] FIG. **6** is a closer view of a bend restrictor section showing an anti-rotation key.

[0020] FIG. **7** is a perspective view of the outlet as would be seen if the subsea pipeline did not rotate during laying.

[0021] FIG. **8** is a side view of the view of FIG. **7**.

[0022] FIG. **9** is an end view of FIG. **8** as seen along lines "**9-9**" of FIG. **8**.

[0023] FIG. **10** is a view similar to FIG. **9**, but with the subsea pipeline rotated 360 degrees.

[0024] FIG. **11** is a view similar to FIG. **10**, but with the subsea pipeline rotated only 180 degrees.

[0025] FIG. **12** is a perspective view of FIG. **11**.

DETAILED DESCRIPTION OF THE INVENTION

[0026] Referring now to FIG. **1**, a subsea pipeline **10** is shown being laid on the seafloor **12** from an offshore structure **14** towards the shore **16**. A pipeline outlet **18** is connected into subsea pipeline **10** in a position such that it will land in a low point or subsea valley **20** in the pipeline path along the seafloor **12**.

[0027] The pipelay vessel **22** is shown with the pipeline end **24** and buoy **26** which is connected to hose **28** which in turn is connected to pipeline outlet **18**. By attaching the hose **28** to the pipeline outlet **18** and in turn attaching the buoy **26** to the hose at the appropriate position, a single pipelay vessel **22** is able to both deploy the subsea pipeline **10** and the buoy **26**.

[0028] Referring now to FIG. **2**, the subsea pipeline **10** is fully laid on the ocean floor **12** with end **30** arriving at a shore facility (not shown). The pipeline outlet **18** is laid in the valley **20** with hose **28** going up to buoy **26** near the surface of the ocean. Water **32** is shown collected in the low portion of the

subsea pipeline **10** in the valley **20**. Sufficient accumulations of water in the valley of the pipeline will stop the flow of gas in the pipeline. The outlet **18**, hose **28** and buoy **26** are utilized to remove the unwanted water from the subsea pipeline **10** by a surface vessel **34**. In the embodiment shown a remotely operated vehicle (ROV) **36** is deployed from the surface vessel **34**, engages the buoy **26** and operates a pump to pump the water out of the pipeline and to the surface. One method for doing this is to have a first hose with seawater flowing down to a motor proximate the pipeline outlet **18** to drive a pump to pump the pipeline water back up to the surface.

[0029] Referring now to FIG. **3**, the hose **40** is shorter than hose **28** of FIG. **2** and buoy **42** provides a connection mandrel **44** facing upwardly. Pipeline **46** is lowered from vessel **48** with a connector **50** on the lower end for sealingly engaging with connection mandrel **44**. At this time the pipeline **46** can be laid along the ocean floor to other facilities as required. A characteristic of subsea pipelines as they are laid from deep-water vessels is that they frequently twist slightly. When a steel pipeline such as **46** twists 180 degrees, the rigidity of the pipeline tends to prevent it from being twisted and will cause the flexible hose at the end to absorb all the twist. If the hose **40** is short, i.e. 50 feet long, and is twisted 180 degrees it will frequently give the hose spiral failure. As will be seen in FIG. **6**, the hose can be reinforced against spiral failure without limiting its flexibility.

[0030] Referring now to FIG. **4**, subsea pipeline **10** is shown with an outlet hose **28** protected at its lower end by a multiplicity of bend restrictor sections **60** and attached a control package **62**. Control package section **62** can comprise shut-off valves, check valves, and/or pumps as are required for the particular purpose of the pipeline outlet. The control package section is in turn connected to elbow **64** into the subsea pipeline **10**. On each side of the control package section, protective gussets **66** are shown. This is as it would be seen when being laid from the vessel before the buoy **26** is launched.

[0031] Referring now to FIG. **5**, a closer partial view of the outlet **18** is seen showing the hose **28** inside the multiplicity of bend restrictor sections **60**.

[0032] Referring now to FIG. **6**, a single half section of bend restrictor is shown with an orientation key **68** which allows the bend restrictor sections to sustain torque and protect the hose **28** from being damaged by torsion.

[0033] Referring now to FIG. **7**, a perspective view of an outlet for attaching a pipeline is seen with the bend restrictor sections **60** going all the way up to the buoy **70** in order to protect the hose within from torque. As shown, the pipe did not rotate during the laying process, and the bend restrictors allow a simple 90 degree curve upwards toward the buoyancy.

[0034] Referring now to FIG. **8**, a side view of FIG. **7** is seen.

[0035] Referring now to FIG. **9**, an end view of the arrangement of view **7** is seen.

[0036] Referring now to FIG. **10**, the view of FIG. **9** is shown with the subsea pipeline **10** rotated a full 360 degrees showing what happens when the pipe is rotated in the laying process. The pipe is rotated, but the connection **44** is still available for connection.

[0037] Referring now to FIG. **11**, the view of FIG. **9** is shown with the subsea pipeline **10** rotated 180 degrees in the laying process.

[0038] Referring now to FIG. **12**, a perspective view of FIG. **11** is shown.

[0039] The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

That which is claimed is:

1. A method of providing an accessible outlet on a subsea pipeline on the seafloor at a location distal from the ends of said pipeline which has an unknown rotational orientation about the centerline of said pipeline comprising:

connecting a first end of a flexible hose to said subsea pipeline,

providing a multiplicity of connected bend restrictor sections around said flexible hose to restrict the bending of said hose, and

providing buoyancy to the second end of said hose such that said second end of said hose will remain accessible for future operations.

2. The method of claim **1**, further comprising the centerline of said first end of said flexible hose is eccentric to and approximately parallel to the centerline of said subsea pipeline which has an unknown rotational orientation.

3. The method of claim **1**, further comprising providing a pump to pump liquids from said subsea pipeline into said hose.

4. The method of claim **1**, further comprising providing a check valve to prevent the flow of liquids from said flexible hose into said subsea pipeline.

5. The method of claim **1**, further comprising providing a check valve to prevent the flow of liquids from said subsea pipeline into said flexible hose.

6. The method of claim **1**, further comprising said multiplicity of bend restrictor sections are long enough to allow said subsea pipeline to rotate one full rotation and still allow said second end of said hose to remain vertical.

7. The method of claim **1**, further comprising launching said flexible hose, multiplicity of bend restrictors, and said buoyancy from the same vessel said subsea pipeline is being laid from.

8. A method of providing an accessible outlet on a subsea pipeline eccentric to the centerline of said subsea pipeline on the seafloor at a location distal from the ends of said pipeline which has unknown rotational orientation about the centerline of said pipeline comprising:

connecting a first end of a flexible hose to said subsea pipeline,

providing a multiplicity of connected bend restrictor sections around said flexible hose to restrict the bending of said hose,

providing buoyancy to the second end of said hose such that said second end of said hose will remain accessible for future operations, and

providing said bend restrictor sections with torsional capacity and connecting said buoyancy to one of said bend restrictor sections to protect said hose from torsional stress.

* * * * *

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(19) United States

(12) Patent Application Publication

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(43) Pub. Date: Jan. 19, 2012

Moszkowski et al.

(54) METHOD OF FILLING CNG TANKS

(76) Inventors: **Marc Moszkowski**, Houston, TX (US); **Benton Frederick Baugh**, Houston, TX (US)

(21) Appl. No.: **12/804,259**

(22) Filed: **Jul. 19, 2010**

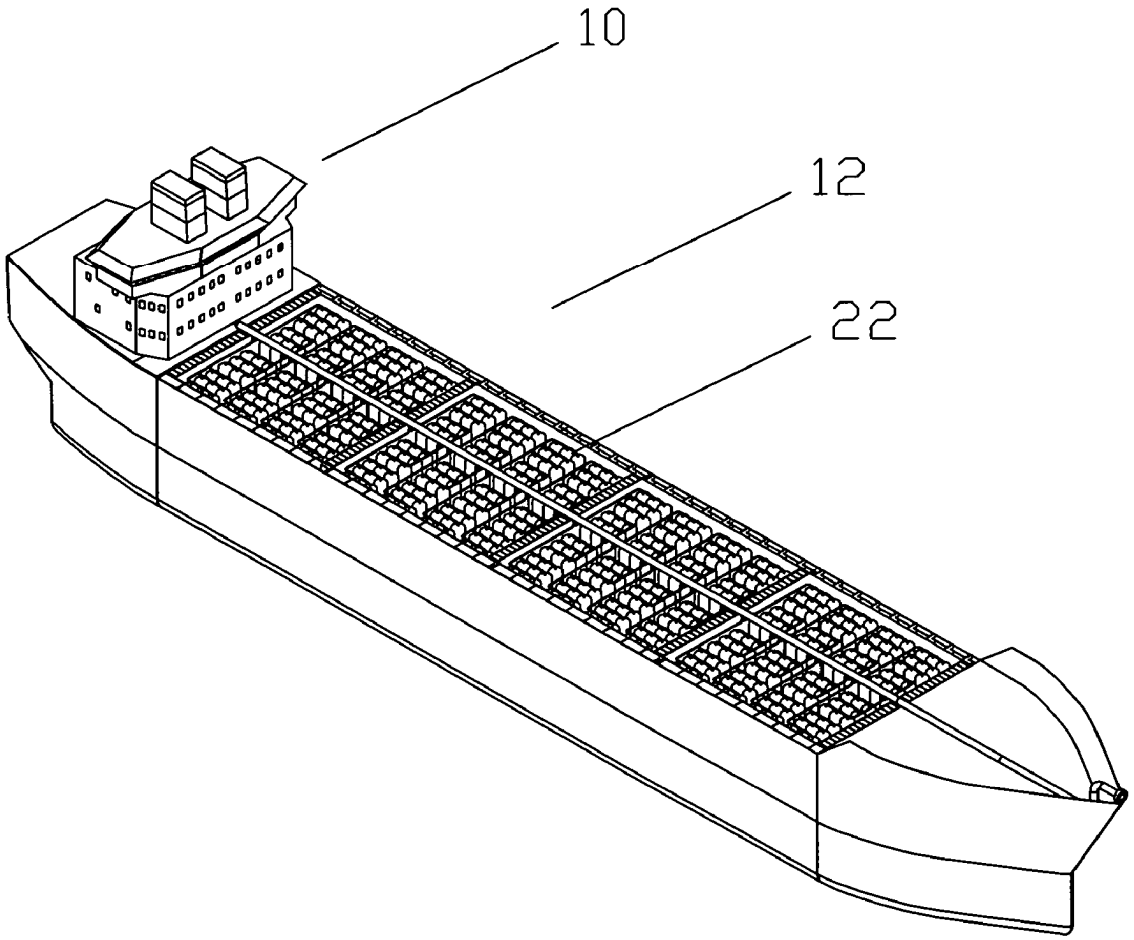
Publication Classification

(51) **Int. Cl.**
F17C 5/06 (2006.01)

(52) **U.S. Cl.** **141/4**; 137/14

(57) **ABSTRACT**

The method of charging a tank with a gas product up to a desired pressure and temperature without increasing the gas in the tank to a pressure and temperature higher than a desired pressure and temperature, comprising pressurizing the incoming gas to be put into the tank to a pressure equal to or higher than the pressure of the resident gas already in the tank, cooling the incoming gas to a temperature lower than the resident gas, mixing the incoming gas with the resident gas up to the desired pressure such that the pressure and temperature of the combined gas will be increased without increasing the temperature and pressure of the resident gas to a pressure and temperature higher than the desired pressure or temperature.



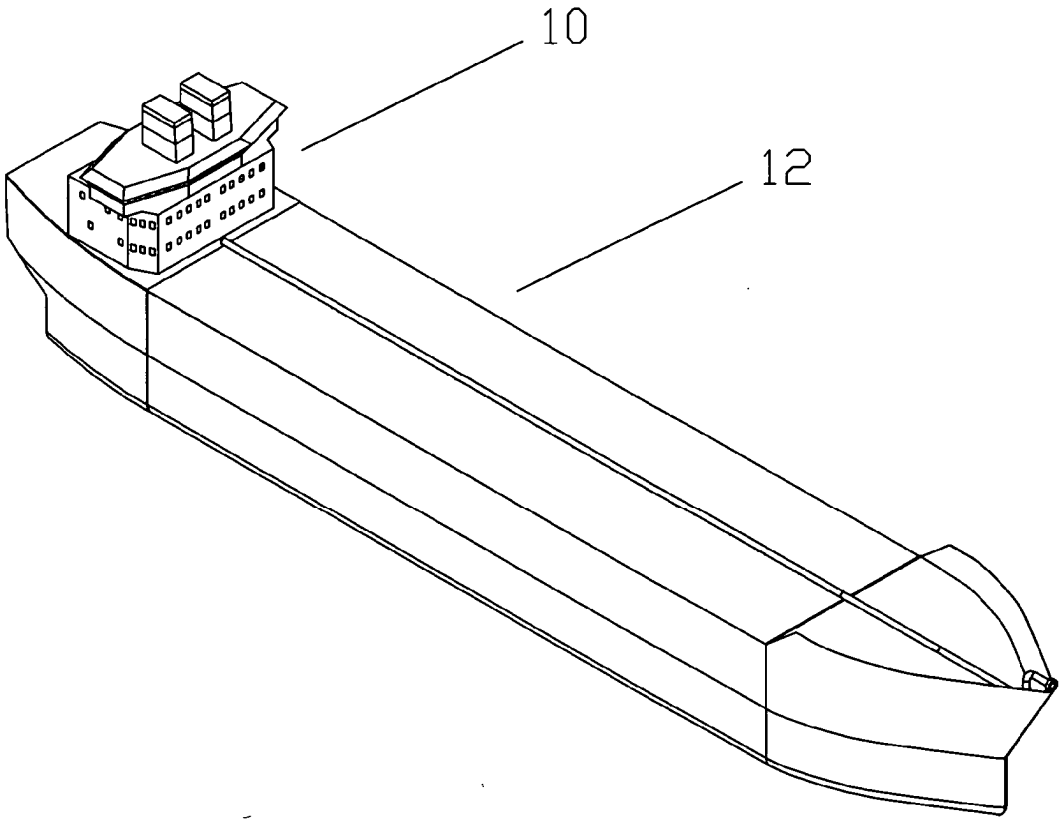


FIG. 1

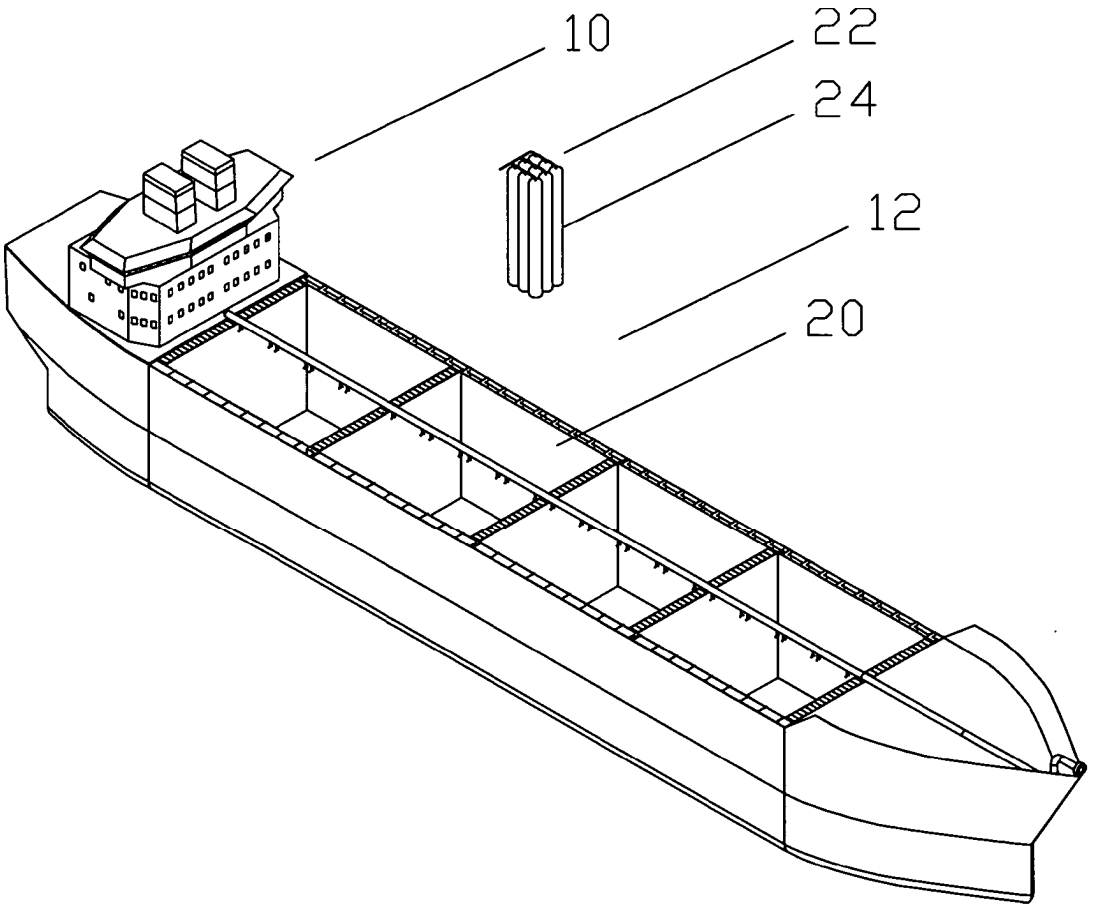


FIG. 2

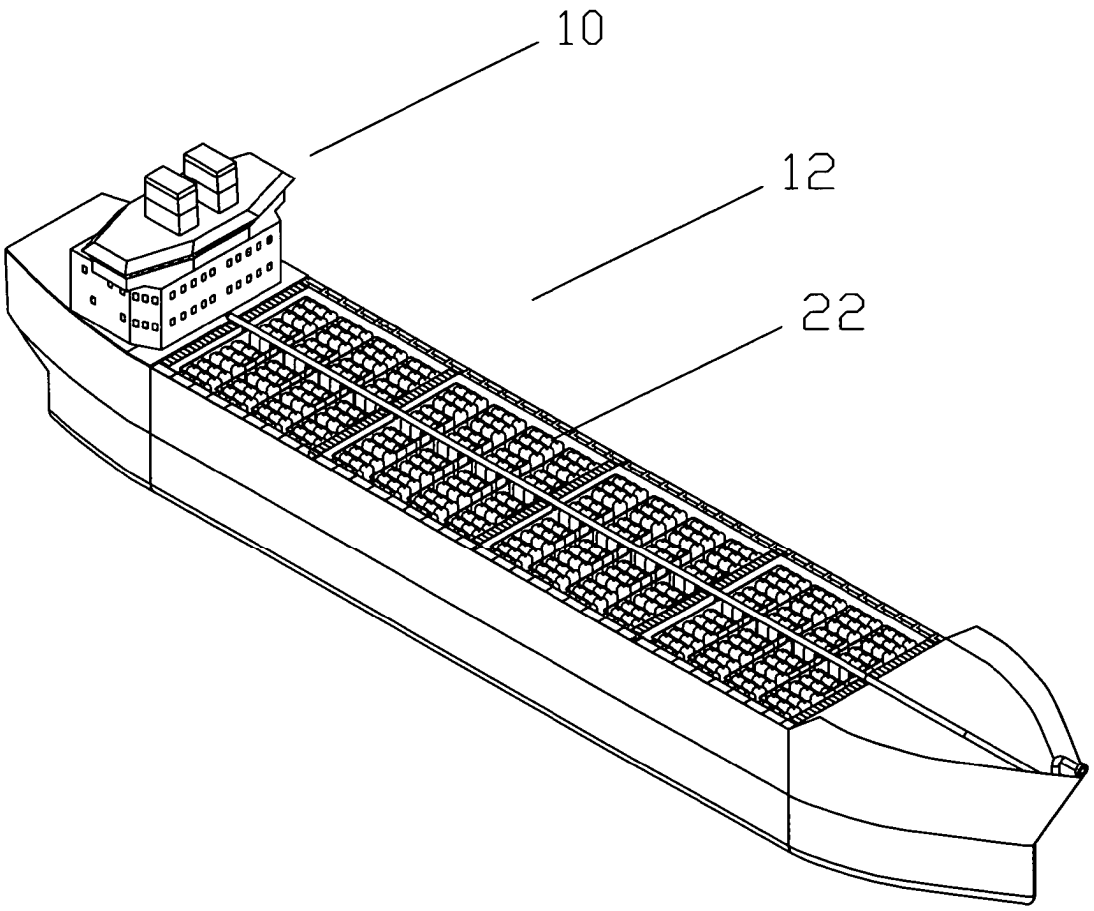


FIG. 3

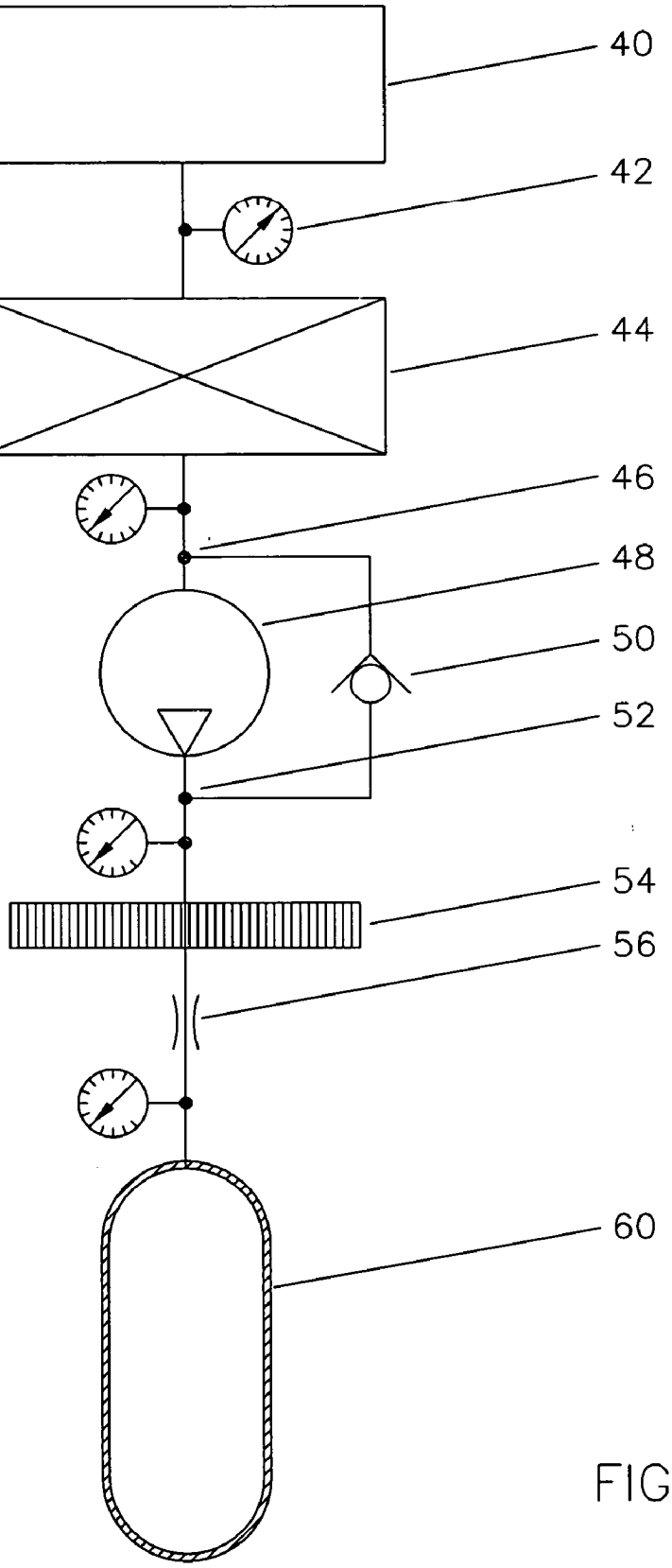


FIG. 4

METHOD OF FILLING CNG TANKS

TECHNICAL FIELD

[0001] This invention relates to the general subject of filling compressed natural gas tanks with gas without over pressuring the tanks.

CROSS-REFERENCE TO RELATED APPLICATIONS

[0002] Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0003] Not applicable

REFERENCE TO A "MICROFICHE APPENDIX"

[0004] Not applicable

BACKGROUND OF THE INVENTION

[0005] The field of this invention of that of charging or increasing the pressure in tanks with a gas product with a relatively high pressure. If such a tank is desired to be charged to a specific pressure such as 2000 p.s.i., it is charged as a progressive process. During this process a portion of this gas is input at a lower pressure such as at 1000 p.s.i. and at a temperature such as 72 degrees F., the volume will be approximately reduced by approximately one half when the pressure is brought up to 2000 p.s.i. During the remainder of the process this gas which was at a temperature at 1000 p.s.i., increases to about 200 degrees when it reaches 2000 p.s.i. If the pressure is simply pumped up to 2000 p.s.i., when the temperature cools back to 72 degrees F. the pressure will drop considerably.

[0006] This means that if you want to transport a product at 2000 p.s.i., you will need to overpressure the tanks to a higher pressure such that it will cool back to a combination of 72 degrees F. and 2000 p.s.i. In realistic terms, this may well mean that the pressure must be pumped up to 2500 p.s.i. This means that the pressure vessel needs to be designed with a working pressure of 2500 p.s.i. rather than a working pressure of 2000 p.s.i., with an extra 25% material weight simply to hold the pressure. This extra weight represents a substantial metal and weight cost, as well as a net reduction in the volume of gas product which can be transported in a vessel of a given size.

BRIEF SUMMARY OF THE INVENTION

[0007] The object of this invention is to provide a method of charging a tank system to a working pressure without having to over design the tank system due to temperature variations in the gas.

[0008] A second object of the present invention is to provide a method of charging a gas tank in which the temperature of the charging gas is reduced by an amount to compensate for the compression heat gained in the gas which is already in the tank.

[0009] A third object of this invention is to provide

[0010] Another object of the present invention

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1** is a view of a vessel having the filling method of this invention.

[0012] FIG. **2** is a view of the vessel of FIG. **1** with the top deck removed and showing a set of tanks about to be installed.

[0013] FIG. **3** is a view of the vessel of FIG. **2** with a full complement of storage bottles installed.

[0014] FIG. **4** is a schematic of method of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Referring now to FIG. **1**, an offshore tanker **10** is shown which has a substantial central portion **12** which contains gas storage tanks.

[0016] Now referring to FIG. **2**, the offshore tanker **10** is shown with the top cover from the central portion **12** removed and showing a number of storage chambers **20**. A bank of storage bottles **22** is shown with one of the individual bottles identified as **24**. Individual bottles can be of a variety of sizes, for example 4 feet in diameter by 34 feet long.

[0017] Referring now to FIG. **3**, offshore tanker **10** is shown with more of the double wall covering from central portion **12** removed and a full set of bottles **22** installed. In this model 576 of the bottles **12** are shown. For each of the 576 bottles to be 25% lighter would comprise a substantial weight savings. If one presumes the same 576 bottles are in the same configuration, it would mean that they were the same outer diameter. This means that the 25% of metal removed yields a larger internal volume of the tank for higher gas transportation capacity. This means the tanks cost less, weigh less and so require less fuel to move, but have greater capacity of product.

[0018] Referring now to FIG. **4**, a graphic of the pumping system of this invention is shown. At the top of the schematic, the supply of gas **40** is shown being produced at some pressure as is shown on the pressure gauge **42**. The gas is piped to processing equipment at **44**. The supply of gas **40** will be processed through processing equipment **44** to remove unwanted elements by processes such as filtering and low pressure evaporation.

[0019] At the exit of the processing equipment **44** a tee **46** is seen with one outlet going to a pump **48** and another bypassing the pump **48** through a check valve **50**. Another tee **52** is placed downstream of the pump **48** and joins the flow through the check valve **50** and the flow through the pump **48**. The purpose of this is to allow initial pressures coming out of the process equipment **44** to simply bypass the pump **48** and flow into the bottles **24**.

[0020] Once the pressure in the bottle **24** exceeds the pressure coming out of the process equipment **44**, the gas will no longer flow through the check valve **50**. The pump will then pump the gas to a pressure higher than the pressure in the bottle **24**, for example 25% higher. The compressed gas will become hot as a natural effect of being compressed. The hot compressed gas will be cooled through a cooler **54** to be approximately the temperature of the gas resident in the bottle **24**. The compressed and cooled gas is then lowered in pressure by going though a choke **56**, with the resulting temperature being lower than the gas **60** in the bottle **24**.

[0021] At this point the cool gas flows into the tank and cools the resident gas **60** by mixing as it heats the resident gas

by compression. When the compression and precooling are properly set, the cooling by mixing and the heating by compression can be balanced. This says that if you want to ship gas at 2000 p.s.i. and 72 degrees F., you can build a tank rated for 2000 p.s.i. and 72 degrees F. to do the job. You do not have to overdesign it to handle 2500 p.s.i. and 200 degrees F.

[0022] In a particular application of interest, the gas comes with 20% carbon dioxide by volume. Daily gas delivery is 1,288 MT/day. The initial gas pressure is about 200 bar (2,800 psi) at temperature 140 C (284 F). Overall the gas will see its pressure drop before it enters the bottles. In the process CO2 is separated as a liquid which later is used as a refrigerant by vaporizing it before release to the atmosphere.

[0023] Cooling through a water exchanger only (Process 1): the heat capacity of the gas is about 2.5 that of water. Considering that the sea temperature is 30 C (86 F) and should exit the heat exchanger at 40 C (104 F) and assuming the gas (or rather supercritical fluid) enters at 140 C (284 F) and exits at 40 C (104 F), the total water volume entering the exchanger would be 120 l per second. The flow decreases dramatically if process 3 as described following is used.

[0024] Cooling due to pressure drop (Process 2): according to initial calculations, the gas temperature drop due to pressure drop through the valve when entering the blocks will be 75 C (135 F) when starting the loading operation and will taper off to 10 C (50 F) upon loading completion. The exiting fluid temperature would be −35 C (−31 F) to +30 C (86 F) depending on loading completion. In both states CO2 is a liquid at pressures exceeding 75 bar (1,050 psi).

[0025] The pressurized liquid CO2 can be used in an evaporator to lower the temperature of the liquid or supercritical fluid further (Process 3). If there is condensation in the exchanger the heat of evaporation equals the heat of liquefaction. Also, the process can be used to decrease the temperature of the fluid without change of phase by 85 C (153 F) from 140 to 55 C (284 to 131 F). A combination of 1 and 3 can also be used.

[0026] In short, the combination of 20% of carbon dioxide and the pressures and temperatures encountered will make possible the separation of liquid CO2 without a need to re-pressurize.

[0027] The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

That which is claimed is:

1. The method of charging a tank with a gas product up to a desired pressure and temperature without increasing the gas in said tank to a pressure and temperature higher than said desired pressure and temperature, comprising:

pressurizing the incoming gas to be put into said tank to a pressure higher than the pressure of the resident gas already in said tank,

allowing said incoming gas to expand to a lower pressure to cool said incoming gas to a temperature lower than said resident gas,

mixing said incoming gas with said resident gas up to said desired pressure such that the pressure and temperature of the combined gas will not be higher than said desired pressure or temperature.

2. The method of claim **1** further comprising cooling said incoming gas prior to allowing said incoming gas to expand.

3. The method of claim **1** further comprising cooling said incoming gas by expansion through an orifice.

4. The method of claim **1** further comprising said tank comprising a multiplicity of individual tanks which are interconnected by piping.

5. The method of claim **4** further comprising said multiplicity of tanks are on a ship for ocean transport.

6. The method of charging a tank with a gas product up to a desired pressure and temperature without increasing the gas in said tank to a pressure and temperature higher than said desired pressure and temperature, comprising:

cooling the incoming gas to be put into said tank to a temperature lower than the temperature of the resident gas already in said tank,

mixing said incoming gas with said resident gas up to said desired pressure and temperature such that the pressure or temperature of the combined gas will not be higher than said desired pressure or temperature.

7. The method of claim **6** further comprising cooling said incoming gas by expansion through an orifice.

8. The method of claim **6** further comprising said tank comprising a multiplicity of individual tanks which are interconnected by piping.

9. The method of claim **8** further comprising said multiplicity of tanks are on a ship for ocean transport.

10. The method of charging a tank with a gas product up to a desired pressure/temperature combination without increasing the gas in said tank to a pressure/temperature combination higher than said desired pressure/temperature combination, comprising:

pressurizing the incoming gas to be put into said tank to a pressure equal to or higher than the pressure of the resident gas already in said tank,

cooling said incoming gas to a temperature lower than said resident gas,

mixing said incoming gas with said resident gas up to said desired pressure/temperature combination such that the pressure/temperature combination of the combined gas will be increased without increasing the temperature/pressure combination of the resident gas to a pressure/temperature combination higher than said desired pressure/temperature combination.

11. The invention of claim **10**, further comprising said incoming gas will be cooled by expansion to a lower pressure through an orifice.

12. The method of claim **10** further comprising said tank comprising a multiplicity of individual tanks which are interconnected by piping.

13. The method of claim **12** further comprising said multiplicity of tanks are on a ship for ocean transport.

* * * * *

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Moszkowski et al. (43) Pub. Date: Jun. 22, 2006

(54) DYNAMIC POSITIONING CONNECTION

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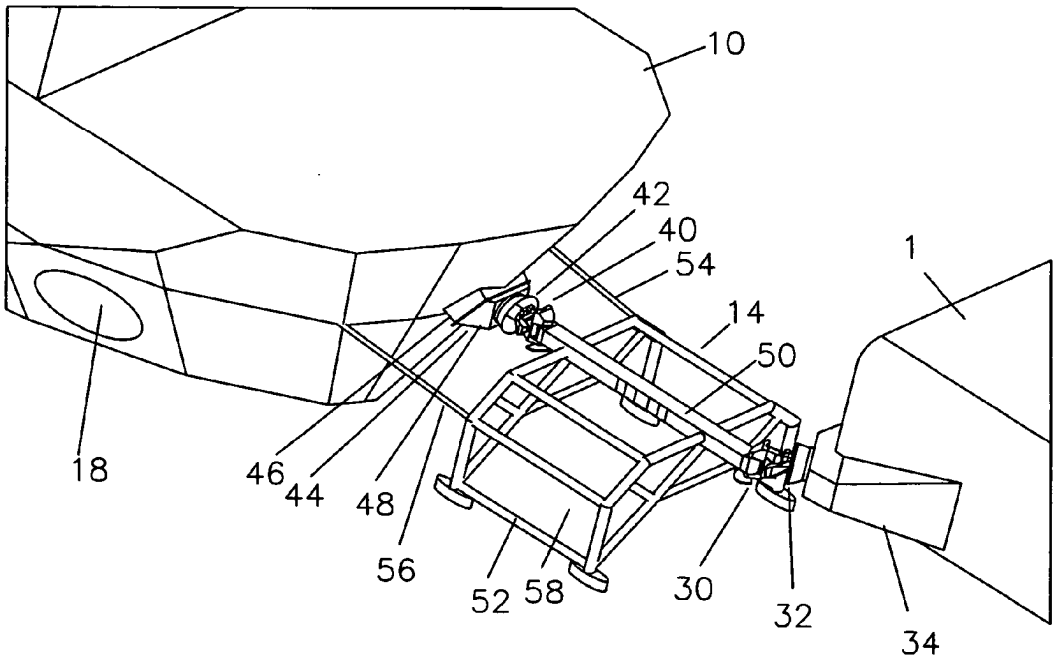
B63B 35/44 (2006.01)

(52) **U.S. Cl.** **114/250**

(57) **ABSTRACT**

A method of providing for the dynamic positioning of a vessel comprising providing a dynamically positioned service boat, linking the service boat to the vessel by a rigid link with a first connection between the link and the vessel, a second connection between the link and the service boat, the combination of connections having 3 degrees of rotational freedom, said supply boat having one degree of axial freedom relative to said vessel, and using the power of the service boat to dynamically position said vessel in a desired location.



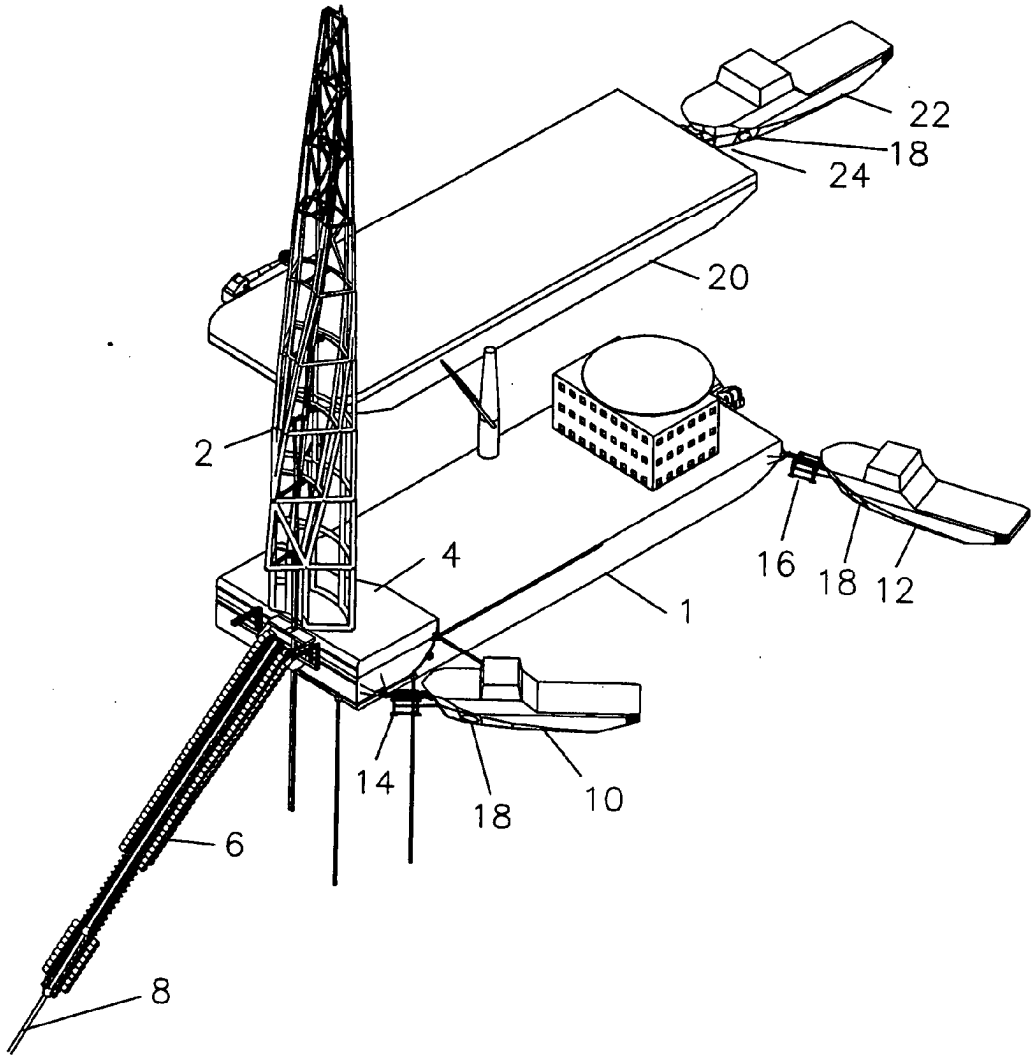


FIGURE 1

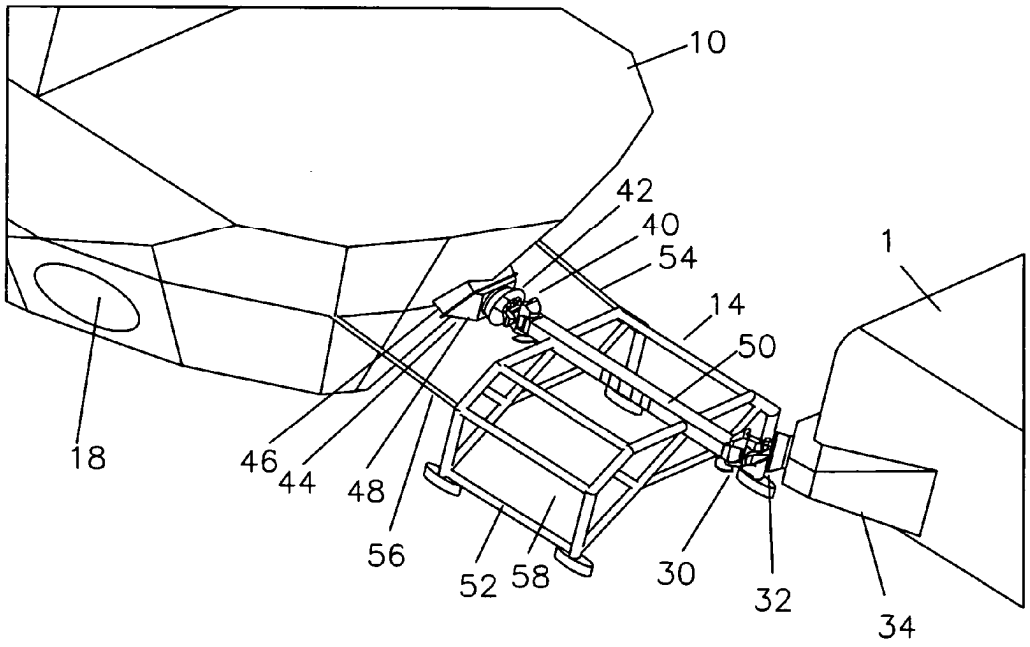


FIGURE 2

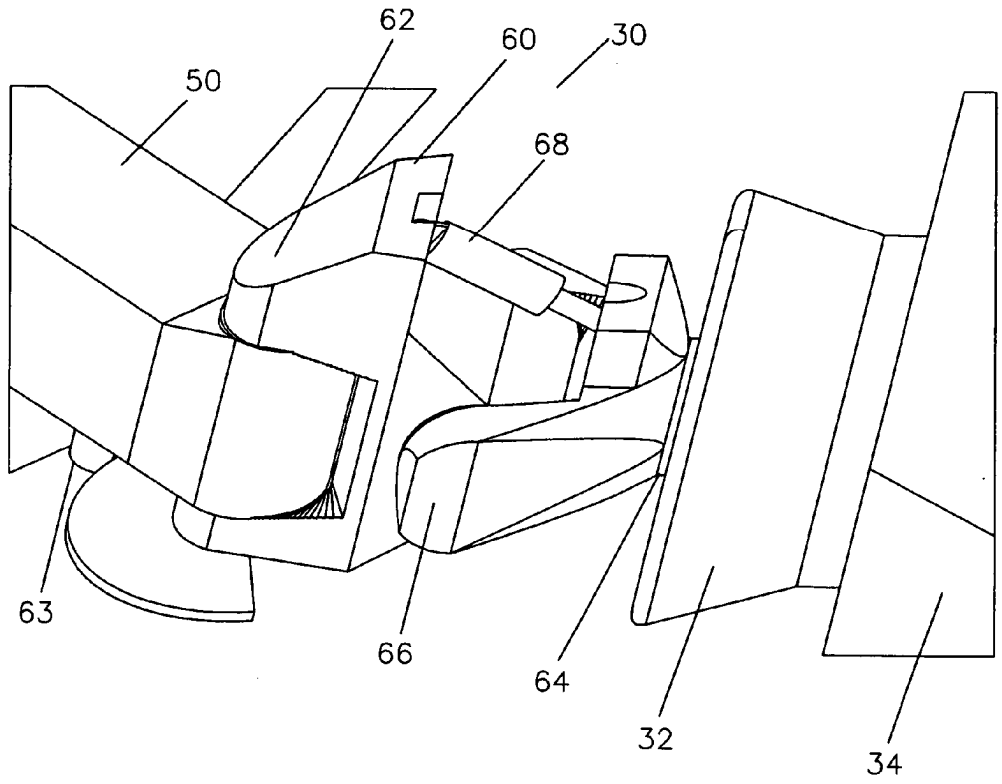


FIGURE 3

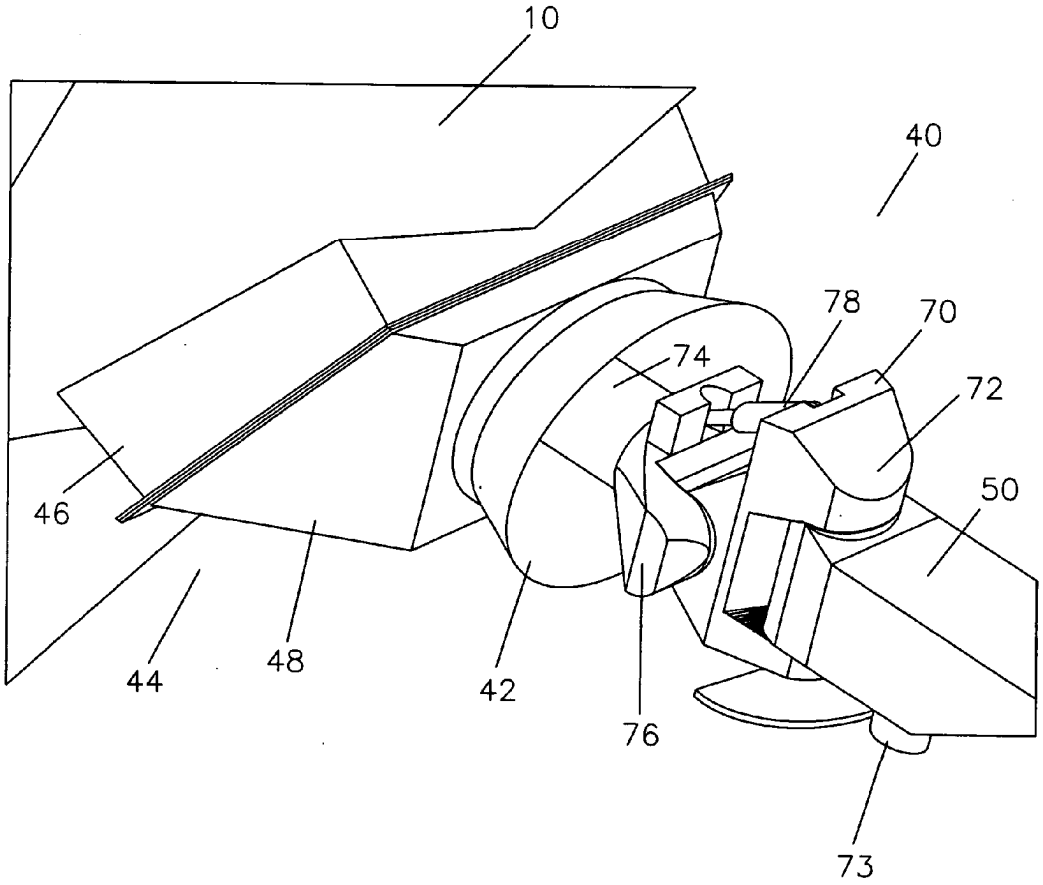


FIGURE 4

DYNAMIC POSITIONING CONNECTION

BACKGROUND OF THE INVENTION

[0001] In shallow waters, pipelay is primarily done by an "S-Lay" method, which means that the welding is done along the deck of a flat barge and then the pipe bends down to the ocean floor in a sort of "S" curve. The pipe bends down on a radiused stinger and then naturally curves back to horizontal as it reaches the ocean floor. In deeper water, the forces on the stinger and the size of the required stinger make it more favorable to weld the pipe together in a near vertical position and have a single bend at the ocean floor. The forms a "J" in the pipe and gives it the name of the "J-Lay" method.

[0002] Offshore deepwater pipeline laying systems are characteristically limited to high cost specialty vessels due the combination of loads and positioning required to accomplish the pipelaying. J-Lay pipelay systems are characteristically complicated and require special connections to the vessel. This makes a costly specialty custom vessel an appropriate investment. As the custom vessel is an appropriate investment, investment in onboard dynamic positioning also becomes an appropriate investment.

[0003] Dynamic positioning is using the propellers to actively hold the vessel in position, in contrast to passively holding the vessel in position with anchors and anchor lines.

[0004] A pipelay system such as the Flex J-lay Tower described in U.S. Pat. No. 6,776,560 provides the unique ability to be simply mounted on a flat and economical barge. Such a barge or vessel would typically not have dynamic positioning available. The barge or vessel could then be positioned along the pipeline route by one or more service boats which can provide the dynamic positioning capability. The service boats would be connected to the barge or vessel by the connections of this invention.

[0005] Such service boats have previously been connected to vessels of this type by a rope, which provides only an axial tension. If the service boat wants to provide a force on the vessel in any direction other than straight along the rope, the service boat must move radially around the connection point on the vessel to another position. The service boat could then pull in that direction only.

[0006] An appropriate mechanical connection would have the ability for the service boat to push or pull the vessel. When the service boat has a horizontal bow thruster, it can provide a sideways force on the connection, and therefore on the vessel. By combinations of axial thrust and sideways bow thrusters, the service boat can impart a force on the vessel in any horizontal direction.

[0007] A complication to a mechanical connection between the vessel and the service boat is that the larger vessel and the smaller supply boat will characteristically have different periods of vertical motion. As one is going up, the other will be going down at some times during operations.

BRIEF SUMMARY OF THE INVENTION

[0008] The object of this invention is to provide a system for improved dynamically positioning a vessel by mechanically connecting one or more dynamically positioned service boats to the vessel.

[0009] A second object of the present invention is to provide 3 degrees of rotational freedom on the mechanical connection between the vessel and the one or more service boats.

[0010] A third object of the present invention is to provide one degree of axial freedom for normal operations.

[0011] Another object of the present invention is to provide a second degree of mechanical freedom when desired.

[0012] Another object of the present invention is to allow the service boat to exert a sideways force on the vessel.

[0013] Another object of this invention is to allow the service boat to exert a push or pull on the vessel in any direction

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

[0014] **FIG. 1** is a view of a j-lay system on a barge and of a supporting pipe barge, each having service boats connected by connections of this invention for dynamic positioning.

[0015] **FIG. 2** is a view of a portion of the pipelay barge and a service boat with the connection of this invention between.

[0016] **FIG. 3** is an enlarged view of the joint between the central connection member and the pipelay barge.

[0017] **FIG. 4** is an enlarged view of the joint between the central connection member and the service boat with dynamic positioning.

DETAILED DESCRIPTION OF THE INVENTION

[0018] **FIG. 1** shows a pipelay vessel **1** with a j-lay tower **2** mounted on the deck **4**. A pipe supporting mechanism **6** is shown with a portion of the pipeline **8** suspended in the ocean water. Service boats **10** and **12** are attached to the pipelay vessel **1** by links **14** and **16** respectively.

[0019] Side thrusters **18** are provided near the bow of the service boats **10** and **12** which enable the service boats to provide a lateral force on links **14** and **16**. Various combinations of lateral and axial forces from the service boat to the vessel allow the service boat to impart forces in any direction to the vessel.

[0020] An additional barge **20** is shown in a position to re-supply the pipelay vessel **1** with pipe or other supplies. A third service boat **22** is shown attached by link **24**.

[0021] Referring now to **FIG. 2**, link **14** is shown between vessel **1** and service boat **10**. Pivoting joint **30** is shown engaging funnel **32** which is mounted to vessel **1** at **34**. The mounting can be prepared and permanently affixed to the vessel **1**, can be removeably attached, or can be magnetically attached.

[0022] Pivoting joint **40** is shown engaging funnel **42** which is mounted to service boat **10** at **44**. Portion **46** of the mounting can be prepared and permanently affixed to the vessel **10** and portion **48** can be bolted to portion **46**.

[0023] Link **14** has a main axial member **50** and a structure **52**. Cables or chains **54** and **56** connect between structure **52**

and service boat **10** to restrict rotational movement in the plane of the surface of the ocean, restricting the two vessels to a single degree of axial freedom relative to each other. When an extra degree of axial freedom is desired, tension can be released on cables or chains **54** and **56**. Buoyancy material **58** is shown generally within the structure **52** to make the structure **52** positively buoyant.

[**0024**] Cables or chains can be installed on the opposite end of the link and attached directly to the vessel to restrict the degree of motion on the opposite end of the link.

[**0025**] Referring now to **FIG. 3**, pivoting joint **30** is shown in greater detail. Central member **60** is pivoted horizontally relative to main axial member **50** about a vertical pin generally located at **62** (not shown). Motor **63** can be powered to rotate central member **60** about the vertical pin located at **62**. Stab **64** is pivoted vertically relative to central member **60** about a horizontal pin generally located at **66** (not shown). Stab **64** lockingly engages funnel **32** to connect to vessel **1** and can rotate about the centerline of the stab. Cylinder **68** can be used to position the stab **64** when the stabbing connection is made. Vertical pin at **62**, horizontal pin at **66**, and stab **64** provide **3** degrees of angular freedom.

[**0026**] Referring now to **FIG. 4**, pivoting joint **40** is shown in greater detail. Central member **70** is pivoted horizontally relative to main axial member **50** about a vertical pin generally located at **72** (not shown). Motor **73** can be powered to rotate central member **70** about the vertical pin located at **72**. Stab **74** is pivoted vertically relative to central member **70** about a horizontal pin generally located at **76** (not shown). Stab **74** lockingly engages funnel **42** to connect to service boat **10** and can rotate about the centerline of the stab. Cylinder **78** can be used to position the stab **74** when the stabbing connection is made. Horizontal pin at **66** vertical pin at **76**, and stab **74** provide decrees of angular freedom.

[**0027**] The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

1. A method of providing for the dynamic positioning of a vessel comprising

providing a dynamically positioned service boat,

providing a link,

providing a first connection between said link and said vessel,

providing a second connection between said link and said service boat,

providing three degrees of rotational freedom by the combination of said first connection and said second connection,

providing one degree of axial freedom between said service boat and said vessel by the combination of said first connection and said second connection, and using the power of said service boat to position said vessel in a desired location.

2. The method of claim 1, further comprising said combination of said first connection and said second connection providing a second degree of axial freedom.

3. The method of claim 1, further comprising providing flotation material for said link such that said link is positively buoyant.

4. The method of claim 1 further comprising providing sideways thrust on said service boat to provide a lateral force on said link and thereby a lateral force on said vessel.

5. The method of claim 4 further comprising the combination of said lateral forces and axial forces from said service boat onto said link allows said link to exert forces on said vessel in any horizontal direction.

6. The method of claim 1 further comprising said first connection being a stab engaging a funnel.

7. The method of claim 6 further providing a cylinder to position said stab prior to entering said funnel.

8. The method of claim 1 further comprising that said first connection being magnetically attached to said vessel.

9. The method of claim 1 further comprising said second connection having a portion permanently affixed to said service boat and a portion removeably attached to said permanently affixed portion on said service boat.

10. The method of claim 9 further comprising said removeably attached portion being a funnel.

11. A method of providing for the dynamic positioning of a vessel comprising

providing a dynamically positioned service boat,

providing a rigid link,

providing a first connection between said link and said vessel, said first connection

providing 3 degrees of rotational freedom and one degree of axial freedom,

providing a second connection between said link and said service boat, said second connection providing 3 degrees of rotational freedom and 2 degrees of axial freedom, and using the power of said service boat to position said vessel in a desired location.

12. A method of providing for the dynamic positioning of a vessel comprising

providing a dynamically positioned service boat,

providing a link capable of pushing or pulling,

providing a first connection between said link and said vessel, said first connection providing 3 degrees of rotational freedom,

providing a second connection between said link and said service boat, said second connection providing three degrees of rotational freedom,

providing one degree of axial freedom between said vessel and said service boat,

and using the power of said service boat to position said vessel in a desired location.

13. The method of claim 12, further comprising said second connection provides a third degree of angular freedom

14. The method of claim 12 further comprising providing a second degree of axial freedom between said vessel and said service boat.

15. The method of claim 12 further comprising providing sideways thrust on said service boat to provide a lateral force on said link and thereby a lateral force on said vessel.

16. The method of claim 15 further comprising the combination of said lateral forces and axial forces from said service boat onto said link allows said link to exert forces on said vessel in any horizontal direction.

17. The method of claim 12 further comprising said first connection being a stab engaging a funnel.

18. The method of claim 17 further providing a cylinder to position said stab prior to entering said funnel.

19. The method of claim 12 further comprising that said first connection being magnetically attached to said vessel.

20. The method of claim 12 further comprising said second connection having a portion permanently affixed to said service boat and a portion removeably attached to said permanently affixed portion on said service boat.

21. The method of claim 20 further comprising said removeably attached portion being a funnel.

22. The method of claim 12, further comprising providing flotation material for said link such that said link is positively buoyant.

* * * * *

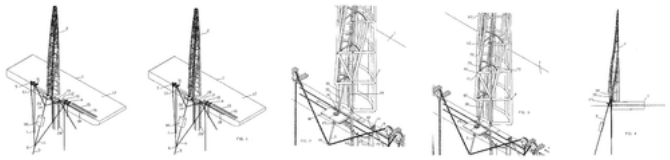
EXHIBIT P

Flex J-Lay tower

Abstract

A method for j-laying a pipeline from an offshore vessel to the floor of the ocean comprising a multiplicity of winches for supporting the upper end of the pipeline at its natural hanging angle, a mast in a fixed angle to the vessel, holding new pipe section in the mast for welding to the upper end of the pipeline, and flexing the lower end of the new pipe section into alignment with the upper end of the pipeline to allow welding to the pipeline and flexing the remainder of the new pipe section to remain within the mast.

Images (5)



Classifications

F16L1/19 Laying or reclaiming pipes on or under water on the bottom the pipes being S- or J-shaped and under tension during laying the pipes being J-shaped

View 1 more classifications

US6776560B2
United States

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Inventor: Mark Moszkowski, Benton F. Baugh

Current Assignee : DEEPGULF Inc , MARC MOSZKOWSKI , REELPOWER LICENSING CORP

Worldwide applications

2002 ~~US~~

Application US10/167,891 events

2002-06-13	Application filed by Mark Moszkowski, Benton F. Baugh
2002-06-13	Priority to US10/167,891
2003-12-18	Publication of US20030231931A1
2004-08-17	Application granted
2004-08-17	Publication of US6776560B2
Status	Expired - Fee Related
2022-06-13	Anticipated expiration

Show all events

Info: Patent citations (32), Cited by (13), Legal events, Similar documents, Priority and Related Applications

External links: USPTO, USPTO Assignment, Espacenet, Global Dossier, Discuss

Claims (27)

Hide Dependent

We claim:

1. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast in a fixed position relative to said vessel, said mast holding a new pipe section,

a pipeline suspended from said vessel at an angle with respect to said mast such that the upper end of said pipeline is not axially aligned with said mast,

alternately welding said new pipe sections onto said upper end of said pipeline to become part of said pipeline and lowering the combination of said pipeline and said new pipe section,

said new pipe section being flexed such that said lower end of said new pipe section is axially aligned with said upper end of said pipeline,

wherein said pipeline is suspended from said vessel with winches, and

wherein a first pair of winches cooperate with a first connector to support said pipeline while a second connector is released for movement and alternately a second pair of winches cooperate with said second connector to support said pipeline while said first connector is moved in order to lower said pipeline.

2. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast in a fixed position relative to said vessel, said mast holding a new pipe section,

a pipeline suspended from said vessel at an angle with respect to said mast such that the upper end of said pipeline is not axially aligned with said mast,

alternately welding said new pipe sections onto said upper end of said pipeline to become part of said pipeline and lowering the combination of said pipeline and said new pipe section,

said new pipe section being flexed such that said lower end of said new pipe section is axially aligned with said upper end of said pipeline,

wherein a multiplicity of arms are provided to flex said new pipe section, and

wherein said arms are mounted on circular tracks for movement around said mast.

3. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast in a fixed position relative to said vessel, said mast holding a new pipe section,

a pipeline suspended from said vessel at an angle with respect to said mast such that the upper end of said pipeline is not axially aligned with said mast,

alternately welding said new nine sections onto said upper end of said pipeline to become part of said pipeline and lowering the combination of said pipeline and said new pipe section,

said new pipe section being flexed such that said lower end of said new pipe section is axially aligned with said upper end of said pipeline, and

wherein said new pipe section is brought to the mast for attachment to the upper end of said pipeline by lowering into the water and pulling up into said mast.

4. The invention of claim 3, wherein said new pipe section is brought to said mast in 2 or more pipe pieces for welding together to form said new pipe section.

5. The invention of claim 4, wherein said 2 or more pipe pieces are formed of pipe joints welded together on the deck of said vessel.

6. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

suspending the upper end of a pipeline below a vessel on a multiplicity of flexible lines from winches and controlling said winches to position said upper end of said pipeline below a mast,

said mast being mounted at a fixed angle with respect to said vessel,

suspending a new pipe section to be welded to the said upper end of said pipeline in said mast,

using a multiplicity of arms to flex said new pipe section such that the lower end of said new pipe section is axially aligned with said upper end of said pipeline,

welding said lower end of said new pipe section to said upper end of said pipeline, and

lowering said pipeline.

7. The invention of claim 6, wherein said pipeline is suspended from said vessel alternately with two sets of said winches.

8. The invention of claim 7, wherein said winches use chain to suspend said pipeline.

9. The invention of claim 6, wherein said multiplicity of arms are provided to flex said new pipe section.

10. The invention of claim 9, wherein said arms are mounted on circular tracks for movement around said mast.

11. The invention of claim 6, wherein said new pipe sections are keelhauled below said vessel to deliver them to said mast.

12. The invention of claim 6, further comprising weathervaning said vessel about said pipeline, using said multiplicity of arms to keep the lower end of said new pipe section aligned with said upper end of said pipeline.

13. The invention of claim 6, wherein the first pair of said winches connected to a first connector support said pipeline while the second pair of said winches connected to a second connector adjusts to a different holding position.

14. The invention of claim 6, wherein the first pair of said winches are connected to a first connector supporting said pipeline while the second pair of said winches are connected to a second connector to be released from said pipeline to pass an object larger than said pipeline.

15. A method of j-laying pipes from a vessel on the surface of the water to the ocean floor comprising

a mast mounted on a floating vessel,

suspending pipe sections in the water,

bringing said suspended pipe sections up out of the water and into said mast,

welding 2 or more said suspended pipe sections together to make a longer pipe section,

suspending a pipeline being laid from said vessel by a multiplicity of winches, said suspended pipeline having an upper end,

welding the lower end of said longer pipe section to said upper end of said pipeline, and

using said multiplicity of winches to lower said combination of said pipeline and said longer pipe section.

16. The invention of claim 15, wherein said mast is fixed relative to said vessel.

17. The invention of claim 15, wherein the first pair of said winches connected to a first connector support said pipeline while the second pair of said winches connected to a second connector adjusts to a different holding position.

18. The invention of claim 15, wherein the first pair of said winches are connected to a first connector supporting said pipeline while the second pair of said winches are connected to a second connector to be released from said pipeline to pass an object larger than said pipeline.

19. The invention of claim 15, wherein said a multiplicity of arms are provided to flex said new pipe section.

20. The invention of claim 19, wherein said arms are mounted on circular tracks for movement around said mast.

21. The invention of claim 15, wherein said new pipe sections are keelhauled below said vessel to deliver them to said mast.

22. The invention of claim 15, further comprising weathervaning said vessel about said pipeline and using said multiplicity of arms to keep the lower end of said new pipe section aligned with said upper end of said pipeline.

23. The invention of claim 15, wherein the first pair of said winches connected to a first connector support said pipeline while the second pair of said winches connected to a second connector adjusts to a different holding position.

24. The invention of claim 15, wherein the first pair of said winches are connected to a first connector supporting said pipeline while the second pair of said winches are connected to a second connector to be released from said pipeline to pass an object larger than said pipeline.

25. The invention of claim 15, wherein the welding together of said 2 or more pipe sections occurs proximate the base of said mast.

26. The invention of claim 15, wherein 2 or more weld stations are provided proximate the base of said mast for welding 2 or more new pipe sections together at the same time.

27. The invention of claim 15 wherein a first weld station is provided proximate the base of said mast and a second weld station is provided higher in said mast to allow two welds to be made on said new pipe section at the same time.

Description

BACKGROUND OF THE INVENTION

Underwater pipelines can be continuously laid from a surface vessel employing S-Lay, Natural J-Lay or Forced Vertical J-Lay mechanical arrangements. Each of these methods have the pipeline being laid approaching the ocean floor in a catenary curve.

S-Lay systems have the pipeline bent back from its near catenary curve to an almost horizontal position where strings of pipes can be added on a vessel deck. Natural J-Lay systems (called J-Lay systems in short) keep the pipeline in its natural near catenary attitude. New pipes have to be brought up at a slanting angle to match the angle of the upper end of the pipeline in the water. Forced Vertical J-Lay systems have the top end of the pipeline bent further from the near catenary curve so as to bring it to a vertical position where new pipes can to be added in a vertical tower.

Both the first and the third type use so-called “stingers” to bend the pipeline to the desired attitude for welding new pipe sections. The second type requires a pipe clamping device sometimes also called improperly a “stinger”.

S-Lay arrangements offer the definite advantage of a near horizontal pipeline on vessel deck, allowing in-line multiple welding, testing and coating stations but require long and, in deep water, deep, expensive and relatively fragile stingers to bend the pipe from its natural no moment angle in the water to the near horizontal on the vessel deck.

Forced Vertical J-Lay systems allow the use of fixed vertical pipe laying towers but also require a sometimes very deep stinger. In addition, keeping the stingers within reasonable dimensions sometimes induce plastic deformation of the pipe, or permanent plastic deformation. In large diameter pipelines, the moment required to handle the upper end of the pipeline can be substantial.

Natural J-Lay systems do not require genuine stingers, strictly speaking, but at the cost of a neither horizontal nor vertical laying attitude, thus involving complex articulated towers. Current natural J-Lay arrangements demand the provision of complex upending or erecting strongback arms to bring new pipes or strings of pipes to a non horizontal variable position where they are jointed to the existing deployed pipeline.

The three kinds of arrangements require that the pipeline total weight be supported above deck in clamps or friction tensioners, the weight of the pipe being held back from the bottom or the top of the systems. Whether J-Laying or S-Laying, that provision is a real drawback when the job calls for the installation of large manifolds inline, as the size of the manifold is bound to be limited by the dimensions of the tensioning or weight holding device. In addition, near vertical J-Lay arrangements where the weight of the deployed pipeline is supported from the top of the tower require very strong structures, thus limiting the overall capacity of the system.

Natural J-Lay Systems have historically been designed as modified onshore drilling rigs. Little of the specific marine environment taken into consideration and all operations are carried on above vessel deck level until the pipeline is eventually lowered into the water. Those systems use drawworks, ram-rig type cylinders or near vertical friction pipe tensioners to hold back the weight of the deployed pipeline, strongback pipe erectors to upend new strings of pipe and rotating articulated masts to allow for a variable pipe angle at water level. In addition, some designs integrate mechanical gimballing of the whole system to compensate for weathervaning vessel rotation.

SUMMARY OF THE INVENTION

The object of this invention is to provide a system for laying pipeline from a vessel with a tower at a fixed angle, but allowing the lower end of the new pipe sections to be aligned with the suspended pipeline by flexing the new pipe sections.

A second object of the present invention is to suspend the pipeline with a multiplicity of winches.

A third object of the present invention is to allow weathervaning of the vessel around the suspended pipeline.

Another object of the invention is to suspend the load of the pipeline below the deck of the vessel rather than above the deck of the vessel.

Another object of the invention is to allow for handling of relatively large subsea packages in the work area while handling the load of the pipeline below the working table area.

Another object of the invention is to provide an area to feed relatively short pipe sections into the tower for welding together in the tower.

Another object of the present invention is to provide the ability to lay pipelines at a variety of angles from a fixed angle tower, without requiring the inducement of a moment on the top of the pipeline.

Another object of the invention is to do the required pipe bending on the portion of the pipeline which is not under tension.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a system of this invention.

FIG. 2 is a perspective view of the work table area.

FIG. 3 is a perspective view of the lower section of the mast.

FIG. 4 is a view of the mast from the front of the vessel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1, a vessel **1** is shown having mast **2** rigidly attached. A pipeline **3** is suspended into the seawater by winches **4** and **5** cooperating with chains **6** and **7** and with connector **8**. The pipeline **3** is also suspended by winches **10** and **11** cooperating with chains **12** and **13** and with connector **14**. Connectors **8** and **14** are releasable types as are well known in the industry. The pipeline **3** is lowered by releasing one connector, i.e. **8** and lowering chains **12** and **13** by winches **10** and **11** respectively. While the pipeline **3** is being lowered, the winches **4** and **5** pull chains **6** and **7** up along with connector **8** to the top of its stroke. At that time connector **8** will be relocked and connector **14** will be released and the process repeated. In this type of "hand over hand" operation, the pipeline will be lowered.

New pipe sections **15** and **16** are shown on the deck **17** of vessel **1**. New pipe section **18** has been moved to engage a track **19** and is shown swung down into the water as new pipe section **20**.

Referring now to FIG. 2, the upper end **25** of pipeline **3** is shown going thru a split work table **26** and thru a split stinger **27**. Stingers of conventional designs are usually utilized to assist in bending of the upper end of the pipeline under high tension to allow its alignment with the new pipe section above. In contrast, stinger **27** is utilized only to stabilize the upper end **25** of pipeline **3** for welding. New pipe section **30** has a lower end **31** for welding to the upper end **25** of pipeline **3**. As will be discussed later, the new pipe section **30** is flexed to align with the natural position of the upper end **20** of pipeline **3**.

New pipe section **35** is shown in an alternate position to new pipe section **30**, illustrating the degree of movement which the flexing of the new pipe sections of this invention allows.

Pipe section **18** is shown attached to track **19** and swung down as new pipe section **20** using a connector **40**. The new pipe section **20** moves around the track **19** at positions **41**, **42**, and **43**. Finally, the new pipe section is pulled up into the mast **2** as new pipe section **50**. When the mast **2** can handle longer new pipe sections than the vessel **1** can weld together from shorter pipe sections, shorter sections can be pulled up into the mast in sequence and welded together generally in the area indicated as **51**. In special cases such as when the deck of the vessel can only deliver doubles of pipe and the tower can handle sextuples, 2 preparation welds can be required for every actual pipeline weld. This means that 2 separate pipe stations would be required at **51**, or alternately a second weld station can be established part way up the mast **2**.

Referring now to FIG. 3, several flexing sections **60**, **61**, **62**, and **63** are shown engaging the new pipe section **30**. In flexing section **61**, arm **70** engages a pivot point **71** near the front and a circular track **72** at the rear. The arm **70** has a connector **73** attached which can move along the length of arm **70**. The movement of arm **70** and connector **73** are remotely controlled to flex the new pipe section **30** to be axially aligned with the upper end **25** of new pipe section **3** and within the area of the tower.

Referring now to FIG. 4, in a conventional tower the upper section of the suspended pipeline is bent to align with the mast. In this invention, the upper end **25** of the pipeline **3** is not bent to align with the mast **2**, but rather remains in its natural angle. In the variety of angles available for the pipeline, the upper end of the new pipe section **30** would tend to be a large cone. For a sextuple new pipe section, it would be a very large cone. In this invention, rather than accommodating a very large cone, the mast and the associated arms bends the new pipe section such that the top of the new pipe section is always in the same location. The top of the mast **2** is actually very small rather than a very large cone. This is facilitated because to bend the pipeline under tension below the support point is very difficult. To bend or flex the new pipe section while it is not under tension is much easier.

Referring again to FIG. 1, skid **80** is shown mounted above the support connector **8**. This means that the skid **80** can be welded into the pipeline **3** while above the split work table **26**. The split work table **26** can be separated along tracks **81** and the skid **80** lowered. The connector **14** can be reattached to the pipeline above the skid **80** allowing the connector **8** to be released and reattached above the skid **80**. This process greatly simplifies the process of handling mid-pipeline skids such as **80**.

The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

Patent Citations (32)

Publication number	Priority date	Publication date	Assignee	Title
US3331212A	1964-03-23	1967-07-18	Shell Oil Co	Tension pipe laying method
US3472034A	1967-02-06	1969-10-14	Brown & Root	Method and apparatus for controlling pipeline laying operations
GB1178219A	1967-05-31	1970-01-21	Grands Travaux De Marseille Sa	Improvements in or relating to a System for Laying of Submarine Pipe Lines
US3555835A *	1968-08-16	1971-01-19	Healy Tibbitts Construction Co	Suspended pipe laying stringer for laying pipelines in unlimited depths of water
US3581506A	1968-12-31	1971-06-01	Pan American Petroleum Corp	Laying pipeline in deep water
US3602175A	1969-07-02	1971-08-31	North American Rockwell	Oil production vessel
US3680322A	1970-04-15	1972-08-01	Brown & Root	Pipeline laying system utilizing an inclined ramp
US3747356A	1972-04-07	1973-07-24	Brown & Root	Method of arresting the propagation of a buckle in a pipeline
US3860122A	1972-12-07	1975-01-14	Louis C Cernosek	Positioning apparatus
US3937334A	1975-02-03	1976-02-10	Brown & Root, Inc.	Pipe handling device
US4068490A *	1975-05-06	1978-01-17	Compagnie Francaise Des Petroles	Method and apparatus for assembling

				and laying underwater pipeline
US4091629A	1977-04-11	1978-05-30	Gunn Charles R	Marine pipeline installation system
US4202653A	1976-04-30	1980-05-13	Western Gear Corporation	Pipe handling apparatus
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US4347029A	1979-12-28	1982-08-31	Deepsea Ventures, Inc.	Pipe transfer system
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US5421675A	1993-11-18	1995-06-06	Mcdermott International, Inc.	Apparatus for near vertical laying of pipeline
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US6273643B1	1998-05-01	2001-08-14	Oil States Industries	Apparatus for deploying an underwater pipe string
US6293732B1	1998-05-01	2001-09-25	Benton F. Baugh	Travelling table for J-Lay pipelaying system
Family To Family Citations				

* Cited by examiner, † Cited by third party

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US20100092244A1 *	2007-02-05	2010-04-15	Stewart Willis	Method and apparatus for laying a marine pipeline
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US10619763B2	2018-02-06	2020-04-14	Benton Frederick Baugh	Subsea pipeline connector method
Family To Family Citations				
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* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
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US5639187A	1997-06-17	Marine steel catenary riser system
RU2140595C1	1999-10-27	Unit for vertical laying of pipe line in water basin (versions)
AU676431B2	1997-03-06	Pipe laying vessel and method
CN102066820B	2014-12-31	Pipe-laying vessel and method of laying a pipeline
CA1196232A	1985-11-05	Offshore process vessel and a method of operating same to receive oil and/or gas production from a subsea well
AU746912B2	2002-05-02	Device and method for installing conduits at very great depths
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US6273643B1	2001-08-14	Apparatus for deploying an underwater pipe string
US9255651B2	2016-02-09	Marine pipeline installation system and method
AU778779B2	2004-12-23	Apparatus, system, and method for installing and retrieving pipe in a well
US7927040B2	2011-04-19	Method for storing, delivering and spooling preassembled pipelines
EP3137801B1	2018-07-04	Marine reel lay method pipeline installation vessel and methods

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
US10/167,891	2002-06-13	2002-06-13	Flex J-Lay tower

Applications Claiming Priority (1)

Application	Filing date	Title
US10/167,891	2002-06-13	Flex J-Lay tower

Legal Events

Date	Code	Title	Description
2007-12-06	AS	Assignment	**Owner name**: DEEPGULF, INC., FLORIDA **Free format text**: ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNOR:MOSZKOWSKI, MARC;REEL/FRAME:020227/0828 **Effective date**: 20071204 **Owner name**: MARC MOSZKOWSKI, FLORIDA **Free format text**: ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNOR:BAUGH, BENTON F.;REEL/FRAME:020227/0824 **Effective date**: 20050922
2008-01-20	FPAY	Fee payment	**Year of fee payment**: 4
2012-04-02	REMI	Maintenance fee reminder mailed	
2012-06-08	SULP	Surcharge for late payment	**Year of fee payment**: 7
2012-06-08	FPAY	Fee payment	**Year of fee payment**: 8
2012-12-17	AS	Assignment	**Owner name**: REELPOWER LICENSING CORP., OKLAHOMA **Free format text**: ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNOR:BAUGH, BENTON F.;REEL/FRAME:029483/0218 **Effective date**: 20121217
2016-03-25	REMI	Maintenance fee reminder mailed	
2016-08-17	LAPS	Lapse for failure to pay maintenance fees	
2016-09-12	STCH	Information on status: patent discontinuation	**Free format text**: PATENT EXPIRED DUE TO NONPAYMENT OF MAINTENANCE FEES UNDER 37 CFR 1.362
2016-10-04	FP	Expired due to failure to pay maintenance fee	**Effective date**: 20160817

Concepts

machine-extracted

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Name	Image	Sections	Count	Query match
welding		claims,abstract,description	16	0.000
water		claims	8	0.000
Joints		claims	1	0.000

Show all concepts from the description section

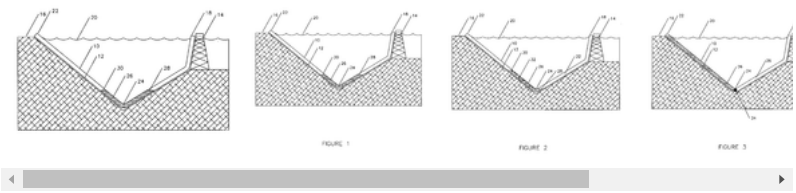
Data provided by IFI CLAIMS Patent Services

Dual gradient pipeline evacuation method

Abstract

The method of removing a first liquid from a subsea pipeline which has a central portion lower than each of the ends of the subsea pipeline by pumping a second lower density fluid into the pipeline and the either removing the second lower density fluid by either displacing it with gas or evaporating the second lower density fluid to a gas.

Images (5)



Classifications

E21B43/36 Underwater separating arrangements

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Life Sciences & Earth Sciences

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US8146667B2
United States

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Inventor: Marc Moszkowski, Benton Frederick Baugh

Current Assignee : Individual

Worldwide applications

2010 ~~US~~

Application US12/804,258 events

2010-07-19	Application filed by Individual
2010-07-19	Priority to US12/804,258
2012-01-19	Publication of US20120012328A1
2012-04-03	Application granted
2012-04-03	Publication of US8146667B2
Status	Expired - Fee Related
2030-07-19	Anticipated expiration

Info: Patent citations (49), Legal events, Similar documents, Priority and Related Applications

External links: USPTO, USPTO PatentCenter, USPTO Assignment, Espacenet, Global Dossier, Discuss

Claims (6)

Hide Dependent

That which is claimed is:

1. The method of removing a first liquid from a subsea gas pipeline which has an intermediate portion which is lower than the ends of said subsea pipeline, comprising:

displacing said first liquid from said subsea pipeline by pumping a second liquid into said pipeline, and

allowing at least a portion of said second liquid to evaporate to a gas.

2. The method of claim 1 further comprising said first liquid is water.

3. The method of claim 1 further comprising said second liquid is propane.

4. The method of claim 1 further comprising said second liquid is butane.

5. The method of claim 1 further comprising said second liquid is a propane/butane mixture.

6. The method of claim 1, further comprising separating said first liquid from said second liquid during said pumping operations with a pig which seals in the bore of said subsea gas pipeline.

Description

TECHNICAL FIELD

This invention relates to the general subject of removing unwanted water from the lower areas of a deepwater subsea pipeline using alternate liquids of lower density.

CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable

REFERENCE TO A “MICROFICHE APPENDIX”

Not applicable

BACKGROUND OF THE INVENTION

The field of this invention is that of removing unwanted water from deepwater pipelines. In some cases methane and other desirable gases will be produced from subsea wells and brought to the surface for initial processing. A prime function of this pre-processing is to remove the water from the gas.

After processing, the gasses will be returned to and along a seafloor pipeline for delivery to a remote location, also at sea level. As the high volume of gasses are passed into the pipeline, some portion of liquids will also reach the pipeline. These liquids, primarily water, will accumulate in the lowest points of the pipelines.

There are pipelines which have each end above sea level, and go through seafloor valleys as deep at 11,000 ft. deep. If a small amount of water accumulates in the pipeline, flowing gasses will simply percolate thru the water. The gas will push the water down on the near side and up on the far side until gas reaches the lowest point. At this time gas passes under the lowest point inside the pipeline and percolates up the far side. If there is enough water in the pipeline to raise the elevation of the water on the downstream side up 100 feet, it will take about 46.5 p.s.i. in gas pressure to do this (salt water is about 0.465 p.s.i./ft.). If you have gas supply pressure of 2,000 p.s.i., it will lift the gas on the downstream side by 4301 feet. If the pipeline depth is greater than 4301 feet, the pipeline is effectively completely blocked. Accumulated salt water in the 11,000 foot deep pipeline would be able to block a pressure of 5,115 p.s.i. (0.465*11,000).

BRIEF SUMMARY OF THE INVENTION

The object of this invention is to provide a method of removing unwanted liquids from a subsea pipeline by displacing the unwanted fluids with a lower density fluid which can be more easily removed by pumping.

A second object of this invention is to provide a method of removing unwanted liquids from a subsea pipeline by displacing the unwanted fluids with a more desirable fluid which can be more easily removed by evaporation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a section of a pipeline extending from an offshore platform through a subsea valley and back up to the shore, having water at the low point in the pipeline.

FIG. 2 is a section of the pipeline of FIG. 1 showing the water displaced towards the downstream side of the low point by gas pressure from the upstream side and gas percolating through the water.

FIG. 3 is a section of the pipeline of FIGS. 1 and 2 showing water being displaced using gas and a pig.

FIG. 4 is a section of the pipeline of FIG. 3 using a low density liquid as the driving means to remove the water from the pipeline.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, a pipeline **10** is shown on the seafloor **12** between offshore platform **14** and the shore **16**. Upstream end **18** of pipeline **10** is approximately at sea level **20** as is the downstream end at **22**. The lowest point or “valley” in the pipeline **24** can be as deep as 11,000 feet deep. Water **26** is shown in the pipeline and is presently shown with its upstream end **28** at approximately at the same level as downstream end **30**.

Referring now to FIG. 2, the upstream gas pressure **32** has been increased to force the water at the upstream end **28** down to the level of the upper side of the low point of the pipeline at **24**. The water at the downstream end **30** is pushed up enough that gas bubbles **32** are percolating through the water **26**. The differing head pressure of the water is the gas pressure differential required to accomplish this. Again, this head pressure is generally calculated by the difference in height times 0.465 p.s.i. per foot. Additional flows of gas in the pipeline will not remove the water, but simply pass through the water until enough water accumulates such that it will no longer flow at all.

Referring now to FIG. 3, a pipeline pig **34** which seals against the bore of the pipeline has been pushed to the “valley” **24** by a working media **36**. As discussed above it would take approximately 5,115 p.s.i. gas to accomplish this if air is the working media.

The compression of gas to these pressures at high volumes associated with large diameter and long subsea pipelines is time consuming and expensive. Finding very large compressors in remote areas operating at that range of pressure would be problematic. The internal volume of a 32 inch diameter pipe **200** miles long is about 4.5 million cu. ft. which would represent an average standard air volume of about 750 million cu. ft. As air has substantial oxygen in it, it has more than a chance of auto-igniting or “dieseling” and generating high and damaging pressures. Nitrogen can be used in place of air without the danger of explosions, but would be very high in cost and supply in remote areas is unlikely.

Referring now to FIG. 4, consider that instead of gas on the upstream side of the pig **34** a different liquid **38** is used. Liquefied propane/butane is a relatively incompressible liquid when subjected to a pressure of at least 28 psi for butane and 112 psi for propane at 68 degrees F. or lower, and is present as a “condensate” in most pipelines. When a liquid at that temperature, the density of butane is 58% that of sea water and that of propane is 50%.

If a 50/50 mixture of propane and butane were to be used as the media for pushing the dewatering pig, more than 50% of the head pressure necessary would be provided by the weight of the liquid mixture in the pipeline. An additional pressure of only 2,400 psi would be required. Further, to pump a liquid instead of a gas it is inherently a much more efficient operation. This means that instead of 5,115 p.s.i. of difficult gas compression, only 2400 p.s.i. of relatively easy liquid pumping would be required.

After the pipeline pig passes the valley and continues up the opposite side, the required pumping pressure would go from a maximum of 2400 p.s.i. to 0 p.s.i. when the mixture reached sea level at the outlet end. At that point as the pipeline if full of mixture, there are two methods of removing the mixture from the pipeline. As it is approximately ½ as heavy as the water was, adequate gas pressure may be available to simply pump it out using a second pig. Secondly, if the downstream end of the pipeline is simply vented at low pressure, the propane/butane mixture will simply evaporate, although it may take a while.

The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. Furthermore, no limitations are intended to the details of construction or design herein shown, other than as described in the claims below. It is therefore evident that the particular embodiments disclosed above may be altered or modified and all such variations are considered within the scope and spirit of the invention. Accordingly, the protection sought herein is as set forth in the claims below.

US2953158A *	1958-03-31	1960-09-20	Shell Oil Co	Apparatus for evacuating pipelines
US3266076A *	1964-11-20	1966-08-16	Sinclair Research Inc	System for cleaning pipelines
US3384169A *	1966-05-17	1968-05-21	Mobil Oil Corp	Underwater low temperature separation unit
US3411483A *	1966-12-19	1968-11-19	Albert G. Canoy	Method and apparatus for low temperature branding of animals
US3495380A *	1967-02-24	1970-02-17	Shell Oil Co	Prevention of gas hydrate formation in gas transport pipelines
US3565689A *	1968-12-31	1971-02-23	Northern Electric Co	Method and apparatus for purging liquid and liquid vapor from the inside of an elongated tube
US3590919A *	1969-09-08	1971-07-06	Mobil Oil Corp	Subsea production system
US3788084A *	1972-06-23	1974-01-29	Exxon Production Research Co	Recovery of marine pipelines
US3961493A *	1975-01-22	1976-06-08	Brown & Root, Inc.	Methods and apparatus for purging liquid from an offshore pipeline and/or scanning a pipeline interior
US4216026A *	1979-02-05	1980-08-05	Shell Oil Company	System for removing fluid and debris from pipelines
US4252465A *	1979-02-13	1981-02-24	Shell Oil Company	Pipeline gel plug
US4416703A *	1981-11-20	1983-11-22	Shell Oil Company	System for removing debris from pipelines
US4543131A *	1979-11-20	1985-09-24	The Dow Chemical Company	Aqueous crosslinked gelled pigs for cleaning pipelines
US4705114A *	1985-07-15	1987-11-10	Texaco Limited	Offshore hydrocarbon production system
US4745937A *	1987-11-02	1988-05-24	Intevep, S.A.	Process for restarting core flow with very viscous oils after a long standstill period
US4753261A *	1987-11-02	1988-06-28	Intevep, S.A.	Core-annular flow process
US5117915A *	1989-08-31	1992-06-02	Union Oil Company Of California	Well casing flotation device and method
US5181571A *	1989-08-31	1993-01-26	Union Oil Company Of California	Well casing flotation device and method
US5215781A *	1991-04-10	1993-06-01	Atlantic Richfield Company	Method for treating tubulars with a gelatin pig
US5232475A *	1992-08-24	1993-08-03	Ohio University	Slug flow eliminator and separator
US5639313A *	1993-03-15	1997-06-17	Petroleo Brasileiro S.A. - Petrobras	Process for the thermo-chemical dewaxing of hydrocarbon transmission conduits
US5795402A *	1995-07-25	1998-08-18	Hargett, Sr.; Daniel	Apparatus and method for removal of paraffin deposits in pipeline systems
US5879561A *	1995-04-25	1999-03-09	Shell Oil Company	Method for inhibiting the plugging of conduits by gas hydrates
US5891262A *	1997-01-21	1999-04-06	Petroleo Brasileiro S.A.- Petrobras	On-line thermo-chemical process for the dewaxing of oil export pipelines
US6109829A *	1995-09-21	2000-08-29	Coflexip Stena Offshore Ltd.	Pipeline pigging
US6129150A *	1996-06-12	2000-10-10	Petroleo Brasileiro S.A. - Petrobras	Method and equipment for offshore oil production by intermittent gas injection
US6267182B1 *	1996-06-12	2001-07-31	Petroleo Brasileiro S. A. - Petrobras	Method and equipment for offshore oil production with primary gas separation and flow using the injection of high pressure gas
US6277286B1 *	1997-03-19	2001-08-21	Norsk Hydro Asa	Method and device for the separation of a fluid in a well
US6536540B2 *	2001-02-15	2003-03-25	De Boer Luc	Method and apparatus for varying the density of drilling fluids in deep water oil drilling applications
US6539778B2 *	2001-03-13	2003-04-01	Valkyrie Commissioning Services, Inc.	Subsea vehicle assisted pipeline commissioning method
US6554068B1 *	2002-01-29	2003-04-29	Halliburton Energy Service,S Inc.	Method of downhole fluid separation and displacement and a plug utilized therein
US6672391B2 *	2002-04-08	2004-01-06	Abb Offshore Systems, Inc.	Subsea well production facility
US6680284B1 *	1999-07-13	2004-01-20	Degussa Ag	Method for producing powdery particle-reduced formulations with the aid of compressed gases
US20050006086A1 *	2001-10-17	2005-01-13	Gramme Per Eivind	Installation for the separation of fluids

US6843331B2 *	2001-02-15	2005-01-18	De Boer Luc	Method and apparatus for varying the density of drilling fluids in deep water oil drilling applications
US7008466B2 *	2001-08-29	2006-03-07	Bp Exploration Operating Company	Method for inhibiting hydrate formation
US20060115332A1 *	2004-11-30	2006-06-01	Halliburton Energy Services, Inc.	Methods for dewatering a pipeline
US7093661B2 *	2000-03-20	2006-08-22	Aker Kvaerner Subsea As	Subsea production system
US20070102369A1 *	2003-07-09	2007-05-10	Per Gramme	Pipe separator with improved separation
US7264653B2 *	2003-10-21	2007-09-04	Champion Technologies, Inc.	Methods for inhibiting hydrate blockage in oil and gas pipelines using simple quaternary ammonium and phosphonium compounds
US20080053659A1 *	2004-09-09	2008-03-06	Statoil Asa	Method of Inhibiting Hydrate Formation
US7389818B2 *	2002-08-21	2008-06-24	Hoeiland Oddgeir	Method and device by a displacement tool
US20080245528A1 *	2005-09-15	2008-10-09	Petroleum Technology Company As	Separating Device
US20080296062A1 *	2007-06-01	2008-12-04	Horton Technologies, Llc	Dual Density Mud Return System
US7516794B2 *	2002-08-16	2009-04-14	Norsk Hydro Asa	Pipe separator for the separation of fluids, particularly oil, gas and water
US20090223672A1 *	2006-04-18	2009-09-10	Upstream Designs Limited	Apparatus and method for a hydrocarbon production facility
US7708839B2 *	2001-03-13	2010-05-04	Valkyrie Commissioning Services, Inc.	Subsea vehicle assisted pipeline dewatering method
US7721807B2 *	2004-09-13	2010-05-25	Exxonmobil Upstream Research Company	Method for managing hydrates in subsea production line
US20100236633A1 *	2005-06-03	2010-09-23	Jose Oscar Esparza	Pipes, systems, and methods for transporting fluids
Family To Family Citations				

* Cited by examiner, † Cited by third party

Similar Documents

Publication	Publication Date	Title
RU2736840C2	2020-11-20	Underwater methane production plant
RU2478074C2	2013-03-27	Method to inject carbon dioxide
CA2734808C	2014-03-25	Method and system for jointly producing and processing hydrocarbons from natural gas hydrate and conventional hydrocarbon reservoirs
US9322253B2	2016-04-26	Method for production of hydrocarbons using caverns
US10683736B2	2020-06-16	Method and system for recovering gas in natural gas hydrate exploitation
GB2481765A	2012-01-04	Apparatus for venting an annular space between a liner and a pipeline of a subsea riser
NO20180242A1	2018-02-16	System and method for processing natural gas produced from a subsea well
KR101684921B1	2016-12-09	A system and method for improving co2 capacity in heterogeneous media and resolving reduction of injection efficiency caused by salt precipitation
WO2011073203A1	2011-06-23	Separating multiphase effluents of an underwater well
US8146667B2	2012-04-03	Dual gradient pipeline evacuation method
AU2015330970B2	2020-02-27	System and method for subsea cooling a wellhead gas to produce a single phase dew-pointed gas
US20170028316A1	2017-02-02	Dual helix cycolinic vertical seperator for two-phase hydrocarbon separation
EA024790B1	2016-10-31	Subsea sour gas and/or acid gas injection system and method
RU2613646C1	2017-03-21	Systems and methods for increasing liquid pressure of petroleum gas separator - liquid using one ore more pumps on sea bed
AU2017427811B2	2024-03-07	Subsea system and method for pressurization of a subsea oil reserve by injecting at least one of water and gas
WO2021066659A1	2021-04-08	Reduced pressure drop in wet gas pipelines by injection of condensate
US10493382B1	2019-12-03	Vapor recovery tank

US20150210915A1	2015-07-30	Self-lubricated water-crude oil hydrate slurry pipelines
KR101422593B1	2014-07-23	Pipe Preventing Hydrate Forming
WO2016054695A1	2016-04-14	System and method for subsea cooling a wellhead gas to produce a single phase dew-pointed gas
WO2018026352A1	2018-02-08	Dual helix cyclonic vertical separator for two-phase hydrocarbon separation
US12130080B2	2024-10-29	Methods of separating carbon dioxide from flue gas and sequestering liquid carbon dioxide
Li	2006	Experimental studies on asphaltene precipitation with CO 2 miscible flooding in Fan 124 block of Daluhu Oilfield
Choi et al.	2014	Study on production availability for new subsea production systems based on a large-scale seabed storage tank
BR102016000011A2	2017-07-11	PROCESS AND APPARATUS FOR REDUCING THE GAS-OIL REASON AND THE CARBON DIOXIDE CONTENT OF A HYDROCARBON CHAIN

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
US12/804,258	2010-07-19	2010-07-19	Dual gradient pipeline evacuation method

Applications Claiming Priority (1)

Application	Filing date	Title
US12/804,258	2010-07-19	Dual gradient pipeline evacuation method

Legal Events

Date	Code	Title	Description
2015-11-13	REMI	Maintenance fee reminder mailed	
2016-04-03	LAPS	Lapse for failure to pay maintenance fees	
2016-05-02	STCH	Information on status: patent discontinuation	**Free format text**: PATENT EXPIRED DUE TO NONPAYMENT OF MAINTENANCE FEES UNDER 37 CFR 1.362
2016-05-24	FP	Lapsed due to failure to pay maintenance fee	**Effective date**: 20160403

Concepts

machine-extracted

Download Filter table

Name				Image	Sections	Count	Query match
method	title,claims,abstract,description	11	0.000				
dual effect	title	1	0.000				
liquid	claims,abstract,description	23	0.000				
pumping	claims,abstract,description	6	0.000				
water	claims,description	26	0.000				
Propane	claims,description	14	0.000				
butane	claims,description	7	0.000				
mixture	claims,description	7	0.000				
n-butane	claims,description	7	0.000				
n-pentane	claims,description	7	0.000				
propane	claims,description	7	0.000				

fluid	abstract,description	7	0.000
evaporation	abstract,description	2	0.000

Show all concepts from the description section

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EXHIBIT Q

Patent Maintenance Fee Receipt

PAYER NAME	PAYMENT DATE	RECEIPT GENERATED	PAYMENT TOTAL
Benton Baugh	01/08/2021	01/08/2021 16:50:32	$1,250.00

Payment Details

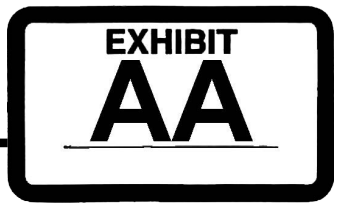
PAYMENT TYPE	ACCOUNT #	TRANSACTION ID
Credit/Debit Card	******2880	E202118G50310617

Patent Details

PATENT #	APPLICATION #
9644792	14729160

Fee Code	Attorney Docket #	Fee Code Name	Sale ID	Fee Code Amount
2551		MAINTENANCE FEE DUE AT 3.5 YEARS	E202118G50310617	$1,000.00
2554		SURCHARGE - 3.5 YEAR SURCHARGE - LATE PAYMENT WITHIN 6 MONTHS	E202118G50310617	$250.00

According to the records of the United States Patent and Trademark Office (USPTO), the maintenance fee and any necessary surcharge have been timely paid for the patent listed above. The payment shown above is subject to actual collection. If the payment is refused or charged back by a financial institution, the payment will be void and the maintenance fee and any necessary surcharge unpaid.



m.moszkowski@deep-gulf.com

From: Marc Moszkowski <m.moszkowski@deep-gulf.com>
Sent: Wednesday, September 5, 2007 12:17 PM
To: 'Rustin Howard'
Subject: Future

Rus,

Any new developments in the financing of DeepGulf? Where do we stand with regards to the financing efforts?

We need to make an evaluation of DeepGulf's accomplishments within the last three years. I have done my part of the technical work, calculations, thorough research, presentations, business plans, financial simulations, web sites and the like but it seems we have not done much progress with raising money, although I may be wrong, please let me know if I am.

We need to make a decision regarding the future. You know the only reason for having Pensacola as my residence is that I wanted to be close to you so that we could work together on a daily basis and make DeepGulf evolve. We are not having enough meetings, in my opinion, and our communication is sparse and not reactive enough. Basically I think we need to make sure that at least 4 to 6 hours are dedicated every day to developing the company, in close collaboration. At first I started to spend a lot if time in your office every day, but not having there any proper space made it very uncomfortable, so the day we started being three in the same office room with one of the occupants eating junk food 2 feet from my desk I realized I needed to make my home my office. At one point you started coming to my home office several times a week, but apparently gave up.

Another concern is the strategic choices for the company. You know we are disagreeing on some of the points, such as deciding whether our offer to Chevron was premature. I think it probably was. In my opinion there is only few ways of raising the capital, we discussed it several times and the subject was again expounded by Bill Lott last week. My opinion is based on decades of experience in this industry.

I am working something like 16 hours a day on subjects all related to the oil and gas industry, about 50% directly for Saipem and Chevron and thus indirectly for DeepGulf, and the balance for J-Flex. In addition I had the model built at my own expense, it is sitting here, apparently not of great interest to anyone.

Are we certain the proper effort is allocated to raising money and keeping each other up-to-date with information? It may be but I am not aware of it and I think I should be better kept informed of everyday's effort.

Rus, my lease is due September 15. I need to know if it's worth for me staying in Pensacola for another year. In a related field, is DeepGulf the best choice for J-Flex? I am sorry for all the candid questions, they need to be asked to ourselves.

Please let me know, I am somewhat discouraged with DeepGulf. I don't see much happening despite all the work I put in the project.

Please call me.

Marc

FIVE DAYS ONLY BEFORE THE FIRST TIMORESE CONTACT