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Method for onshore or offshore erecting an upstanding construction

(57)

Method for onshore or offshore erecting an upstanding construction comprising longitudinal construction parts (9) , in particular parts of a windmill, comprising the steps of

- providing the longitudinal parts (9) of the construction;
- transporting the longitudinal parts (9) of the construction on a vehicle (4, 4', 4") to an erection site (5) ;
- providing a crane (1) for hoisting the longitudinal parts (9) of the construction;
- using the crane (1) for placing the respective longitudinal parts (9) of the construction on top of each other on a construction base (3) at the erection site (5) ;
- providing the construction base (3) and/or the longitudinal parts (9) of the construction with a support and guide facility (2) for the crane (1) ;
- arranging that the crane (1) is mountable on the support and guide facility (2); and
- mounting the crane (1) on the support and guide facility (2) of at least one of the construction base (3) and the longitudinal parts (9) of the construction that is placed on the construction base (3) , so as to arrange that the crane (1) is movable up and down along the support and guide facility (2) of the construction.

Method for onshore or offshore erecting an upstanding construction

The invention relates to a method for onshore or offshore erecting an upstanding construction comprising longitudinal construction parts, in particular parts of a windmill, comprising the steps of

- providing the longitudinal parts of the construction;
- transporting the longitudinal parts of the construction on a vehicle to an erection site;
- providing a crane for hoisting the longitudinal parts of the construction; and
- using the crane for placing the respective longitudinal parts of the construction on top of each other on a construction base at the erection site.

The prior art method to erect an upstanding longitudinal construction, such as a windmill, is to lift and stack column segments to create a tower on which, in the case of a windmill, the wind turbine generator can be positioned at its design height. A crane is used to erect the column and place the wind turbine generator and rotor blades on top of the construction. Depending on the height of the windmill, the length of the crane boom needs to be adapted thereto in order to be able to reach the necessary elevation for the placement of the wind turbine generator and the rotor blades at the top of the upstanding construction. Disadvantageously however an increased length of the crane boom implies that the crane as a whole has to increase in size and weight in order to be able to provide the required capacity for erection of the upstanding construction.

It is an object of the invention to provide a method for onshore or offshore erecting of an upstanding construction comprising longitudinal construction parts, in particular parts of a windmill, wherein:

- the eventual height of the upstanding construction is not determining the required length of the crane boom;
- a more stable method of erecting an upstanding construction is provided that is less sensitive to weather conditions so that construction can continue also in weather conditions that

would in the prior art prevent the continuation of erecting the upstanding construction;

- the parameters of the crane in other respect is also independent of the height of the upstanding construction and of the mass of its components;

- cost and effort to implement the method of erecting an upstanding construction remain relatively small and are basically independent from the height of the upstanding construction; and

- the ground area or footprint required for the crane in proximity of the upstanding construction is relatively limited and smaller than with a crane of the prior art.

The inventors stress to note that particularly with the erection of a windmill the time gained or saved during the erection of the windmill is very valuable and can amount to millions of dollars, particularly when a series of windmills have to be erected. There is therefore an ongoing effort within the industry to come to smarter, quicker, and less costly solutions for the erection of windmills. The instant invention will hereinafter be basically elucidated with reference to the erection of a windmill, but it will be clear for the skilled person that the advantages that come within reach with the invention are equally available when the invention is used for the construction of other high upstanding constructions. The application of the invention to the erection of a windmill must therefore be seen as purely illustrative, without the invention being limited thereto.

The invention is embodied in the features of one or more of the appended claims.

Basically the method of the invention comprises the steps of:

-providing the construction base and/or the longitudinal parts of the construction with a support and guide facility for the crane;

-arranging that the crane is mountable on the support and guide facility; and

-mounting the crane on the support and guide facility of at least one of the construction base and the longitudinal parts of the construction that is placed on the construction base, so as to arrange that the crane is then movable up and down along the support and guide facility of the construction.

The just-mentioned features of the invention provide the advantage that the footprint of the crane is independent from the size of the upstanding construction which is to be erected. Also the other dimensions and the weight of the crane are thus independent from the upstanding constructions size.

Another advantage is that the movements of the crane can remain limited which contributes to the stability of the entire construction process when the upstanding construction is build up from the ground. Severe weather conditions, particularly wind, only have a limited effect on the upstanding construction and on the crane mounted thereon during erection of the construction, particularly in comparison with the prior art solution.

Cost and effort to erect the upstanding construction can further remain limited since all preparatory work off-site can remain limited and be delayed until the construction will be done on-site. The prior art method is comparatively costly since most construction is then required to be done off-site, which necessitates also the use of costlier transportation and high-capacity cranes. The invention however provides the advantage that transporting the longitudinal parts of the construction and the crane to the erection site can be done on the same vehicle.

According to the invention it is preferred that:

- transporting the longitudinal parts of the construction and the crane to the erection site is done with the construction parts and the crane resting in a horizontal position on the vehicle; and that

- the crane is up-ended at the site into a vertical position so as to enable that the crane is mounted on the support and guide facility of at least one of the construction base and the longitudinal parts of the construction that is placed on the construction base. Thereafter the crane is immediately functional to be moved up and down the support and guide facility for moving loads up and down the gradually growing upstanding construction, as will be further explained hereinafter.

Up-pending of the crane into a vertical position can be done by different means; for instance using hydraulic cylinders or by using pull wires between the construction base and

the crane. During up-ending a foot of the crane can be provided with a pivot point close to the support and guide facility provided on the construction base on which the crane will be mounted.

5 In connection with both onshore and offshore activities, the vehicle can be appropriately moved into the position which is best suited for mounting the crane on the supporting guide facility. If no appropriate position can be found, then the crane can first be mounted on an additional support that is
10 provided on the construction base (or on a higher longitudinal construction part above the construction base), and then moved into its final position mounted on the support and guide facility on the construction base or the higher longitudinal construction part on top of the construction base.

15 For limiting the costs of transport and making handling of all parts of the upstanding construction and the crane easy, it is preferred that at least one of the longitudinal construction parts and the crane is/are provided with dimensions equal or less than the dimensions of a standard sea
20 freight container.

 The actual erection of the upstanding construction is preferably initiated by moving the crane from the vehicle into an initial position on the support and guide facility that is provided on one of the construction base and the longitudinal
25 part of the construction that is first placed on the construction base.

 The erection of the upstanding construction can then take place by repeatedly positioning the crane at a top level of the support and guide facility of the highest longitudinal
30 part of the construction, and picking up with the crane a next longitudinal part of the construction that still rests on the vehicle or at base level, and subsequently placing said next longitudinal part on top of the longitudinal part that supports the crane, while arranging that the support and guide facility
35 of the respective longitudinal parts of the construction that are placed on top of each other are kept in line. Accordingly the crane can reach ever increasing heights corresponding each time with the up till then latest placed and highest longitudinal construction part of the tower of construction parts.

40 In the example wherein the upstanding construction is

a windmill, it is preferred to use the crane for picking up and placing the windmill generator and hub on top of the upstanding construction, followed by using the crane for picking up and placing the rotor blades on the hub.

5 As mentioned the method of erecting the upstanding construction can be used onshore and offshore. It is preferred that with onshore erection the vehicle is a trailer, and that with offshore erection the vehicle is a floating vessel or a jack-up vessel. In case of a floating vessel it is preferred
10 that the vessel deck is stabilized.

 Completing the erection of the upstanding construction is preferably done by removing the crane and removing the support and guide facility from the longitudinal parts of the construction. Removal of the support and guide facility is particularly desirable with windmills to avoid inducements of turbulence when the wind is blowing past the upstanding construction. Such turbulence could adversely affect the rotor blades when in rotating operation.

 The invention is also well equipped to execute maintenance on or to execute dismantling of the upstanding construction. Both activities involve replacing the support and guide facility along the longitudinal parts of the construction and mounting a crane on the support and guide facility. The crane can then be applied for providing maintenance to the upstanding
25 construction or for part by part top-down removal of the respective longitudinal parts of the construction.

 The invention is further embodied in a crane which is arranged for moving up and down a vertical support and guide facility, wherein the crane comprises a mast which is movable
30 up and down the support and guide facility, and wherein the remainder of the crane which comprises the crane's hoisting means is rotatably mounted on the mast.

 The invention will hereinafter be further elucidated with reference to the drawing illustrating methods according to
35 the invention that is not limiting as to the appended claims.

 In the drawing:

 -figures 1 - 7 illustrate mounting a crane on a construction base for an upstanding construction which is to be erected according to the invention; and

40 -figures 8 - 18 illustrate the method of erecting an

upstanding construction comprising longitudinal construction parts in accordance with the invention.

Whenever in the figures the same reference numerals are applied, these numerals refer to the same parts.

5 First an explanation will be provided with reference to figures 1 - 7 of mounting the crane 1 on a support and guide facility 2 on a construction base 3 onshore. The way of mounting the crane 1 when the construction base is onshore is basically the same as when the construction base would be offshore,
10 so a detailed explanation and showing of mounting the crane on a support and guide facility on a construction base which is located offshore can be dispensed with.

In figure 1 the longitudinal parts of the construction are for clarity not shown. Figure 1 shows however that the
15 crane 1 is placed in a horizontal position on a vehicle 4, that is to say a trailer, and moved to an erection site 5 where for instance a windmill construction base 3 is located.

Figure 2 shows the subsequent up-ending of the crane 1 into a vertical position which is reached in figure 3, and
20 which enables that the crane 1 is mounted on the support and guide facility 2 of the construction base 3. Needless to say that if there would already be a first or higher longitudinal part positioned on the construction base 3, the crane 1 could also be mounted on this first or higher longitudinal part of
25 the construction that would be on top of the construction base 3.

Figure 3 shows that the crane 1 is still in a folded condition. In figures 4 - 7 the crane is unfolded by extending first the struts 6 of the crane (figure 4); and subsequently
30 extending the jib 7 of the crane 1 (figure 5); extending the jib extension 7' (figure 6); and extending a telescopic piece 8' from the mast 8 that is mounted on the support and guide facility on the construction base 3 (figure 7). The Crane 1 is then ready for use.

35 Using the Crane 1 according to the invention will now be elucidated with reference to figures 8 - 18 illustrating the case that the erection of the upstanding construction is done offshore. It is remarked that the following elucidation of erecting the construction offshore will likewise be applicable
40 to erecting the upstanding construction onshore. The details of

the method of the invention are the same in both situations. A specific elucidation with reference to an erection onshore can therefore be dispensed with.

Figures 8 and 9 depict two alternative situations in which the vehicle 4 to be used for transporting the longitudinal parts 9 of the construction and the crane 1 in a horizontal position to the erection site 5 is different, ntably either a floating vessel 4' (figure 8) or a jack-up vessel 4'' (figure 9).

Figure 8 shows a fully loaded floating vessel 4' after arrival at the construction site 5, and this figure shows a moment during the initial up-ending of the crane 1 so as to enable its eventual mounting on the support and guide facility that is provided on the construction base 3 on which a windmill column will be completed.

Likewise figure 9 shows a fully loaded jack-up vessel 4'' at the construction site 5, and shows a moment during the initial up-ending of the crane 1 so as to enable its eventual mounting on the support and guide facility that is provided on the construction base 3 on which a windmill column will be completed.

With reference to figure 8 and figure 9 it shows that besides the crane 1, also the longitudinal parts 9 of the construction that have already been provided off-site with support and guide facilities 2 for the crane 1, a windmill generator 10, and a hub 11 for mounting the rotor blades 13, and said rotor blades 13 can be moved to the erection site 5 on one and the same vehicle 4', 4''.

The remainder of the explanation of using the Crane 1 of the invention for erecting the upstanding construction of the windmill will now be provided for the case that the vehicle is a jack-up vessel 4'' in accordance with figure 9, but the skilled person will understand without further explanation that any other type of vessel could similarly be used for this purpose, and not necessarily only the alternative of the floating vessel 4' of figure 8.

Turning now to figures 10 - 15, these figures show the consecutive building up and erection of the tower of longitudinal construction parts 9, wherein after mounting the crane 1 on the construction base 3 (in a way similar to what is discussed

hereinabove with reference to figures 1 - 7) a first construction part 9' is picked up by the crane 1 from the vessel 4'' and positioned on top of the construction base 3. This is shown in figure 10.

5 In figure 11 it shows that the crane 1 is moved to a higher altitude than in figure 10, until it reaches the top level 12 of the support and guide facility 2 of the then highest first longitudinal part 9' of the construction. This shows figure 12.

10 Figure 12 further shows that a next longitudinal construction part 9'' is picked up by the crane 1 from the vessel 4'' and positioned on top of the first longitudinal construction part 9' that was earlier placed on the construction base 3.

15 Figure 13 shows a subsequent placement of a next yet still intermediate longitudinal construction part 9''' in the tower of construction parts 9, whereas figure 14 shows the generalization of the placement of construction part X in the tower of construction parts 9. Each intermediate placement of a
20 construction part according to the building method of the invention can therefore be deemed illustrated by the generalization of placing construction part X in the tower of construction parts 9. Figure 15 shows the final and uppermost longitudinal construction part being placed on top of the pile or tower
25 of construction parts 9.

Figure 16 and figure 17 depict respectively the placement after picking up from the vehicle 4'' of the wind turbine generator 10 (figure 16), and the hub 11 for the rotor blades (figure 17).

30 Finally figure 18 shows the placement of the rotor blades 13, after their picking up from the vehicle 4'', in their final mounted position on the hub 11.

Although the invention has been discussed in the foregoing with reference to exemplary embodiments of applying the
35 method of the invention, the invention is not restricted to these particular embodiments which can be varied in many ways without departing from the invention. The discussed exemplary embodiments shall therefore not be used to construe the appended claims strictly in accordance therewith. On the contrary the
40 embodiments are merely intended to explain the wording of the

appended claims without intent to limit the claims to these embodiments. The scope of protection of the invention shall therefore be construed in accordance with the appended claims only, wherein a possible ambiguity in the wording of the claims
5 shall be resolved using these exemplary embodiments.

CONCLUSIES

1. Werkwijze voor het on-shore of offshore oprichten van een staande constructie omfattende longitudinale constructiedelen (9), in het bijzonder delen van een windmolen, omfattende de stappen van het

5 -verschaffen van de longitudinale delen (9) van de constructie;

 -transporteren van de longitudinale delen (9) van de constructie op een voertuig (4, 4', 4'') naar een oprichtingsplaats (5);

10 -verschaffen van een kraan (1) voor het ophijzen van de longitudinale delen (9) van de constructie;

 -gebruiken van de kraan (1) voor het plaatsen van de respectievelijke longitudinale delen (9) van de constructie bovenop elkaar op een constructiebasis (3) ter plaatse van de oprichtingsplaats (5);

15 **gekenmerkt door** de stappen van het:

 -voorzien van de constructiebasis (3) en/of de longitudinale delen (9) van de constructie van een steun- en geleidingsfaciliteit (2) voor de kraan (1);

20 -bewerkstelligen dat de kraan (1) monteerbaar is op de steun- en geleidingsfaciliteit (2); en

 -monteren van de kraan (1) op de steun- en geleidefaciliteit (2) van ten minste één van de constructiebasis (3) en de longitudinale delen (9) van de constructie die op de constructiebasis (3) zijn geplaatst, teneinde te bewerkstelligen dat de kraan (1) op-en-neer beweegbaar is langs de steun- en geleidefaciliteit (2) van de constructie.

2. Werkwijze volgens conclusie 1, **gekenmerkt door** de stap van het:

30 -transporteren van de longitudinale delen (9) van de constructie en de kraan (1) op hetzelfde voertuig (4, 4', 4'') naar de oprichtingsplaats (5).

3. Werkwijze volgens conclusie 1 of 2, **gekenmerkt door** de stap van het:

35 -transporteren van de longitudinale delen (9) van de constructie en de kraan (1) in een horizontale positie op het voertuig (4, 4', 4'') naar de oprichtingsplaats (5); en

-omhoog verstellen van de kraan (1) in een verticale positie teneinde mogelijk te maken dat de kraan (1) gemonteerd wordt op de steun- en geleidefaciliteit (2) van ten minste één van de constructiebasis (3) en de longitudinale delen (9) van de constructie die geplaatst is op de constructiebasis (3).

4. Werkwijze volgens één der voorgaande conclusies 1 - 3, **gekenmerkt door** het bewerkstelligen dat ten minste één van de longitudinale constructiedelen (9) en de kraan (1) voorzien is van afmetingen gelijk of kleiner dan de afmetingen van een standard zeevrachtcontainer.

5. Werkwijze volgens één der voorgaande conclusies 1 - 4, **gekenmerkt door** het bewegen van de kraan (1) vanaf het voertuig (4, 4', 4'') naar een initiële positie op de steun- en geleidefaciliteit (2) die voorzien is op één van de constructiebasis (3) en het longitudinale deel (9') van de constructie dat als eerste is geplaatst op de constructiebasis (3).

6. Werkwijze volgens één der voorgaande conclusies 1 - 5, **gekenmerkt door** het herhaaldelijk positioneren van de kraan (1) op een hoogste niveau (12) van de steun- en geleidefaciliteit (2) van het dan hoogste longitudinale deel van de constructie, en het oppakken met de kraan (1) van een volgend longitudinaal deel (X) van de constructie dat nog rust op het voertuig (4, 4', 4''), en vervolgens plaatsen van genoemd volgend longitudinaal deel (X) bovenop het longitudinale deel dat de kraan (1) draagt, terwijl bewerkstelligd wordt dat de steun- en geleidefaciliteit (2) van de respectievelijke longitudinale delen (9, 9', 9'', 9''', X) van de constructie die op elkaar geplaatst zijn ten opzichte van elkaar in lijn worden gehouden.

7. Werkwijze volgens één der voorgaande conclusies 1 - 6, waarbij de opstaande constructie een windmolen is, **gekenmerkt door** het gebruiken van de kraan (1) voor het oppakken en plaatsen van de windmolengenerator (10) en hub (11) bovenop de opstaande constructie, gevolgd door het gebruiken van de kraan (1) voor het oppakken en plaatsen van de rotorbladen (13) op de hub (11).

8. Werkwijze volgens één der voorgaande conclusies 1 - 7, **gekenmerkt door** het bewerkstelligen dat bij het on-shore

oprichten het voertuig (4) een trailer is, en dat bij het off-shore oprichten het voertuig een, bij voorkeur gestabiliseerd drijvend vaartuig (4') of een jack-up vaartuig (4'') is.

5 9. Werkwijze volgens één der voorgaande conclusies 1
- 8, **gekenmerkt door** het voleindigen van het oprichten van de opstaande constructie door het verwijderen van de kraan (1) en het verwijderen van de steun- en geleidefaciliteit (2) van de longitudinale delen (9, 9', 9'', 9''', X) van de constructie.

10 10. Werkwijze voor het uitvoeren van onderhoud of het
ontmantelen van de opstaande constructie, **gekenmerkt door** het plaatsen van de steun- en geleidefaciliteit (2) langs de longitudinale delen (9, 9', 9'', 9''', X) van de constructie en het monteren van een kraan (1) op de steun- en geleidefaciliteit (2), en toepassen van de kraan (1) voor het verschaffen
15 van onderhoud aan de opstaande constructie of voor het deel voor deel top-down verwijderen van de respectievelijke longitudinale delen (9, 9', 9'', 9''', X) van de constructie.

20 11. Kraan (1) ingericht voor het op-en-neer bewegen langs een verticaal steun- en geleidefaciliteit (2), **gekenmerkt doordat** deze een mast (8) omvat welke op-en-neer beweegbaar is langs de steun- en geleidefaciliteit (2), waarbij de rest van de kraan welke de hijsmiddelen van de kraan omvat, roteerbaar gemonteerd is op de mast (8).

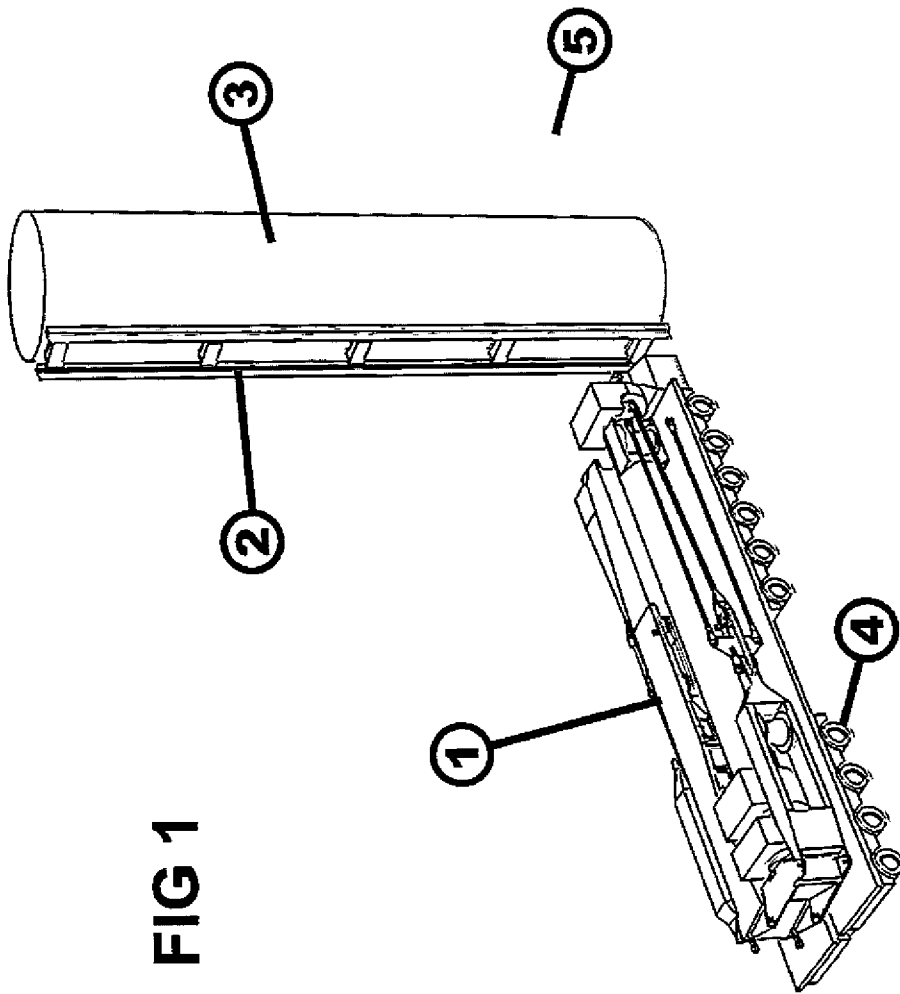


FIG 1

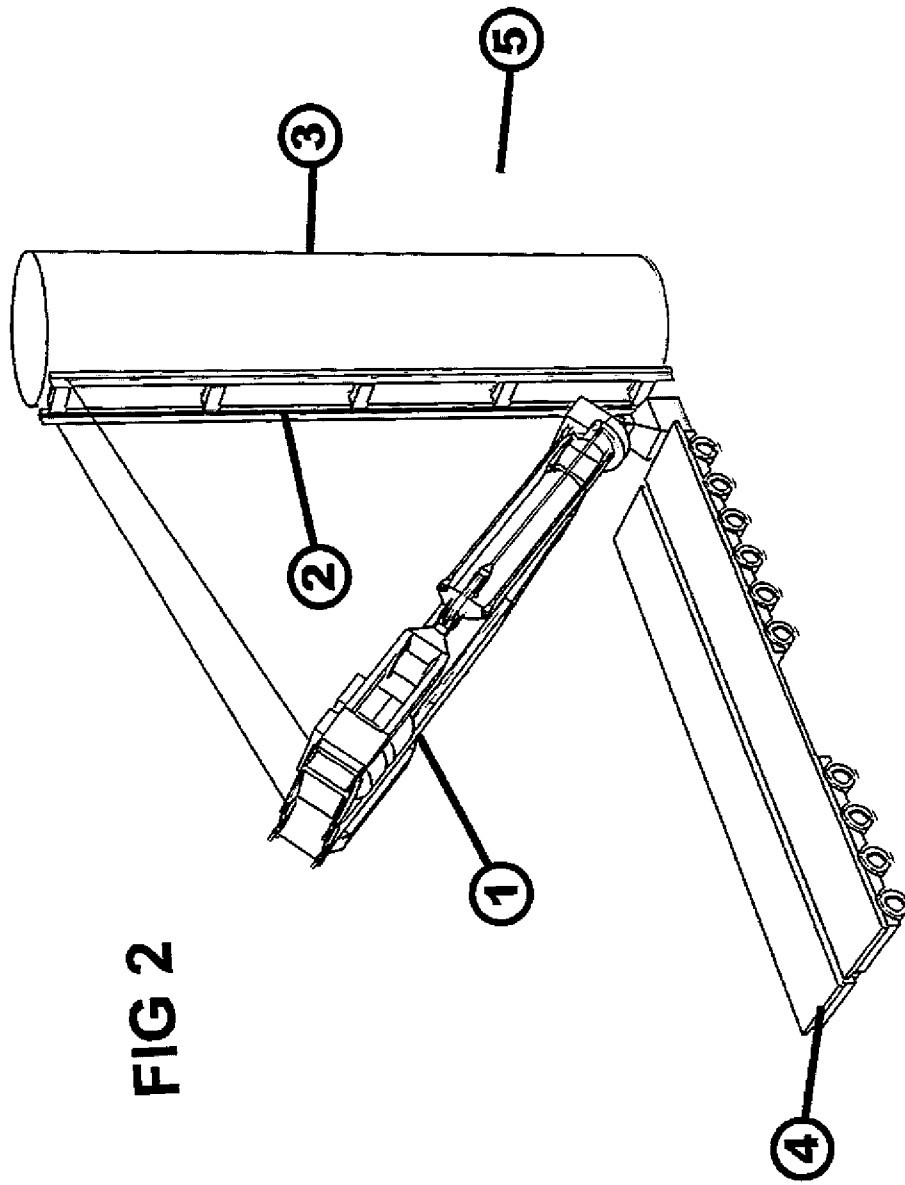


FIG 2

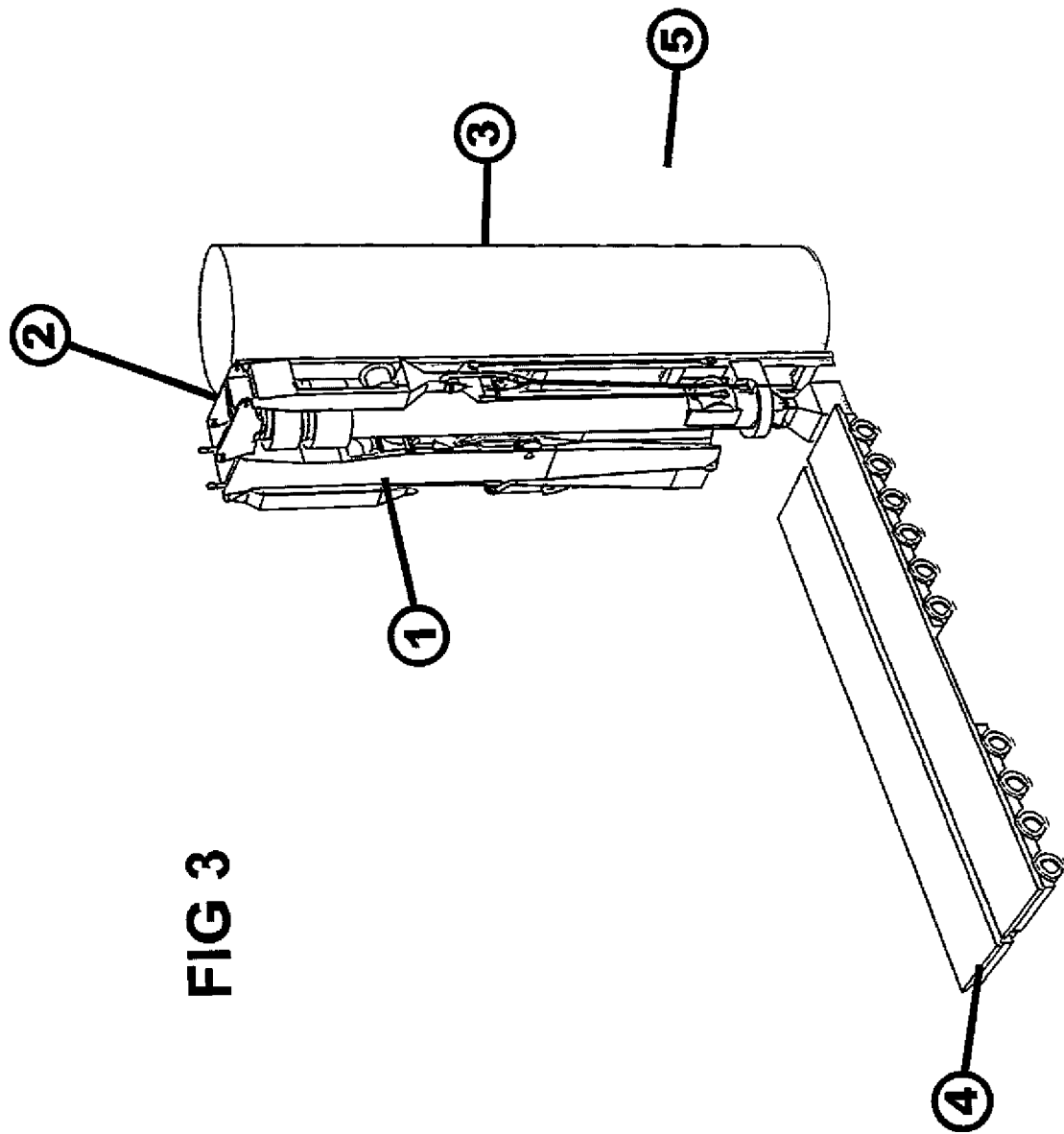
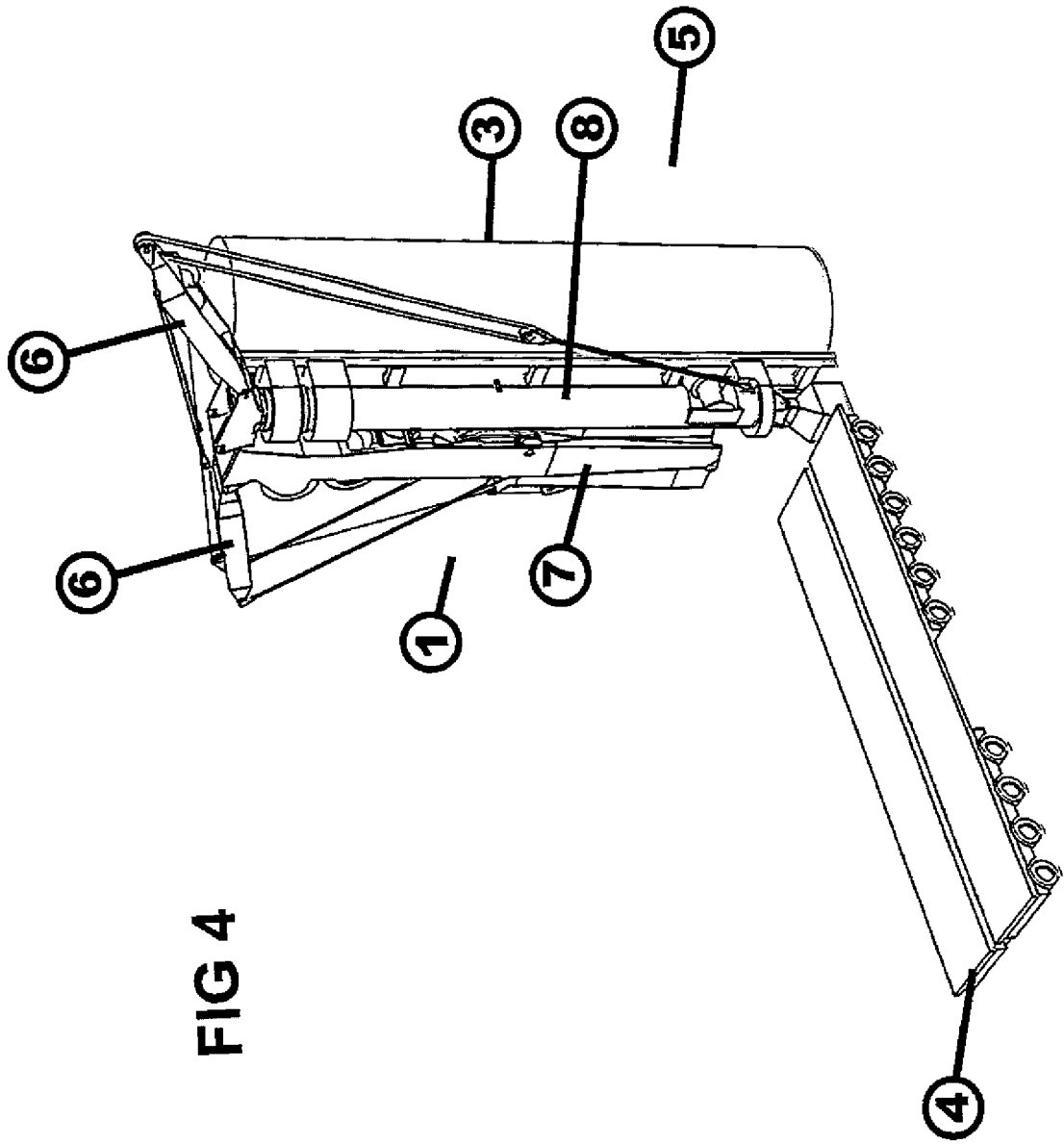


FIG 3



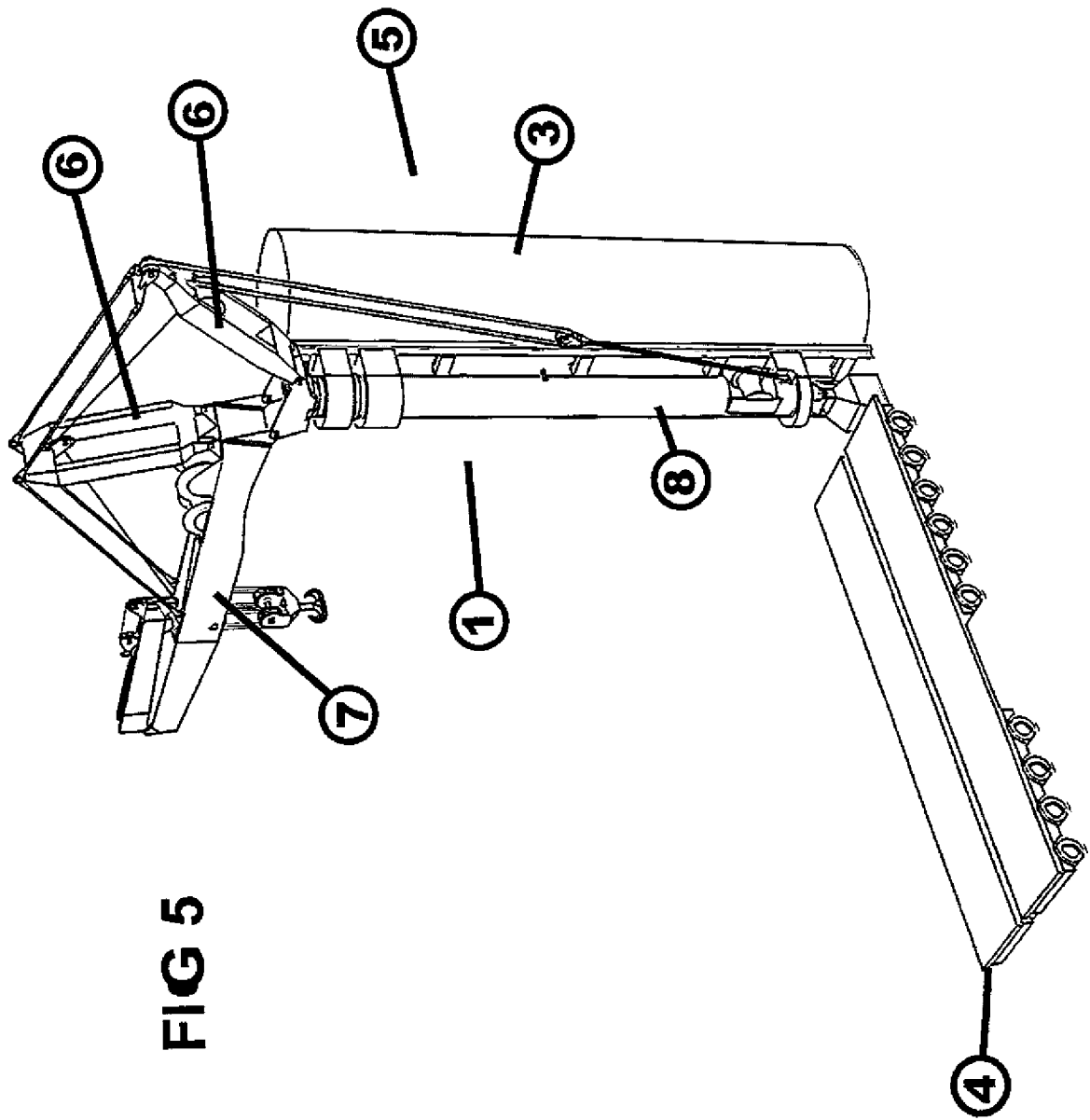


FIG 5

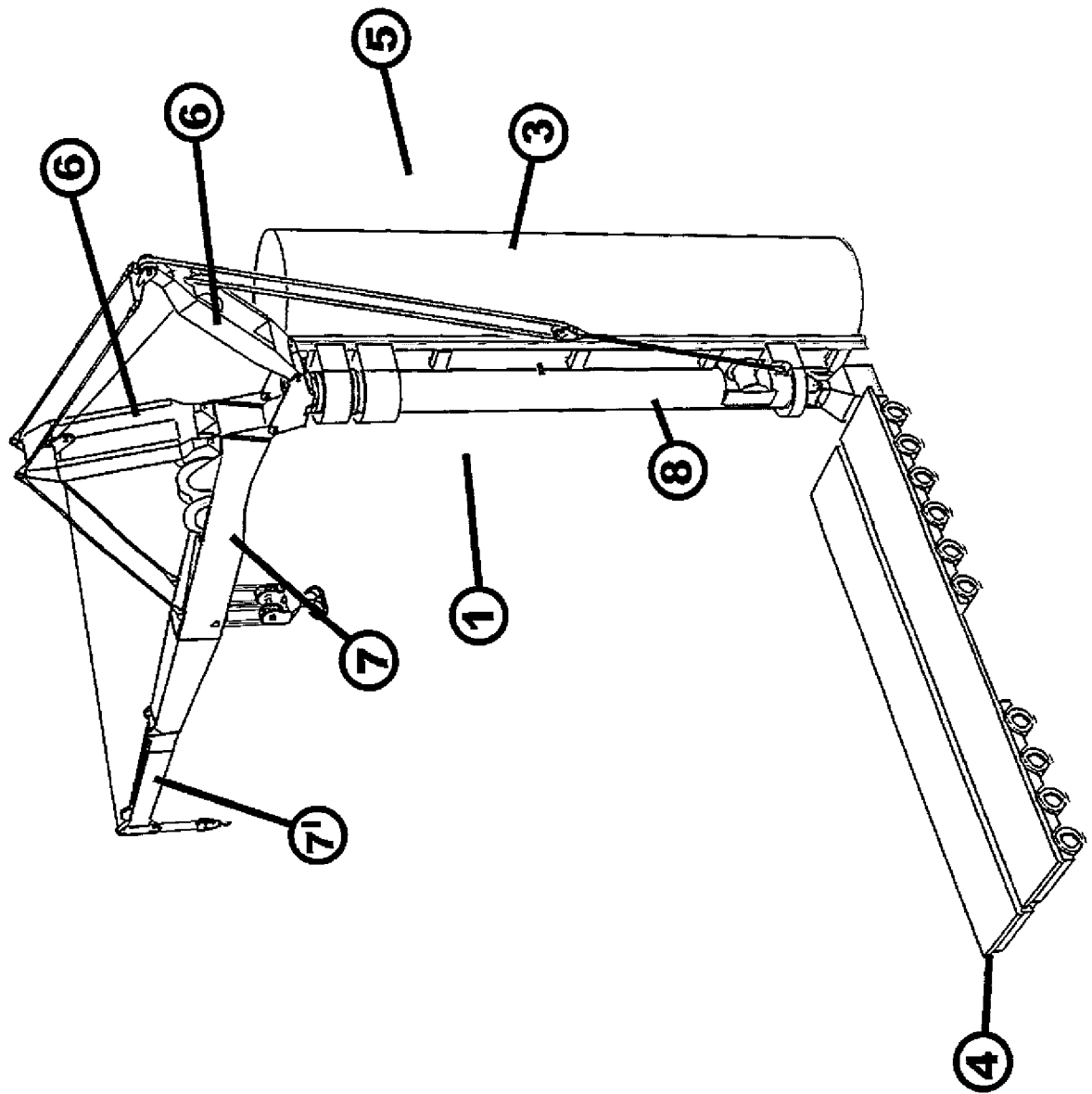


FIG 6

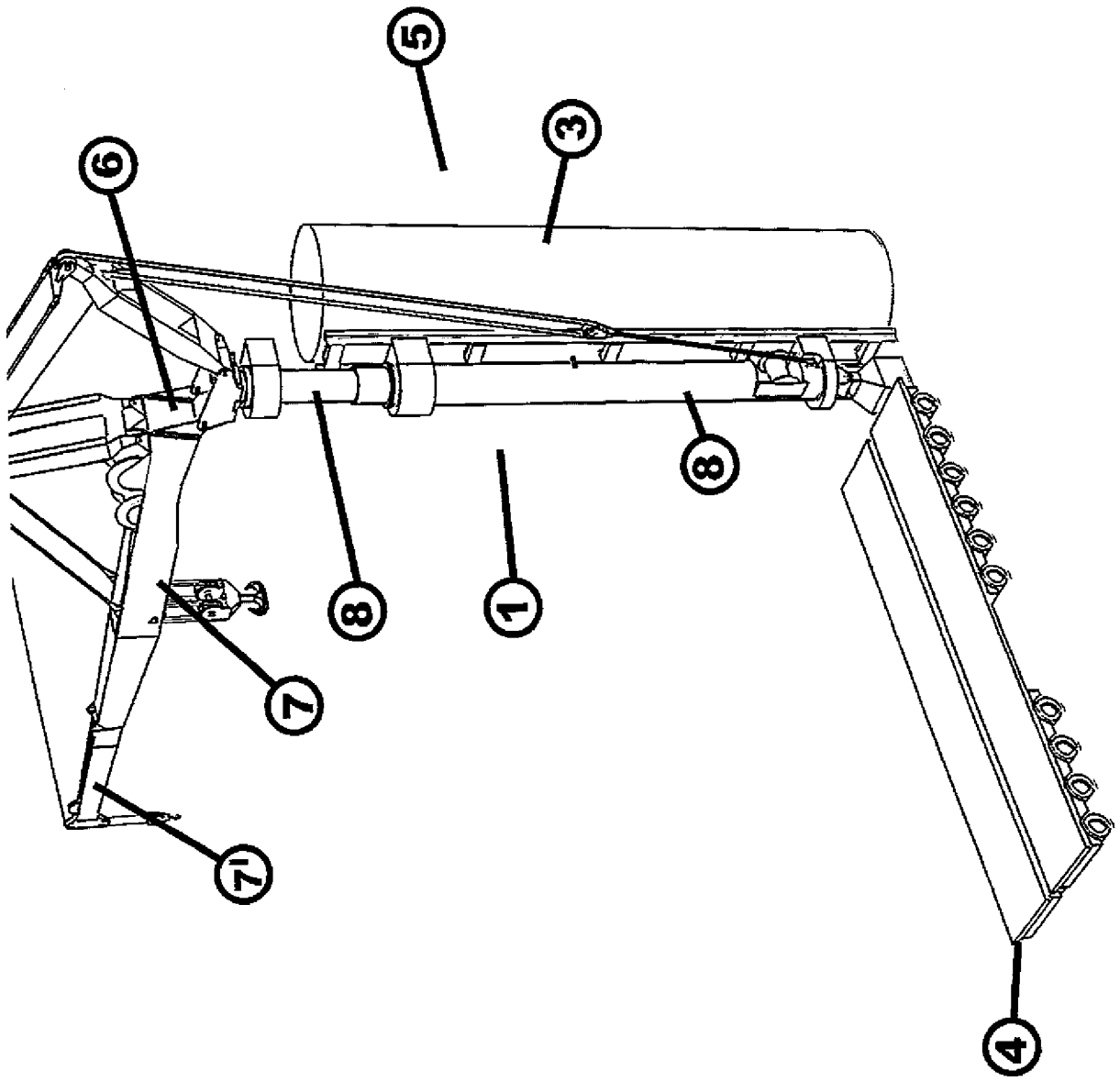
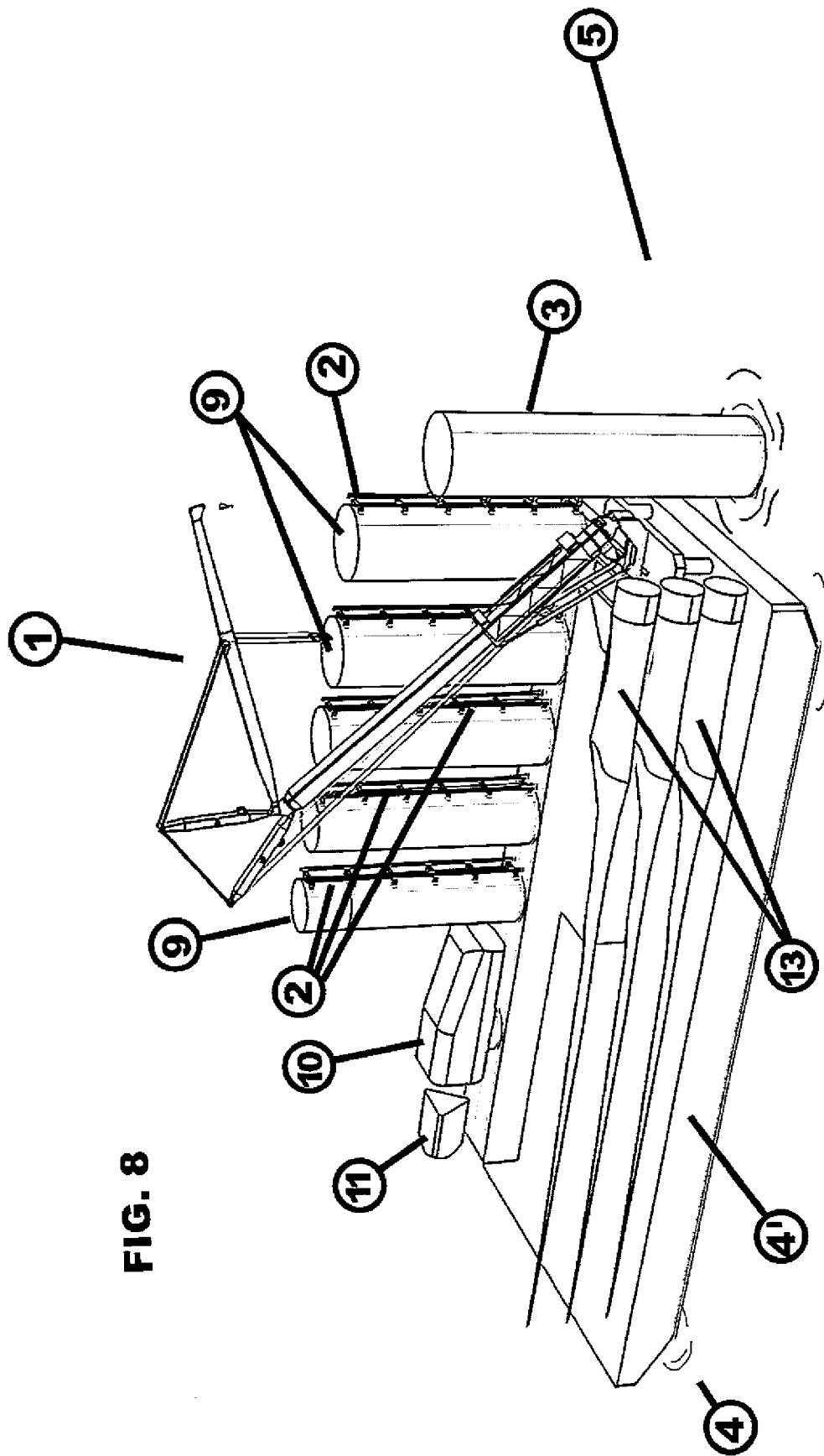
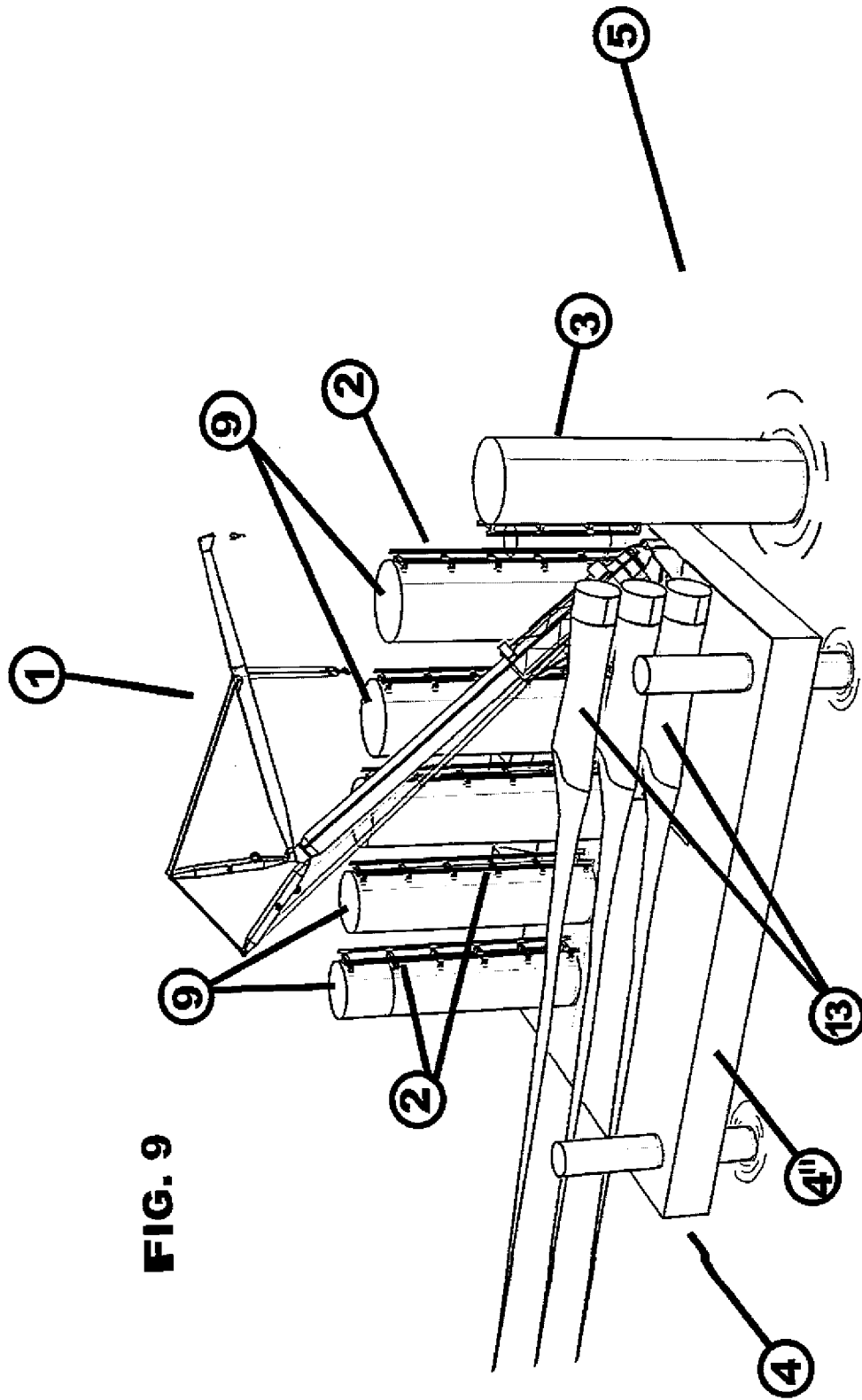
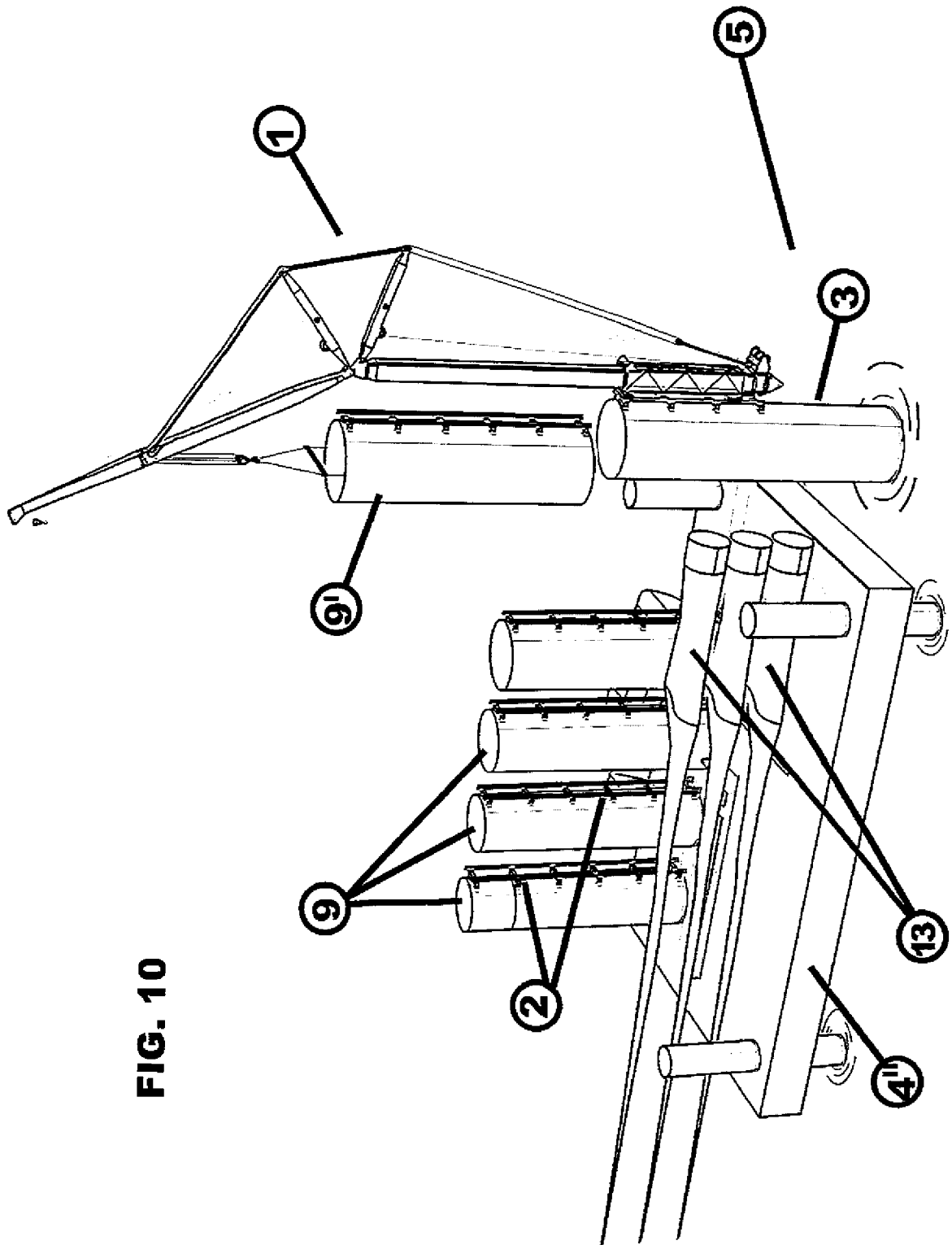


FIG 7







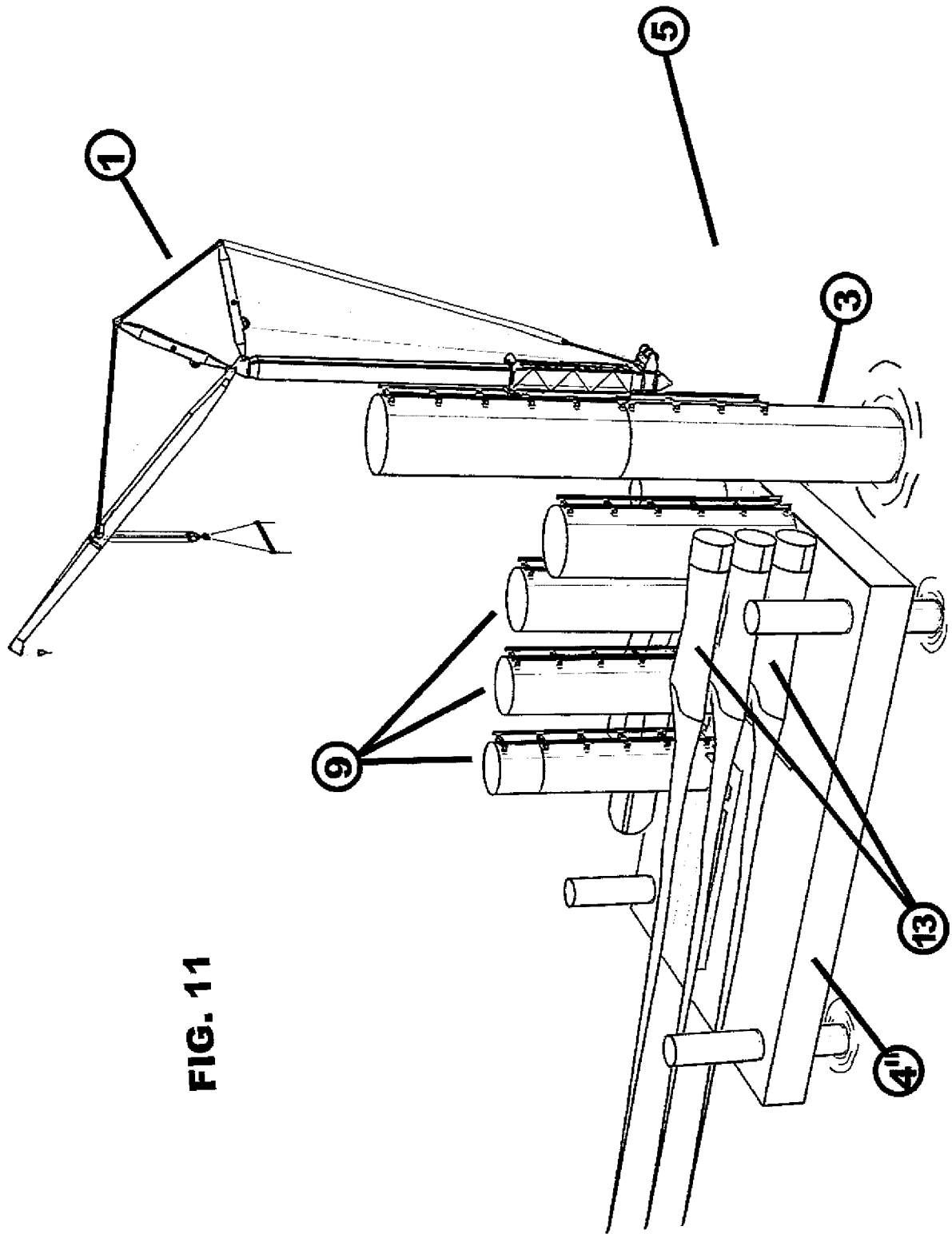


FIG. 11

FIG. 12

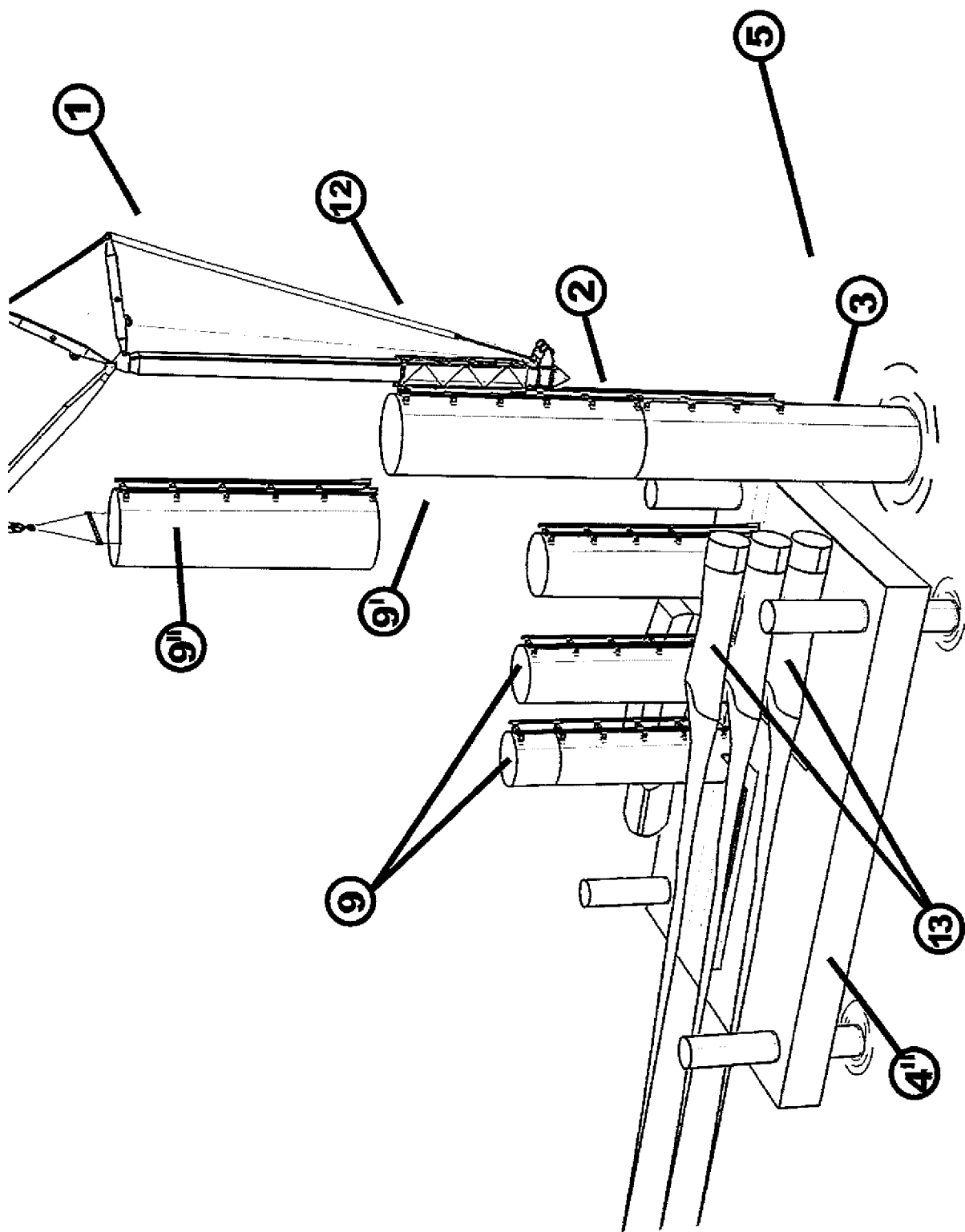


FIG. 13

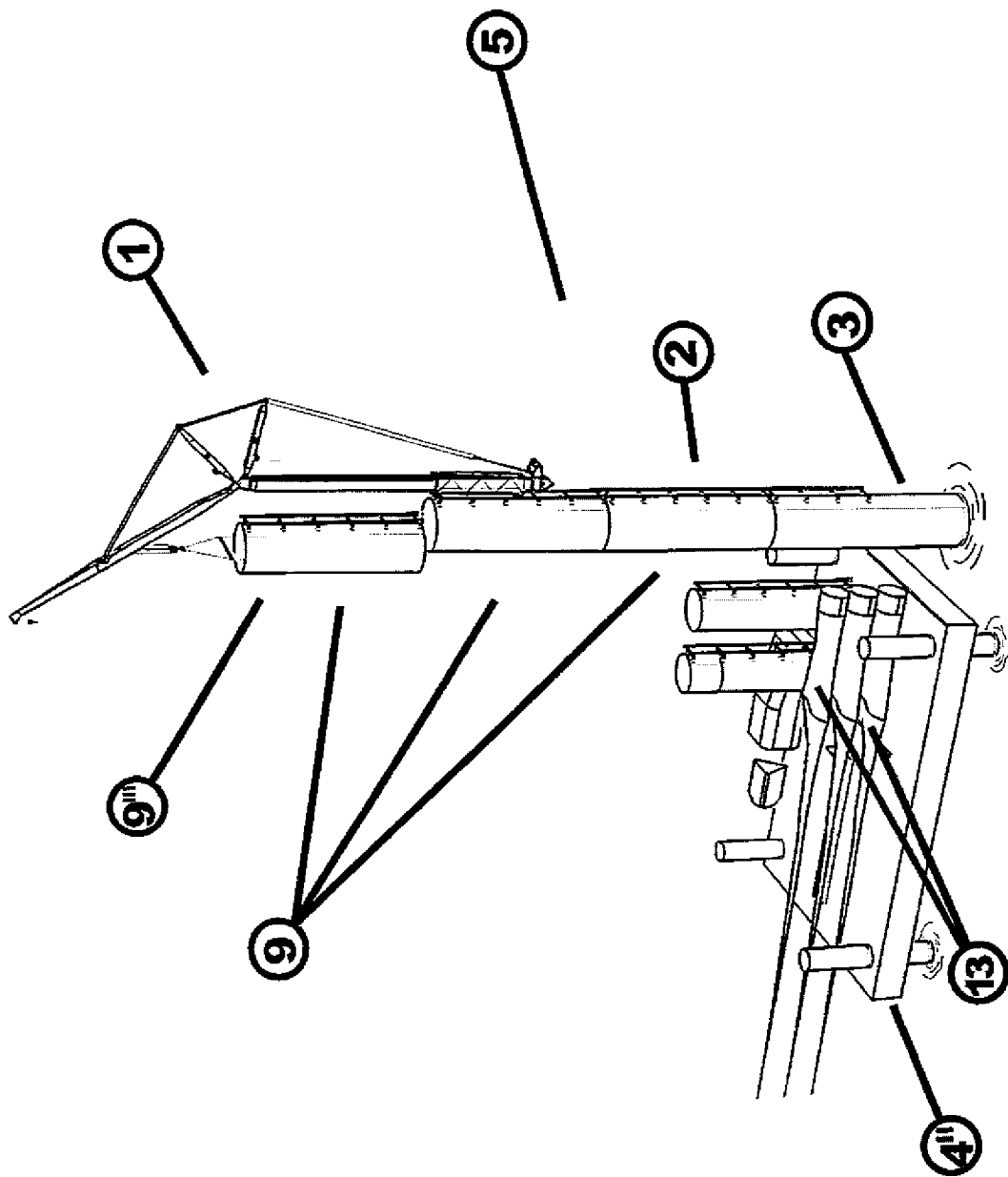
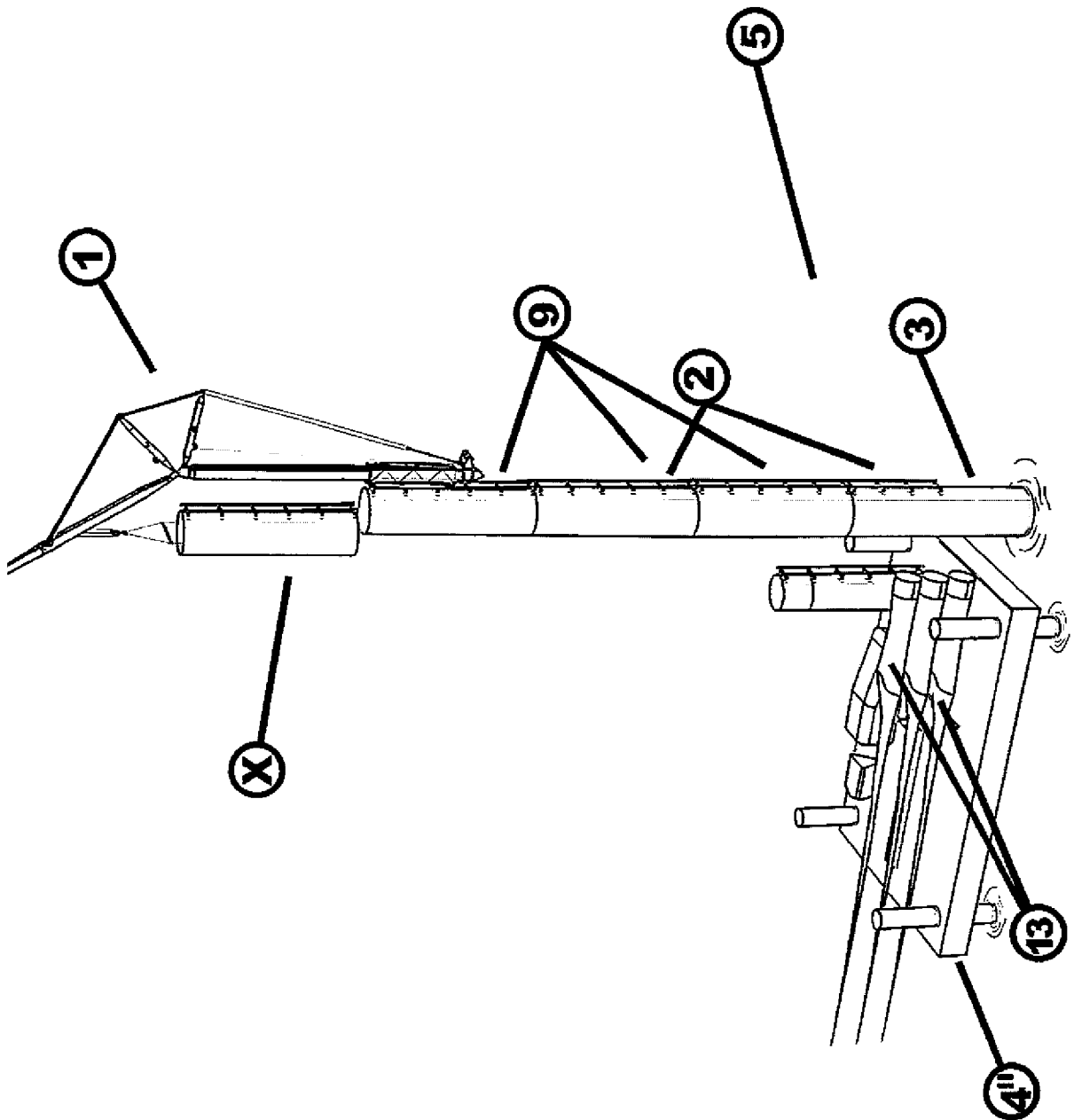


FIG. 14



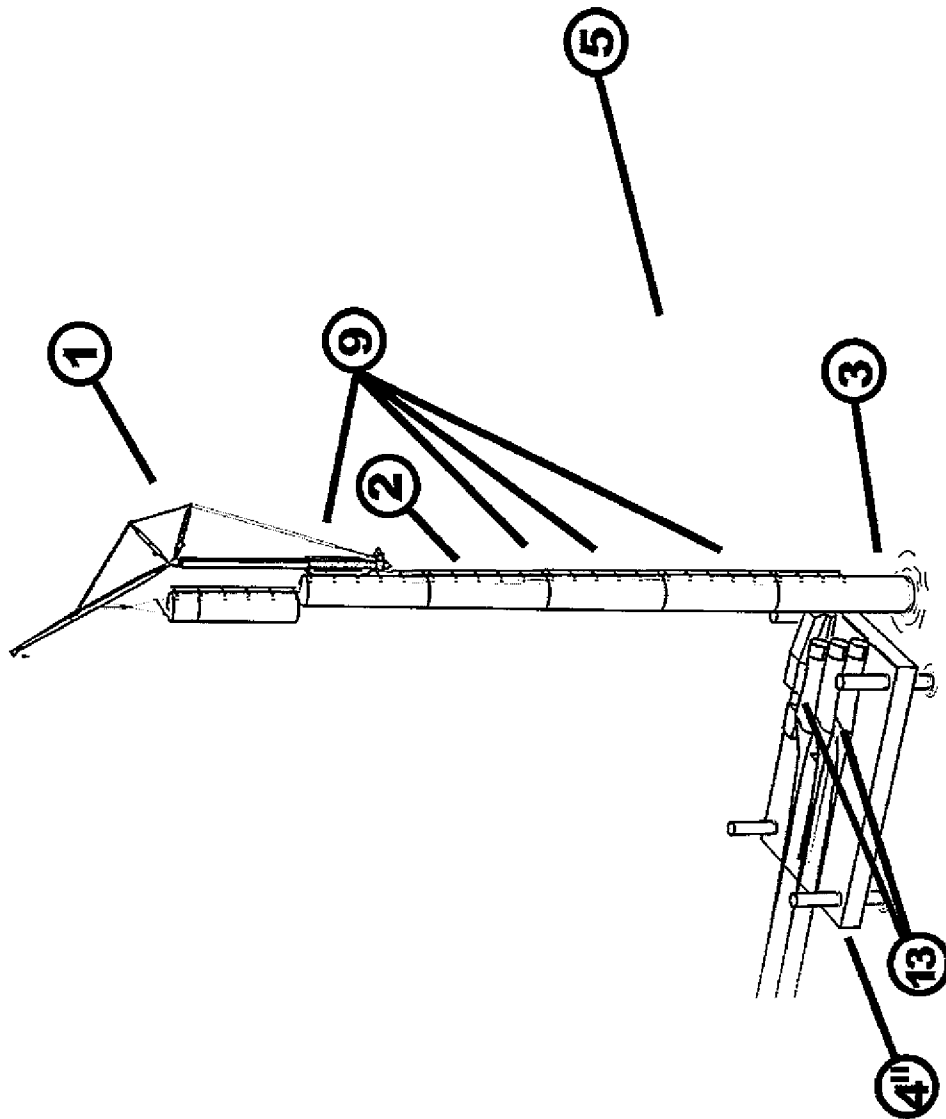


FIG. 15

FIG. 16

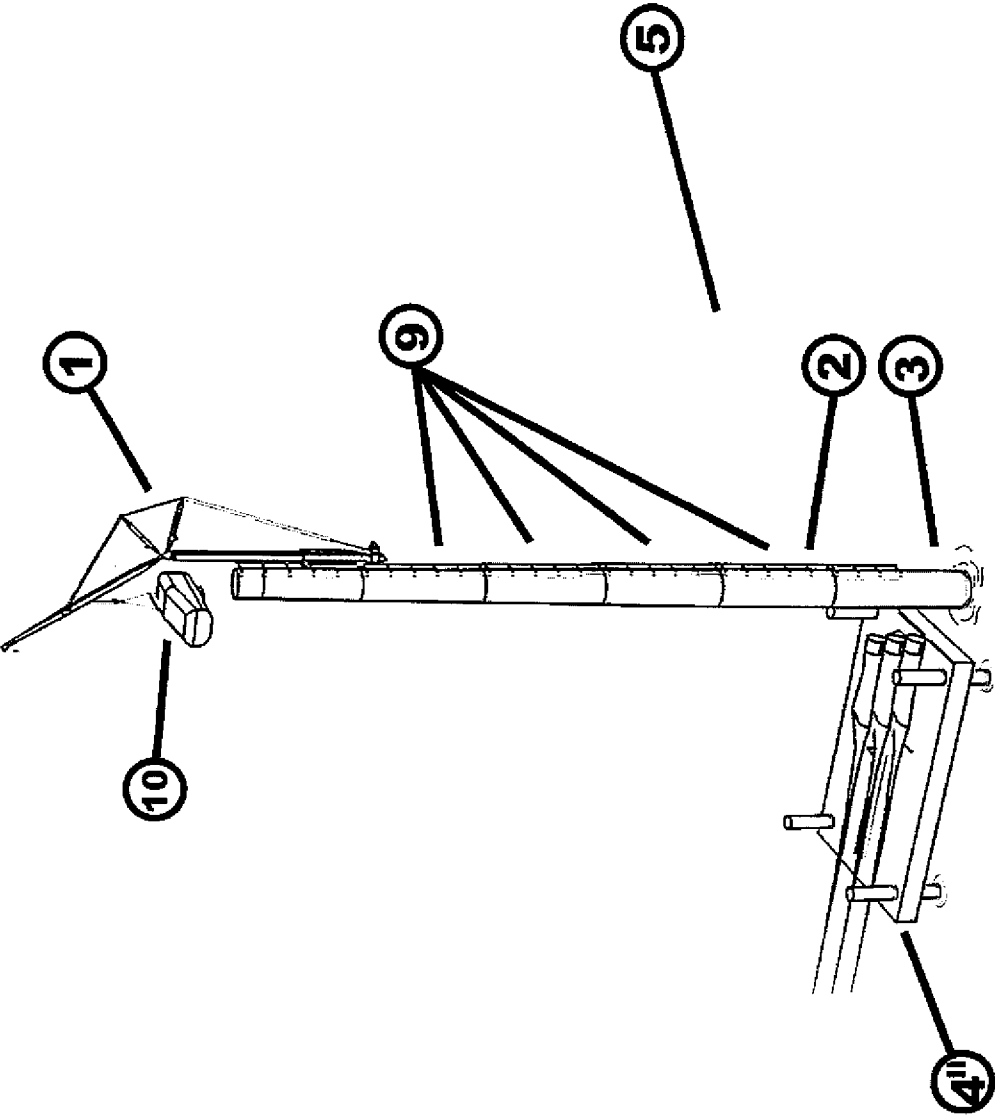
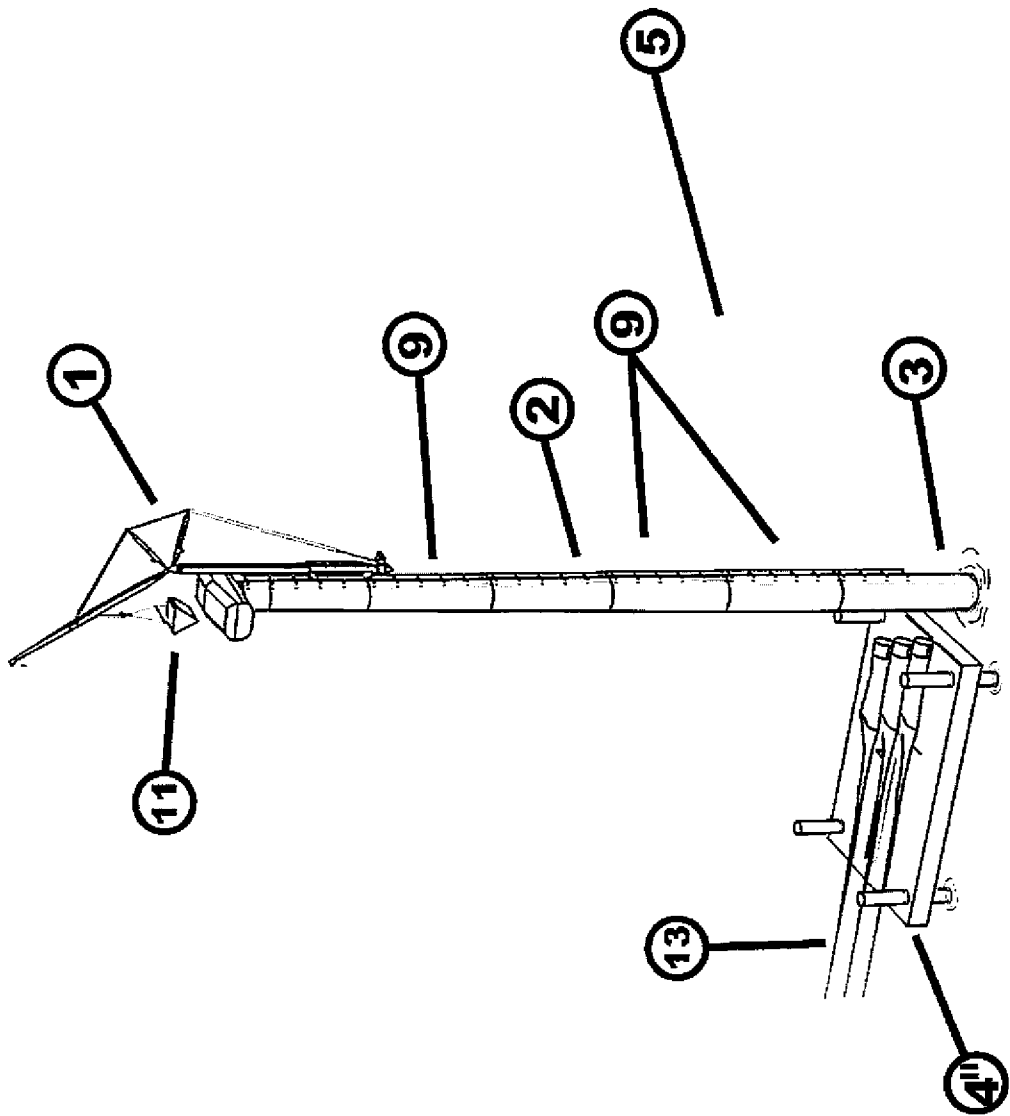


FIG. 17



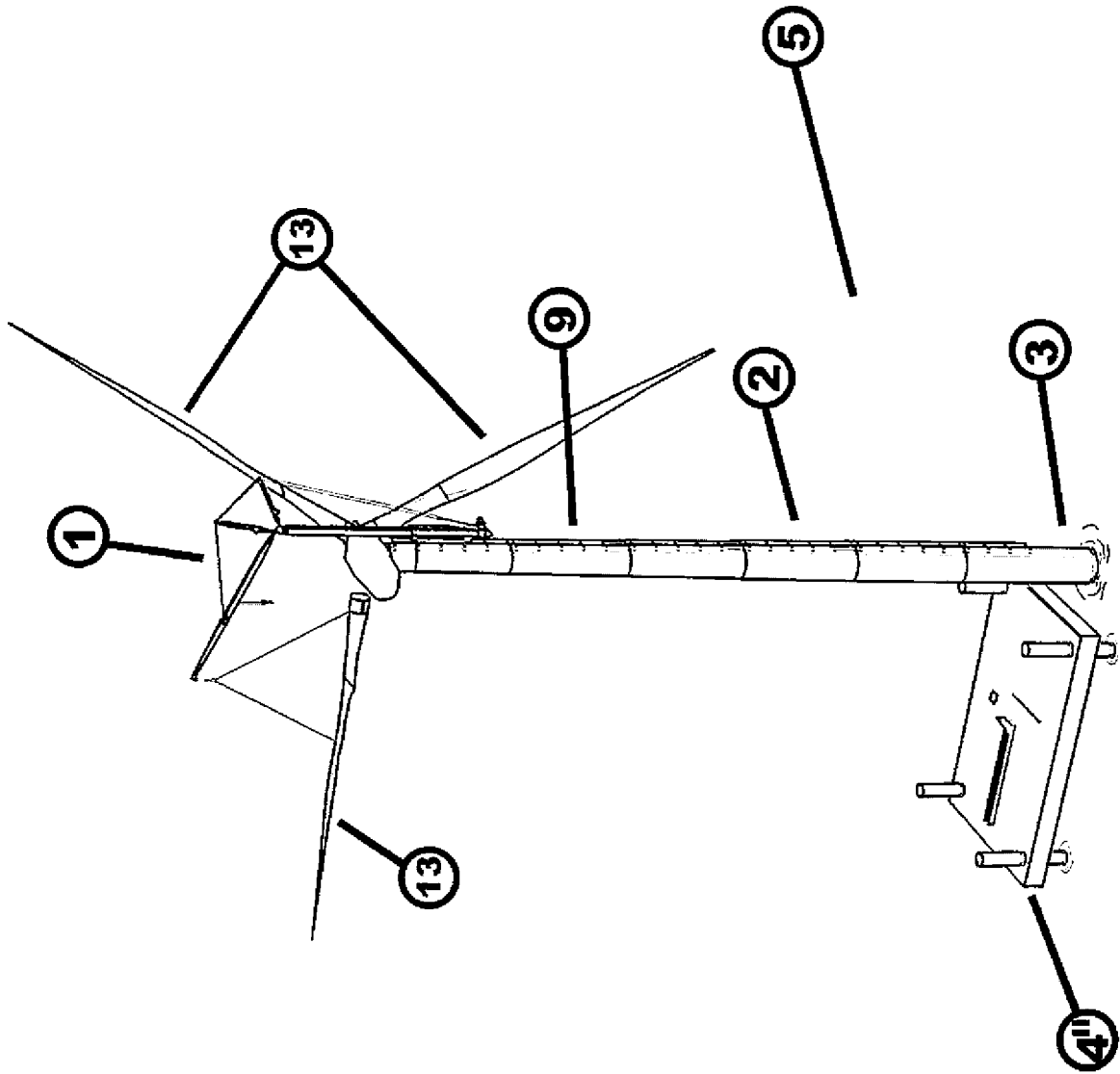


FIG. 18

ABSTRACT

Method for onshore or offshore erecting an upstanding construction comprising longitudinal construction parts (9), in particular parts of a windmill, comprising the steps of

-providing the longitudinal parts (9) of the construction;
5 tion;

-transporting the longitudinal parts (9) of the construction on a vehicle (4, 4', 4'') to an erection site (5);

-providing a crane (1) for hoisting the longitudinal parts (9) of the construction;

10 -using the crane (1) for placing the respective longitudinal parts (9) of the construction on top of each other on a construction base (3) at the erection site (5);

-providing the construction base (3) and/or the longitudinal parts (9) of the construction with a support and guide
15 facility (2) for the crane (1);

-arranging that the crane (1) is mountable on the support and guide facility (2); and

-mounting the crane (1) on the support and guide facility (2) of at least one of the construction base (3) and the
20 longitudinal parts (9) of the construction that is placed on the construction base (3), so as to arrange that the crane (1) is movable up and down along the support and guide facility (2) of the construction.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE 	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE 4H/2TS87/RA/3				
Nederlands aanvraag nr. 2018176	Indieningsdatum 16-01-2017				
	Ingeroepen voorrangsdatum 				
Aanvrager (Naam) Mammoet Holding B.V					
Datum van het verzoek voor een onderzoek van internationaal type 11-03-2017	Door de instantie voor internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. SN68568				
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven) Volgens de internationale classificatie (IPC) B66C23/20;B66C23/18;B66C23/32;F03D13/10;F03D13/20;E04H12/34					
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK Onderzochte minimumdocumentatie <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Classificatiesysteem</td> <td>Classificatiesymbolen</td> </tr> <tr> <td style="text-align: center;">IPC</td> <td>B66C;F03D;E04H</td> </tr> </table>		Classificatiesysteem	Classificatiesymbolen	IPC	B66C;F03D;E04H
Classificatiesysteem	Classificatiesymbolen				
IPC	B66C;F03D;E04H				
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen 					
III.	☐ GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)				
IV.	☐ GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)				

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018176

A. CLASSIFICATIE VAN HET ONDERWERP

INV. B66C23/20 B66C23/18 B66C23/32 F03D13/10 F03D13/20
E04H12/34

ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)

B66C F03D E04H

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	WO 2014/082176 A1 (MARMEN INC [CA]) 5 juni 2014 (2014-06-05)	1,2,4,6, 7,9,11
Y	* samenvatting * * alinea [0078] - alinea [0079] * * alinea [0089] - alinea [0090] * * alinea [0080] - alinea [0087] * * figuren * * 66: two longitudinally-extending rail members having apertures *	3,5,8,10
Y	JP S51 62222 U (MITSUBISHI HEAVY INDUSTRIES, LTD) 17 mei 1976 (1976-05-17)	1
A	* figuren * ----- -/-	10,11



Verdere documenten worden vermeld in het vervolg van vak C.



Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

* Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvraag vermeld

"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"Z" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

19 september 2017

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

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De bevoegde ambtenaar

Guthmuller, Jacques

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2018176

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
Y	DE 196 47 515 A1 (OTTO GERD ALBRECHT [DE]) 20 mei 1998 (1998-05-20) * samenvatting * * kolom 2, regel 20 - kolom 4, regel 44 * * figuren *	1,3,5,8
Y	EP 2 908 000 A2 (GARCIA DE LA PEÑA RAZQUIN JULIO [ES]; HALS TORALF [DE]) 19 augustus 2015 (2015-08-19)	10
A	* samenvatting * * alinea [0023] * * conclusie 1 * * figuren *	1
A	US 2002/047277 A1 (WILLIS JEFFREY O [US] ET AL) 25 april 2002 (2002-04-25) * samenvatting * * figuren 3A, 3B, 4-12, 15-20 *	1-3,10, 11
A	FR 2 903 739 A1 (EOLE OVERSEAS COMPANY LTD [CY]) 18 januari 2008 (2008-01-18) * samenvatting * * figuren *	1-3,11
A	EP 1 350 953 A2 (TORRES MARTINEZ M [ES]) 8 oktober 2003 (2003-10-08) * samenvatting * * figuren *	1-3,10, 11
A	DE 197 41 988 A1 (PEITER KARIN [DE]) 1 april 1999 (1999-04-01) * samenvatting * * figuren * * conclusies 1, 3 *	1,10,11
A	JP H11 82285 A (NIPPON KOKAN KK) 26 maart 1999 (1999-03-26) * samenvatting * * figuren 1-5 *	1,10,11

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018176

In het rapport genoemd octrooigescrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
WO 2014082176	A1	05-06-2014	CA 2892651 A1 05-06-2014
			EP 2925942 A1 07-10-2015
			US 2015300037 A1 22-10-2015
			WO 2014082176 A1 05-06-2014
JP S5162222	U	17-05-1976	JP S5162222 U 17-05-1976
			JP S5435489 Y2 27-10-1979
DE 19647515	A1	20-05-1998	GEEN
EP 2908000	A2	19-08-2015	EP 2908000 A2 19-08-2015
			ES 2630904 T3 25-08-2017
			US 2015298943 A1 22-10-2015
			WO 2012175766 A2 27-12-2012
US 2002047277	A1	25-04-2002	EP 1417413 A1 12-05-2004
			US 2002047277 A1 25-04-2002
			US 2002171247 A1 21-11-2002
			WO 03029650 A1 10-04-2003
FR 2903739	A1	18-01-2008	AU 2007321076 A1 22-05-2008
			DK 2041429 T3 18-02-2013
			EP 2041429 A1 01-04-2009
			ES 2402735 T3 08-05-2013
			FR 2903739 A1 18-01-2008
			US 2010101086 A1 29-04-2010
			WO 2008059118 A1 22-05-2008
EP 1350953	A2	08-10-2003	EP 1350953 A2 08-10-2003
			ES 2206014 A1 01-05-2004
			US 2003183594 A1 02-10-2003
DE 19741988	A1	01-04-1999	GEEN
JP H1182285	A	26-03-1999	GEEN

WRITTEN OPINION

File No. SN68568	Filing date (day/month/year) 16.01.2017	Priority date (day/month/year)	Application No. NL2018176
International Patent Classification (IPC) INV. B66C23/20 B66C23/18 B66C23/32 F03D13/10 F03D13/20 E04H12/34			
Applicant Mammoet Holding B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner Guthmuller, Jacques
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WRITTEN OPINION

Application number

NL2018176

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	2, 3, 5, 8-10
	No: Claims	1, 4, 6, 7, 11
Inventive step	Yes: Claims	
	No: Claims	1-11
Industrial applicability	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number

NL2018176

Box No. VII Certain defects in the application

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1 WO 2014/082176 A1 (MARMEN INC [CA]); (2014-06-05)

D2 JP S51 62222 U (MITSUBISHI HEAVY INDUSTRIES, LTD);
(1976-05-17)

D3 DE 196 47 515 A1 (OTTO GERD ALBRECHT [DE]); (1998-05-20)

D4 EP 2 908 000 A2 (GARCIA DE LA PEÑA RAZQUIN JULIO [ES] et al.); (2015-08-19)

2 **Concerning independent method claim 1:**

2.1 The present application does not meet the criteria of patentability, because the subject-matter of method claim 1 is not new.

Document D1 discloses:

Werkwijze voor het on-shore of offshore oprichten van een staande constructie omvattende longitudinale constructiedelen (22), in het bijzonder delen van een windmolen [see figure 1],

omvattende de stappen [see all the relevant passages mentioned in the search report] van het:

- verschaffen [obvious] van de longitudinale delen (22) van de constructie;
- transporteren van de longitudinale delen (22) van de constructie op een voertuig naar een oprichtingsplaats;
- verschaffen [obvious] van een kraan (68) voor het ophijzen van de longitudinale delen (22) van de constructie;
- gebruiken [obvious] van de kraan (68) voor het plaatsen van de respectievelijke longitudinale delen (22) van de constructie bovenop elkaar op een constructiebasis ter plaatse van de oprichtingsplaats;

en de stappen van het:

- voorzien van de constructiebasis en/of de longitudinale delen (22) van de constructie van een steun- en geleidingsfaciliteit (66) voor de kraan (see especially the paragraphs [0078]-[0087] together with the figures 2-7);
- bewerkstelligen dat de kraan (68) monteerbaar is op de steun- en geleidingsfaciliteit (66; see again the paragraphs [0078]-[0087] together with the figures 2-7); en
- monteren van de kraan (68) op de steun- en geleidefaciliteit (66) van ten minste één van de constructiebasis en de longitudinale delen (22) van de constructie, teneinde te bewerkstelligen dat de kraan (68) op-en-neer beweegbaar is langs de steun- en geleidefaciliteit (66) van de constructie (*see again all the relevant passages mentioned in the search report*).

2.2 Additionally to point 1.1,

it is to be noted that independent method claim 1 does not involve an inventive step, when considering the obvious combination of the documents D2 [see the figures] & D3 [see especially: column 2, line 68 - column 3, line 11 together with the figures 1 & 2].

2.3 As an alternative to the two preceding points 1.1 & 1.2,

if the applicant were to object that D1 does not unambiguously disclose the method as claimed in independent claim 1, note that method claim 1 does certainly not involve an inventive step, when considering the obvious combination of the documents D3 [see especially: column 2, line 68 - column 3, line 11 together with the figures 1 & 2] & D1 [see again the relevant passages mentioned in the search report].

3 Concerning the dependent claims 2 to 9:

3.1 The dependent method claims 4, 6, 7 do not contain any features which, in combination with the features of claim 1 to which they refer, meet the requirements of novelty.

Document D1 [see again the relevant passages mentioned in the search report] does also disclose all the additional elements and steps as recited in the depending method claims 4, 6, 7.

Consequently, the subject-matter of claims 4, 6, 7 also lacks novelty.

3.2 The dependent method claims 2, 3, 5, 8, 9 do not contain any features which, in combination with the features of claim 1 to which they refer, meet the requirements inventive step.

- 3.2.1 In dependent claim 2, a slight change in the method of claim 1 is defined [*transporteren van de delen van de constructie en de kraan op hetzelfde voertuig*] which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen.

Consequently, the subject-matter of claim 2 also lacks an inventive step.

- 3.2.2 The obvious combination of the documents D1 [*see again the relevant passages mentioned in the search report*] and D3 [*see the abstract, the figures & column 2, line 20 - column 4, line 44*] discloses or at least strongly suggest all the elements and steps recited in the depending claims 3, 5 and 8.

Consequently, said claims also lack an inventive step.

- 3.2.3 In dependent claim 9, a slight change in the method of claim 1 is defined [*het voleindigen van het oprichten van de opstaande constructie door het verwijderen van de kraan en het verwijderen van de steun- en geleidefaciliteit van de longitudinale delen van de constructie*] which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen.

Consequently, the subject-matter of claim 9 also lacks an inventive step.

4 **Concerning the second independent method claim 10:**

The subject-matter of claim 10 does certainly not involve an inventive step, because the obvious combination of the documents D1 [*see again the relevant passages mentioned in the search report*] and D4 [*see the abstract, paragraph [0023], claim 1, the figures*] discloses or at least strongly suggest all the elements and steps recited in method claim 10.

5 **Concerning independent apparatus claim 11:**

The present application does not meet the criteria of patentability, because the subject-matter of apparatus claim 11 is not new. Document D1 [*see again the relevant passages mentioned in the search report*] discloses:

Kraan (68) ingericht voor het op-en-neer bewegen langs een verticaal steun- en geleidefaciliteit (66), **waarbij** deze een mast (see: 72) omvat welke op-en-neer beweegbaar is langs de steun- en geleidefaciliteit (66), waarbij de rest van de kraan welke de hijsmiddelen van de kraan omvat, roteerbaar gemonteerd is op de mast (*see again the cited passages*).

Re Item VII

Certain defects in the application

- 6 A document reflecting the prior art is evoked on page 3 of the description, but not identified - *by a reference sign* - in said description.

- 7 The relevant background art disclosed in D1 throughout D4 is not mentioned in the description, nor are these documents identified therein.