Description

The present invention relates to a flotation riser which extends from a subsea location to a floating platform and is provided with a flotation structure and flotation system which allows full control of the buoyancy of the riser. In such risers it is often necessary because of severe weather to move the floating platform and thus, the riser must be disconnected from the floating platform at a level below the water surface so as not to present a hazard to shipping and the riser should have sufficient buoyancy to be free-standing against water currents so that it is not destroyed by excessive angular motion while disconnected from the platform. The time necessary to release a riser and cause it to be buoyant is limited in emergency conditions. To supply the air necessary to allow the riser to have sufficient buoyancy when it is discovered from the floating platform it is either necessary to have a high capacity air compressor or a smaller compressor with large capacity storage tanks on the floating platform. Neither of these alternatives is totally acceptable since space and weight at the platform are at a premium and the high cost of a high capacity air compressor.

In such risers it has been proposed previously to provide a riser and to surround the riser with a series of chambers with the riser forming the interior of the chamber. An example of this prior art structure is the B. J. Watkins U.S. Patent No. 3,858,401. This patent discloses the riser flotation chambers surrounding the riser and a float control to control the amount of water and gas in each chamber and thereby control the buoyancy of each chamber. A similar arrangement is disclosed in US-A-3992889. The W. J. Hayes et al U.S. Patent No. 3,330,340 discloses another buoyancy structure for a marine conductor which includes sleeves extending across the individual flotation chambers and through which small diameter pipe strings can be contained and be freely insertable. U.S. Patent Nos. 3,354,951 and 3,522,709 disclose other types of prior art buoyant marine conductors or risers. A further Prior art arrangement is disclosed in US-A-4422801. This makes use of semi-circular buoyancy canisters which are secured to support tubes which in turn are secured to flanges on the riser sections. It also discloses the pre-characterising part of claim 7.

According to one aspect of the present invention there is provided a flotation riser comprising a series of annular housings which are interconnected to form a plurality of buoyancy chambers surrounding an open central bore, means for connecting the lower of said housings to a subsea location, means for supporting the upper of said housings from a floating structure, and means for supplying a gas to said chambers to provide each of said chambers with a preselected amount of buoyancy, characterised in that a tubular string extends through the central bore of said series of housings and has an external diameter slightly smaller than the internal diameter of said central bore so that said tubular string extends in a free-standing manner through said housings without direct connection thereto whereby said string can be maintained in a substantially upright condition by controlling the buoyancy of said chambers.

According to another aspect of the present invention there is provided a method of providing an emergency deballasting system for a flotation riser having a plurality of flotation chambers including the step of supplying gas to a plurality of the lower of said flotation chambers, and characterised by retaining gas in said lower chambers as an emergency source of deballasting gas, and remotely releasing gas from said lower chambers into the chambers above them to deballast the chambers under emergency conditions and provide sufficient buoyancy to maintain said flotation riser in a substantially upright position above its connection to a subsea well head when its upper end is free of all connections.

One form of the present invention includes a plurality of annular chambers surrounding a free-standing riser with suitable means for controlling the amount of air and water in each chamber and also including a means for providing an emergency supply of air for rendering the riser sufficiently buoyant so that it is free-standing and does not have to be charged during the emergency from the floating structure. This improved flotation riser has application to both drilling and production risers. The improved riser includes a plurality of annular housings interconnected to form a plurality of buoyancy chambers surrounding an open central bore, the lower of said housings being connected to a subsea wellhead and the upper being supported from a floating structure, a tubular riser extends through the open central bore of said plurality of chambers, a plurality of flanges are secured and extend outwardly from said annular housings with a plurality of openings through the flanges to receive free-standing tubular strings extending from the subsea wellhead to the upper of the annular chambers, means for supplying air to the chambers, means for controlling the amount of air in each chamber to maintain the desired amount of buoyancy, a reserve air storage in the lower group of the annular chambers and means for releasing the reserve air through a cascading system to provide sufficient buoyancy to render the riser and flotation system self-standing.

The invention will be described now by way of example only, with particular reference to the ac-

companying drawings. In the drawings:

Figure 1 is an elevation view of a subsea template serviced by a floating platform and with the improved flotation riser extending from the subsea template or riser base location to the floating platform.

Figure 2 is a detailed sectional view taken along line 2-2 in Figure 3 of one of the improved annular flotation structures having its intermediate portion broken away and showing the free-standing riser extending through its central bore.

Figure 3 is a transverse sectional view to clearly illustrate the free-standing tubular strings carried by the annular flotation chamber flanges.

Figure 4 is a schematic illustration of the flotation control system of the present invention.

Figure 5 is another schematic illustration of the self-contained air reservoir and reserve buoyancy system in its fully charged condition.

Figure 6 is another schematic illustration of the reserve buoyancy system in operation.

A flotation riser 10 is illustrated in Figure 1 extending between floating platform 12 to subsea location or template 14 which is illustrated as central subsea collecting site which serves several sites, such as subsea wellhead 16 which is illustrated to be connected to the central location 14 by several subsea flowlines 18. Platform 12 includes suitable means 20 for exerting a tension on the upper end of flotation riser 10. Flotation riser 10 includes a series of annular housings 22 through which riser 24 extends.

Riser 10 is more clearly illustrated in Figures 2 and 3. Annular housings 22 includes central bore 26 through which riser 24 is inserted and extends in free-standing relationship to housings 22. Annular housing 22 is watertight except as hereinafter described with respect to the flotation system. Housing 22 includes inner annular shell 28, outer annular shell 30, lower annular flange 32 secured to shells 28 and 30, upper annular flange 33 secured to the upper end of outer shell 30 and upper annular dome 34 which is sealed to shells 28 and 30 to form annular flotation chamber 36. Suitable fasteners (not shown) are used to connect upper flanges 33 to lower flanges 32 in the next higher housing 22 to thereby interconnect the series of housings 22. Flanges 38 and 40 are secured to the upper and lower portions of outer shell 30. Each of flanges 38 and 40 are provided with openings 41 through which free-standing tubing strings 42 are inserted and extend. Vent holes 29 are provided in shell 30 for expelling or introducing water and to ensure that chambers 36 are not over-pressured either externally or internally. As best seen in FIGURE 2, syntatic foam modules 43 with tubing openings therein are installed around shell 30 between flanges 38 and 40.

Thus when flotation riser 10 is installed, it extends from subsea location 14 to the position under floating platform 12 with tubular strings 42 and riser 24 being free-standing. Free-standing is meant that strings 42 and riser 24 are small enough to pass through the openings in flanges 38 and 40 and through central bore 26 in housings 22. With air in chambers 36, adjustable as hereinafter set forth, each chamber 36 provides a desired amount of buoyancy to flotation riser 10 which is used to control the position of riser 24 and strings 42. Thus, when the riser 10 is inclined from the vertical the buoyancy of chambers 36 exerts a force on riser 24 and strings 42 to return them to a vertical position.

As explained above one of the primary objects of the present invention is to provide an air reservoir which can deballast the flotation riser 10 sufficiently to ensure that it can be free-standing against currents whenever conditions require that the floating platform be moved without disconnecting the riser from its subsea connection. The present invention provides this deballasting structure and method as hereinafter set forth. This structure and method are schematically illustrated in FIGURES 4 through 6.

In FIGURE 4, the lower end of flotation riser 10 is shown with the omission of riser 24 and tubing string, 42 and annular chambers 36 being shown as cylindrical chambers 44. Lower chamber 44a is illustrated as being the chamber immediately above the connection of flotation riser 10 to subsea location 14. The chambers above chamber 44a are identified by the numerals 44 and the letters "b" through "f" in ascending order. Chambers 44 are served by gas manifold 46 which connects into each chamber individually through valves 48 which preferably is controlled by the level of water in its chamber. Main valve 50 controls flow of gas to manifold 46. Additionally, line 52 connects into chamber 44a and is controlled by valve 54. Line 52 functions as the supply line to the deballasting system including chambers 44a, 44b and 44c together with manifold 56 connecting through check valves 58a and 58b into the upper end of chambers 44a and 44b and remote controlled shut-off valve 60 into the upper end of chamber 44c. While only two of chambers 44 are shown in the drawings as forming the reservoir portion of the deballasting system either additional or fewer chambers may be used so long as sufficient deballasting gas is provided to render flotation riser 10 free-standing when it is disconnected from floating platform 12.

FIGURE 5 illustrates the condition of the deballasting system and the chambers thereabove during normal operations. Chambers 44a and 44b have been charged through line 52 and valve 60 is closed to confine the gas charge in chambers 44a

and 44b. The other chambers are shown to include both water and gas with the water level control functioning to control the buoyancy of flotation riser 10 by controlling the amount of water and gas in each of the chambers in a manner known in the art. Cascading ducts 62 are positioned in each of the chambers to extend from the lower portion of the chamber into the lower portion of the next higher chamber. No duct 62 is provided between the upper of the reservoir chambers (chamber 44b in the drawings) to the chamber immediately above such chamber 44b (chamber 44c).

When the deballasting system is to be operated, valve 60 is remotely opened to release the deballasting gas through manifold 56 from chambers 44a and 44b. This gas flows into the upper portion of chamber 44c and forces the water out of chamber 44c through duct 62c and into chamber 44d. The system proceeds in the cascading of gas into the next higher chamber until the gas is completely utilized to provide the necessary free-standing buoyancy. This system functions without interruption once valve 60 has been opened and can be completed while the upper end of flotation riser 10 is being disconnected from floating platform 12. FIGURE 6 illustrates this cascading action of the gas upwardly through the chambers. In chamber 44c the flow of gas is schematically illustrated as a series of droplets to show the flow from the connection of manifold 56 into the upper end of chamber 44c to the lower portion of chamber 44c and into the lower end of duct 62c.

Thus, with the improved system, a small compressor may be used in charging the system and no storage facilities are needed on the floating platform. The system is also quick acting and will move independently to completion once valve 60 is opened unless valve 60 is closed. With the opening of valve 60 it is suggested that the normal buoyancy control system be inactivated to ensure that it does not defeat the emergency system.

Claims

1. A flotation riser comprising a series of annular housings (22) which are interconnected to form a plurality of buoyancy chambers surrounding an open central bore (26), means for connecting the lower of said housings to a subsea location, means for supporting the upper of said housings from a floating structure, and means for supplying a gas to said chambers to provide each of said chambers with a preselected amount of buoyancy, characterised in that a tubular string (24) extends through the central bore of said series of housings and has an external diameter slightly smaller than the internal diameter of said central bore so that said tubular string (24) extends in a free-standing manner through said housings without direct connection thereto whereby said string can be maintained in a substantially upright condition by controlling the buoyancy of said chambers.

2. A flotation riser according to claim 1 characterised by including a flange (38, 40) secured to and extending outward from each of said plurality of said housings (22), each of said flanges having a plurality of openings (41) therethrough, a plurality of free-standing tubular strings (42) positioned in said openings to extend from said subsea wellhead to the upper one of said housings.

3. A flotation riser according to claim 1, characterised by including a gas supply line (52) connected into the lower of said annular housings to supply gas to said chamber within said lower annular housing, means (62) for conducting gas from said lower chamber to the chamber immediately above said chamber whereby said chamber can form an emergency gas reservoir, means (60) for controlling release of gas from said lower chamber to chambers thereabove.

4. A flotation riser according to claim 3, characterised in that said gas conducting means includes a manifold (56) connecting to the chambers of said emergency gas reservoir, and a remote controlled valve (60) in said manifold for releasing the gas from the emergency gas reservoir to the higher chambers.

5. A flotation riser according to claim 3, characterised in that said gas release means includes cascading means (62) connecting from said emergency gas reservoir to the next higher chamber and progressively between chambers whereby gas released from said reservoir progressively deballasts the chambers.

6. A flotation riser according to claim 5, characterised in that said cascading means includes a connection from said reservoir into the upper portion of the next higher chamber, and a duct (62) in each of said next higher chamber and those chambers thereabove extending from a position in the lower portion of its chamber into the next higher chamber.

7. A method of providing an emergency deballasting system for a flotation riser (10) having a

and 44b. The other chambers are shown to include both water and gas with the water level control functioning to control the buoyancy of flotation riser 10 by controlling the amount of water and gas in each of the chambers in a manner known in the art. Cascading ducts 62 are positioned in each of the chambers to extend from the lower portion of the chamber into the lower portion of the next higher chamber. No duct 62 is provided between the upper of the reservoir chambers (chamber 44b in the drawings) to the chamber immediately above such chamber 44b (chamber 44c).

When the deballasting system is to be operated, valve 60 is remotely opened to release the deballasting gas through manifold 56 from chambers 44a and 44b. This gas flows into the upper portion of chamber 44c and forces the water out of chamber 44c through duct 62c and into chamber 44d. The system proceeds in the cascading of gas into the next higher chamber until the gas is completely utilized to provide the necessary free-standing buoyancy. This system functions without interruption once valve 60 has been opened and can be completed while the upper end of flotation riser 10 is being disconnected from floating platform 12. FIGURE 6 illustrates this cascading action of the gas upwardly through the chambers. In chamber 44c the flow of gas is schematically illustrated as a series of droplets to show the flow from the connection of manifold 56 into the upper end of chamber 44c to the lower portion of chamber 44c and into the lower end of duct 62c.

Thus, with the improved system, a small compressor may be used in charging the system and no storage facilities are needed on the floating platform. The system is also quick acting and will move independently to completion once valve 60 is opened unless valve 60 is closed. With the opening of valve 60 it is suggested that the normal buoyancy control system be inactivated to ensure that it does not defeat the emergency system.

Claims

1. A flotation riser comprising a series of annular housings (22) which are interconnected to form a plurality of buoyancy chambers surrounding an open central bore (26), means for connecting the lower of said housings to a subsea location, means for supporting the upper of said housings from a floating structure, and means for supplying a gas to said chambers to provide each of said chambers with a preselected amount of buoyancy, characterised in that a tubular string (24) extends through the central bore of said series of housings and has an external diameter slightly smaller than the internal diameter of said central bore so that said tubular string (24) extends in a free-standing manner through said housings without direct connection thereto whereby said string can be maintained in a substantially upright condition by controlling the buoyancy of said chambers.

2. A flotation riser according to claim 1 characterised by including a flange (38, 40) secured to and extending outward from each of said plurality of said housings (22), each of said flanges having a plurality of openings (41) therethrough, a plurality of free-standing tubular strings (42) positioned in said openings to extend from said subsea wellhead to the upper one of said housings.

3. A flotation riser according to claim 1, characterised by including a gas supply line (52) connected into the lower of said annular housings to supply gas to said chamber within said lower annular housing, means (62) for conducting gas from said lower chamber to the chamber immediately above said chamber whereby said chamber can form an emergency gas reservoir, means (60) for controlling release of gas from said lower chamber to chambers thereabove.

4. A flotation riser according to claim 3, characterised in that said gas conducting means includes a manifold (56) connecting to the chambers of said emergency gas reservoir, and a remote controlled valve (60) in said manifold for releasing the gas from the emergency gas reservoir to the higher chambers.

5. A flotation riser according to claim 3, characterised in that said gas release means includes cascading means (62) connecting from said emergency gas reservoir to the next higher chamber and progressively between chambers whereby gas released from said reservoir progressively deballasts the chambers.

6. A flotation riser according to claim 5, characterised in that said cascading means includes a connection from said reservoir into the upper portion of the next higher chamber, and a duct (62) in each of said next higher chamber and those chambers thereabove extending from a position in the lower portion of its chamber into the next higher chamber.

7. A method of providing an emergency deballasting system for a flotation riser (10) having a

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plurality of flotation chambers (44) including the step of supplying gas to a plurality of the lower of said flotation chambers (44) and characterised by retaining gas in said lower chambers as an emergency source of deballasting gas, and remotely releasing gas from said lower chambers into the chambers above them to deballast the chambers under emergency conditions and provide sufficient buoyancy to maintain said flotation riser in a substantially upright position above its connection to a subsea wellhead when its upper end is free of all connections.

8. A method according to claim 7, characterised by including the step of cascading gas progressively up through said chambers above said reservoir chambers.

Revendications

1. Colonne montante flottante comportant une série de gaines annulaires (22) qui sont reliées entre elles pour former des chambres de flottaison entourant un alésage central ouvert (26), des moyens pour relier la plus basse desdites gaines à fine position sous-marine, des moyens pour faire supporter la plus haute desdites gaines par une structure flottante, et des moyens pour envoyer un gaz dans lesdites chambres pour donner à chacune desdites chambres une valeur présélectionnée de flottabilité, caractérisée en ce qu'une ligne tubulaire (24) s'étend à travers l'alésage central de ladite série de gaines et présente un diamètre extérieur légèrement inférieur au diamètre intérieur dudit alésage central de sorte que ladite ligne tubulaire (24) s'étend de façon autonome à travers lesdites gaines, sans liaison directe avec elles, ce qui permet de maintenir ladite ligne dans une situation sensiblement verticale en commandant la flottaison desdites chambres.

2. Colonne montante flottante selon la revendication 1, caractérisée en ce qu'elle comporte une bride (38, 40) fixée à chacune desdites gaines (22) et s'étendant à l'extérieur de chacune de ces gaines, chacune desdites brides étant traversée par des ouvertures (41), des lignes tubulaires autonomes (42) étant placées dans lesdites ouvertures pour s'étendre de ladite tête de puits sous-marine à la plus haute desdites gaines.

3. Colonne montante flottante selon la revendication 1, caractérisée en ce qu'elle comporte une conduite (52) d'alimentation en gaz raccordée à la plus basse desdites gaines annulaires pour alimenter en gaz ladite chambre située à l'intérieur de ladite gaine annulaire la plus basse, ainsi que des moyens (62) pour conduire le gaz, depuis ladite chambre la plus basse, à la chambre située immédiatement au-dessus de ladite chambre, de sorte que ladite chambre peut former un réservoir à gaz de secours, ainsi que des moyens (60) pour commander la libération du gaz pour le faire passer de ladite chambre la plus basse aux chambres situées pardessus.

4. Colonne montante flottante selon la revendication 3, caractérisée en ce que lesdits moyens pour conduire le gaz comportent un collecteur (56) raccordé aux chambres dudit réservoir à gaz de secours, ainsi qu'une vanne télécommandée (60) dans ledit collecteur pour libérer le gaz pour le faire passer du réservoir à gaz de secours aux chambres plus hautes.

5. Colonne montante flot tante selon la revendication 3, caractérisée en ce que lesdits moyens de libération du gaz comportent des moyens (62) opérant en cascade, montés entre ledit réservoir à gaz de secours et la chambre située immédiatement au-dessus et progressivement entre les chambres, de sorte que le gaz libéré dudit réservoir assure le déballastage progressif des chambres.

6. Colonne montante flottante selon la revendication 5, caractérisée en ce que lesdits moyens opérant en cascade comportent une liaison entre ledit réservoir et la région supérieure de la chambre située immédiatement au-dessus, ainsi qu'un conduit (62) dans chacune de ladite chambre située immédiatement au-dessus et des chambres situées au-dessus de celle-ci, en s'étendant, depuis une position située dans la région inférieure de sa chambre, jusque dans la chambre située immédiatement au-dessus.

7. Procédé pour équiper d'un système de déballastage d'urgence une colonne montante flottante (10) présentant des chambres flottantes (44), comportant l'étape consistant à envoyer du gaz dans plusieurs de celles desdites chambres flottantes (44) qui sont situées en-dessous, et caractérisé en ce que l'on retient dit gaz dans lesdites chambres situées dessous en tant que source d'urgence de gaz de déballastage et qu'on libère, par télécommande, le gaz pour le faire passer, desdites chambres situées dessous, dans les chambres si-

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tuées audessus d'elles, pour déballaster les chambres en situation d'urgence et assurer une flottabilité suffisante pour maintenir ladite colonne montante flottante en position sensiblement verticale au-dessus de sa liaison avec la tête de puits sous-marine lorsque son extrémité supérieure est libérée de toutes les liaisons.

8. Procédé selon la revendication 7, caractérisé en ce qu'il comporte l'étape consistant à faire passer progressivement, en cascade, le gaz vers le haut en passant par lesdites chambres situées au-dessus desdites chambres formant réservoir.

Ansprüche

1. Schwimmendes Unterwasserstandrohr mit einer Reihe ringförmiger Gehäuse (22), die zur Ausbildung einer Mehrzahl von eine offene Zentralbohrung (26) umgebenden Auftriebskammern miteinander verbunden sind, einer Einrichtung zum Anschließen des unteren der Gehäuse an eine Unterwasserstation, einer Einrichtung zum Haltern des oberen der Gehäuse durch einen Schwimmaufbau, und einer Einrichtung zum Beschicken der Kammern mit einem Gas, um jede der Kammern mit einem vorbestimmten Ausmaß an Auftrieb auszustatten,
dadurch **gekennzeichnet,** daß
durch die Zentralbohrung (26) der Reihe von Gehäusen ein rohrförmiger Strang (24) mit einem Außendurchmesser verläuft, der geringfügig kleiner ist als der Innendurchmesser der Zentralbohrung, so daß der rohrförmige Strang (24) frei stehend durch die Gehäuse ohne direkte Verbindung mit diesen verläuft, wodurch der Strang durch Steuern des Auftriebs der Kammern in einem im wesentlichen aufrechten Zustand gehalten werden kann.

2. Schwimmendes Unterwasserstandrohr nach Anspruch 1,
gekennzeichnet durch
einen Flansch (38, 40), der befestigt ist an und sich nach außen erstreckt von jedem der Mehrzahl von Gehäusen (22), wobei jeder dieser Flansche eine Mehrzahl von Durchgangsöffnungen (41) aufweist, und eine Mehrzahl freistehender rohrförmiger Stränge (42), die in den öffnungen von dem Unterwasserbohrlochkopf zu dem oberen der Gehäuse verlaufend angeordnet ist.

3. Schwimmendes Unterwasserstandrohr nach Anspruch 1,
gekennzeichnet durch
eine Gasversorgungsleitung (52), die an das untere der ringförmigen Gehäuse zum Zuführen von Gas zu der Kammer innerhalb des unteren ringförmigen Gehäuses angeschlossen ist, eine Einrichtung (62) zum Überführen von Gas von der unteren Kammer in die unmittelbar über dieser angeordnete Kammer, wodurch diese Kammer ein Notfall-Gasreservoir auszubilden vermag, und eine Einrichtung (60) zum Steuern der Gasabgabe aus der unteren Kammer in die darüber angeordneten Kammern.

4. Schwimmendes Unterwasserstandrohr nach Anspruch 3,
dadurch **gekennzeichnet,** daß
die Gasüberführungseinrichtung eine mit den Kammern des Gasnotfallreservoirs in Verbindung stehende Sammelleitung (56) umfaßt, sowie ein ferngesteuertes Ventil (60) innerhalb der Sammelleitung zum Abgeben des Gases von dem Notfall-Gasreservoir an die höher gelegenen Kammern.

5. Schwimmendes Unterwasserstandrohr nach Anspruch 3,
dadurch **gekennzeichnet,** daß
die Gasabgabeeinrichtung eine Kaskadenverbindungseinrichtung (62) zur Übertragungsverbindung von dem Notfall-Gasreservoir zu der nächsthöher gelegenen Kammer sowie zur fortschreitenden Verbindung zwischen Kammern umfaßt, wodurch aus dem Reservoir abgegebenes Gas die Kammern fortschreitend von Ballast befreit.

6. Schwimmendes Unterwasserstandrohr nach Anspruch 5,
dadurch **gekennzeichnet,** daß
die Kaskadenverbindungseinrichtung eine Verbindung von dem Reservoir in den oberen Abschnitt der nächsthöher gelegenen Kammer umfaßt, sowie in jeder nächsthöher gelegenen Kammer und den je darüber gelegenen Kammern eine Rohrleitung (62), die sich von einer Stellung im unteren Abschnitt ihrer Kammer in die nächsthöher gelegene Kammer erstreckt.

7. Verfahren zum Ausrüsten eines mit einer Mehrzahl von schwimmenden Kammern (44) versehenen schwimmenden Unterwasserstandrohres (10) mit einem Notauftriebssystem, bei dem einer Mehrzahl der unteren Schwimmkammern (44) Gas zugeführt wird,
dadurch **gekennzeichnet,** daß
in den unteren Kammern zur Ausbildung einer

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Notauftriebsquelle Gas gehalten wird, und das Gas aus den unteren Kammern in die darüberliegenden Kammern ferngesteuert abgegeben wird, um die Kammern unter Notfallbedingungen von Ballast zu befreien, sowie um genügend Auftrieb zu erzeugen, um das Unterwasserstandrohr in einer im wesentlichen aufrechten Stellung oberhalb seiner Verbindung mit einem Unterwasserbohrkopf zu halten, wenn sein oberes Ende aller Verbindungen ledig ist.

8. Verfahren nach Anspruch 7, **gekennzeichnet** durch ein fortschreitendes kaskadenartiges Durchleiten von Gas durch die Kammern oberhalb der Bevorratungskammern.

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