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(54) **MOBILE DISTRIBUTOR APPARATUS FOR DISTRIBUTING THICK MATTER**

(57) The present invention relates to a mobile distributor apparatus for distributing thick matter, such as uncured concrete. The mobile distributor apparatus comprises a frame, a steering mechanism; a rotatable drum with a hose wound thereon, a hose-guide, and a distributor arm.

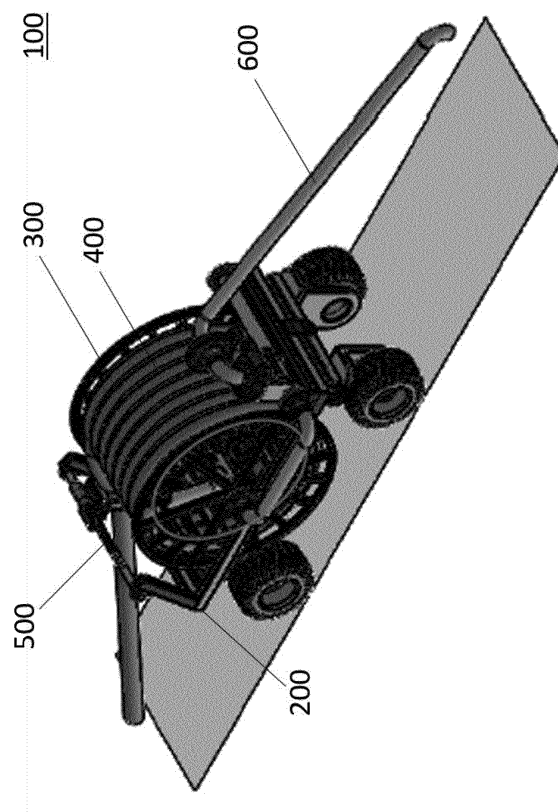


Fig. 1

Description

Technical field of the invention

[0001] The present invention relates to distribution of thick matter, such as uncured concrete. More particularly, the present invention relates to mobile distributor apparatuses for distributing thick matter, such as uncured concrete.

Background of the invention

[0002] Developments in concrete construction methods include the mechanized transfer of concrete from a source, such as a ready-mix concrete truck or the like, to a relatively remote and/or confined location on the building or construction site. This permits the positioning of the heavy-duty concrete trucks at a convenient location in spaced relation to the application points, and avoids the difficult and time-consuming manual transfer of the concrete from the truck to the application point. However, even with motorized wheelbarrows and the like, the transfer requires a suitable path as well as a significant amount of time to effectively distribute the concrete. This not only results in a relatively high labor cost, but also results in a significant delivery time for the ready-mix truck or the like.

[0003] Other systems have employed a mobile concrete pump unit with a detachable conduit hose of a flexible material, which is manually mounted along a predetermined path or the like. The flexible hose is heavy and requires a plurality of workers to manipulate the hose. Furthermore, it is extremely difficult to evenly distribute the discharging material, and additional personnel is required to more evenly spread the concrete material.

Summary of the invention

[0004] It is an object of the present invention to overcome the above mentioned problems.

[0005] One aspect relates to a mobile distributor apparatus for distributing thick matter, in particular for distributing uncured concrete, comprising:

- a frame supported for movement over a surface by wheels or belts;
- a steering mechanism associated with the wheels or belts;
- a rotatable drum with a hose wound thereon in a plurality of side-by-side convolutions in at least one layer;
- a hose-guide reciprocated parallel to the axis of rotation of the rotatable drum as said drum is rotated; and
- a distributor arm connected to the outlet of the hose;

wherein the inlet of the hose comprises means for releasably fastening to the outlet of a thick matter pump

unit; wherein the rotatable drum is a) configured to unwind the hose as the mobile distributor apparatus moves forward, whereby the unwound hose is placed behind the mobile distributor apparatus and b) configured to rewind the hose as the mobile distributor apparatus moves backward.

[0006] Another aspect relates to a mobile distributor apparatus for distributing thick matter, in particular for distributing uncured concrete, comprising:

- a rotatable drum with a hose wound thereon in a plurality of side-by-side convolutions in at least one layer;
- a hose-guide reciprocated parallel to the axis of rotation of the rotatable drum as said drum is rotated; and
- a distributor arm connected to the outlet of the hose;

wherein the inlet of the hose comprises means for releasably fastening to the outlet of a thick matter pump unit; wherein the rotatable drum is a) configured to unwind the hose as the mobile distributor apparatus moves forward, whereby the unwound hose is placed behind the mobile distributor apparatus and b) configured to rewind the hose as the mobile distributor apparatus moves backward.

[0007] The present invention relates to a mobile distributor apparatus comprising a frame, a steering mechanism, a rotatable drum with a hose wound thereon, a hose-guide, and a distributor arm.

[0008] The frame is supported for movement over a surface by wheels or belts, and the steering mechanism is associated therewith.

[0009] The hose is wound on the rotatable drum in a plurality of side-by-side convolutions in at least one layer. The hose and the rotatable drum makes it possible for the mobile distributor apparatus to move away from the thick matter pump unit, such as a heavy-duty concrete truck, from which it is coupled when active. Hence, the hose leaves the rotatable drum as the mobile distributor apparatus moves forward, and is thereby placed behind the mobile distributor apparatus. When the mobile distributor apparatus moves backward, the hose will be rewound by the rotatable drum. In one or more embodiments, the rotatable drum is configured to unwind the hose as the mobile distributor apparatus moves forward. In one or more embodiments, the rotatable drum is configured to rewind the hose as the mobile distributor apparatus moves backward.

[0010] In one or more embodiments, during an unwinding operation, when the hose is unwound from the rotatable drum at a speed above a pre-set speed, a motor unit is configured to increase torque in the opposite direction of the rotatable drum rotation until the speed has reached the pre-set speed. This configuration is present to avoid an uncontrolled unwinding of the rotatable drum during the forward movement of the mobile distributor apparatus.

[0011] In one or more embodiments, a motor unit configured to rotate the rotatable drum is further configured to oppose the unwinding operation with a counterforce. This configuration is present to avoid an uncontrolled unwinding of the rotatable drum during the forward movement of the mobile distributor apparatus.

[0012] In one or more embodiments, the rotatable drum is adapted to unwind and rewind the hose with a speed adjusted to the speed of the mobile distributor apparatus.

[0013] In one or more embodiments, the rotatable drum is coupled to the wheels by a speed reduction gear unit. This is to overcome the differences in diameter of the wheels and the drum, whereby the rotatable drum can unwind and rewind the hose with a speed adjusted to the speed of the mobile distributor apparatus.

[0014] The hose-guide is reciprocated parallel to the axis of rotation of the rotatable drum as said drum is rotated. Thereby, the hose is positioned in the right position on the drum during unwinding and rewinding.

[0015] In one or more embodiments, the distributor arm comprises a rotary joint connected to the frame such that the distributor arm can move from a position along a side of the mobile distributor apparatus and up to 270 degrees horizontally relative thereto. This configuration allows for a very compact mobile distributor apparatus where the distributor arm is protected during storage and positioning. The distributor arm will only swing out when needed for the distributing operation.

[0016] In one or more embodiments, the frame is supported for movement over a surface by wheels, and wherein the rotatable drum is coupled to the wheels by a speed reduction gear unit. This is to overcome the differences in diameter of the wheels and the drum.

[0017] In one or more embodiments, the distributor arm is configured for up/down and sideways movement. This configuration makes it easier to distribute the thick matter within a confined space.

[0018] In one or more embodiments, the mobile distributor apparatus does not comprise a thick matter pump unit. The main purpose of the mobile distributor apparatus is not to pump the thick matter, but to reach a position within a confined space, and to provide connection to a thick matter pump unit, such as a heavy-duty concrete truck, such that the thick matter can be transported thereto.

[0019] In one or more embodiments, the mobile distributor apparatus further comprises a motor unit (e.g. a hybrid motor unit) operatively connected to the wheels or belts.

[0020] In one or more embodiments, the mobile distributor apparatus further comprises an electric motor unit and a combustion motor unit, both operatively connected to the wheels or belts. This is an advantage when the mobile distributor apparatus is entering a confined space, where there is little air exchange. The mobile distributor apparatus can then run on battery rather than fuel to avoid using the oxygen in the air and expelling toxic gases

thereto.

[0021] In one or more embodiments, the mobile distributor apparatus further comprises a rotatable cable drum operatively connected to the electric motor, and wherein the rotatable cable drum is a) configured to unwind the cable as the mobile distributor apparatus moves forward, whereby the unwound cable is placed behind the mobile distributor apparatus and b) configured to rewind the cable as the mobile distributor apparatus moves backward. This configuration secures that the hose and the cable will not become tangled.

[0022] In one or more embodiments, the steering mechanism and/or motor unit and/or distributor arm are responsive to remotely-controlled electrical signals.

[0023] Preferably, the hose is adapted for the working pressure of the thick matter pump unit, such as a heavy-duty concrete truck.

[0024] In one or more embodiments, the hose is adapted for a working pressure of at least 5 bar, such as at least 10 bar, such as at least 15 bar, such as at least 20 bar, such as at least 25 bar, such as at least 30 bar, such as at least 35 bar, at least 30 bar, such as at least 35 bar, such as at least 40 bar, such as at least 45 bar, such as at least 50 bar, such as at least 55 bar, such as at least 60 bar, such as at least 65 bar, such as at least 70 bar, such as at least 75 bar, such as at least 80 bar, preferably at least 85 bar, such as at least 90 bar, such as at least 100 bar, such as at least 120 bar, such as at least 140 bar, such as at least 160 bar, such as at least 180 bar, such as at least 200 bar, which is the operating pressure of a thick matter pump unit, such as a heavy-duty concrete truck.

[0025] In one or more embodiments, the mobile distributor apparatus further comprises a tensioning apparatus engaging the outer surface of the hose at a position adjacent the hose-guide; wherein the tensioning apparatus comprises driving means therefore, and operable on the hose as the drum is rotating, thereby to maintain said hose in tension and thereby to prevent the convolutions on the drum from becoming loose on said drum.

[0026] It should be noted that embodiments and features described in the context of one of the aspects of the present invention also apply to the other aspects of the invention.

Brief description of the figures

[0027]

Figure 1 shows a perspective view of a mobile distributor apparatus in accordance with various embodiments of the invention;

Figure 2 shows a top view of a mobile distributor apparatus in accordance with various embodiments of the invention;

Figure 3 shows a rear view of a mobile distributor

apparatus in accordance with various embodiments of the invention;

Figure 4 shows a left-side view of a mobile distributor apparatus in accordance with various embodiments of the invention;

Figure 5 shows a right-side view of a mobile distributor apparatus in accordance with various embodiments of the invention; and

Figure 6 shows a front view of a mobile distributor apparatus in accordance with various embodiments of the invention.

Detailed description of the invention

[0028] Referring to Figure 1, the general scheme of the invention is shown in perspective view. Figure 1 shows a mobile distributor apparatus 100 comprising a frame 200, a steering mechanism (not shown), a rotatable drum 300 with a hose 400 wound thereon, a hose-guide 500, and a distributor arm 600.

[0029] The frame 200 is supported for movement over a surface by wheels, and the steering mechanism (not shown) is associated therewith.

[0030] The hose 400 is wound on the rotatable drum 300 in a plurality of side-by-side convolutions in one layer. The hose 400 and the rotatable drum 300 makes it possible for the mobile distributor apparatus 100 to move away from a thick matter pump unit, such as a heavy-duty concrete truck, from which it is coupled when active (not shown). Hence, the hose 400 leaves the rotatable drum 300 as the mobile distributor apparatus 100 moves forward, and is thereby placed/released behind the mobile distributor apparatus. When the mobile distributor apparatus moves backward, the hose will be rewound by the rotatable drum. To avoid an uncontrolled unwinding of the rotatable drum during the forward movement of the mobile distributor apparatus, a motor unit configured to unwind the rotatable drum is further configured to oppose the unwinding with a counterforce. The motor unit 800 configured to unwind the rotatable drum is shown in Figure 4, and is shown functioning through a chain drive 810, 310 (the chain is not shown).

[0031] The hose-guide 500 is reciprocated parallel to the axis of rotation of the rotatable drum 300 as said drum is rotated. Thereby, the hose 400 is positioned in the right position on the drum 300 during unwinding and rewinding. Figure 3 shows a rear view of the mobile distributor apparatus 100 with the hose-guide 500 positioned in the rear end of said apparatus.

[0032] The distributor arm comprises a rotary joint 610 (Figure 6) connected to the frame 200 such that the distributor arm 600 can move from a position along a side of the mobile distributor apparatus 100 and up to 270 degrees horizontally relative thereto. This configuration allows for a very compact mobile distributor apparatus

where the distributor arm is protected during storage and positioning. The distributor arm will only swing out when needed for the distributing operation.

[0033] The distributor arm 600 is also configured for up and down movement with the aid of the rotary joint 620 (Figure 5). This configuration makes it easier to distribute the thick matter within a confined space.

[0034] The mobile distributor apparatus is shown with a motor unit 700 operatively connected to the wheels (Figures 2 and 3).

References

[0035]

100	Mobile distributor apparatus
200	Frame
300	Rotatable drum
310	Part of chain drive
400	Hose
500	Hose-guide
600	Distributor arm
610	Rotary joint
620	Rotary joint
700	Motor unit
800	Motor unit
810	Part of chain drive

Claims

1. A mobile distributor apparatus (100) for distributing thick matter, in particular for distributing uncured concrete, comprising:

- a frame (200) supported for movement over a surface by wheels or belts;
- a steering mechanism associated with the wheels or belts;
- a rotatable drum (300) with a hose (400) wound thereon in a plurality of side-by-side convolutions in at least one layer;
- a hose-guide (500) reciprocated parallel to the axis of rotation of the rotatable drum (300) as said drum (300) is rotated; and
- a distributor arm (600) connected to the outlet of the hose (400);

wherein the inlet of the hose (400) comprises means for releasably fastening to the outlet of a thick matter pump unit; wherein the rotatable drum (300) is a) configured to unwind the hose (400) as the mobile distributor apparatus (100) moves forward, whereby the unwound hose is placed behind the mobile distributor apparatus (100) and b) configured to rewind the hose (400) as the mobile distributor apparatus (100) moves backward.

2. A mobile distributor apparatus (100) according to claim 1, wherein during an unwinding operation, when the hose (400) is unwound from the rotatable drum (300) at a speed above a pre-set speed, a motor unit (800) is configured to increase torque in the opposite direction of the rotatable drum (300) rotation until the speed has reached the pre-set speed. 5
 3. A mobile distributor apparatus (100) according to claim 1, wherein a motor unit (800) configured to rotate the rotatable drum (300) is further configured to oppose the unwinding operation with a counterforce. 10
 4. A mobile distributor apparatus (100) according to any one of the claims 1-3, wherein the distributor arm (600) is configured for up/down and sideways movement. 15
 5. A mobile distributor apparatus (100) according to any one of the claims 1-4, wherein the distributor arm (600) comprises a rotary joint (610) connected to the frame (200) such that the distributor arm (600) can move from a position along a side of the mobile distributor apparatus (100) and up to 270 degrees horizontally relative thereto. 20 25
 6. A mobile distributor apparatus (100) according to any one of the claims 1-5, wherein the mobile distributor apparatus (100) does not comprise a thick matter pump unit. 30
 7. A mobile distributor apparatus (100) according to any one of the claims 1-6, wherein the rotatable drum (300) is adapted to unwind and rewind the hose (400) with a speed adjusted to the speed of the mobile distributor apparatus (100). 35
 8. A mobile distributor apparatus (100) according to any one of the claims 1-7, wherein the frame (200) is supported for movement over a surface by wheels, and wherein the rotatable drum (300) is coupled to the wheels by a speed reduction gear unit. 40
 9. A mobile distributor apparatus (100) according to any one of the claims 1-8, further comprising a motor unit (700) (e.g. hybrid) operatively connected to the wheels or belts. 45
 10. A mobile distributor apparatus (100) according to any one of the claims 1-8, further comprising an electric motor unit and a combustion motor unit, both operatively connected to the wheels or belts. 50
 11. A mobile distributor apparatus (100) according to claim 10, wherein the mobile distributor apparatus (100) further comprises a rotatable cable drum operatively connected to the electric motor, and where- 55
- in the rotatable cable drum is a) configured to unwind the cable as the mobile distributor apparatus moves forward, whereby the unwound cable is placed behind the mobile distributor apparatus and b) configured to rewind the cable as the mobile distributor apparatus moves backward.
12. A mobile distributor apparatus (100) according to any one of the claims 1-11, wherein the steering mechanism and/or motor unit and/or distributor arm are responsive to remotely-controlled electrical signals.
 13. A mobile distributor apparatus (100) according to any one of the claims 1-12, wherein the hose (400) is adapted for a working pressure of at least 70 bar.
 14. A mobile distributor apparatus (100) according to any one of the claims 1-13, further comprising a tensioning apparatus engaging the outer surface of the hose at a position adjacent the hose-guide; wherein the tensioning apparatus comprises driving means therefore, and operable on the hose as the drum is rotating, thereby to maintain said hose in tension and thereby to prevent the convolutions on the drum from becoming loose on said drum.

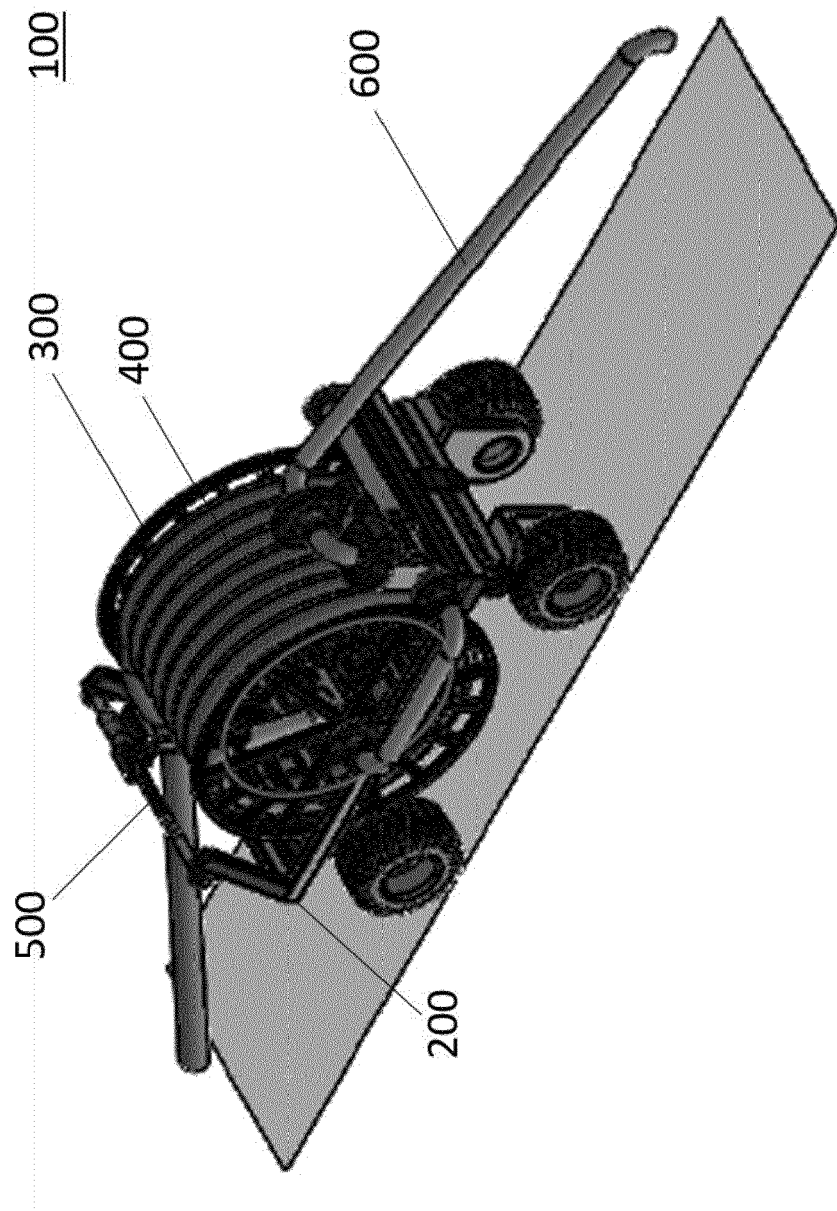


Fig. 1

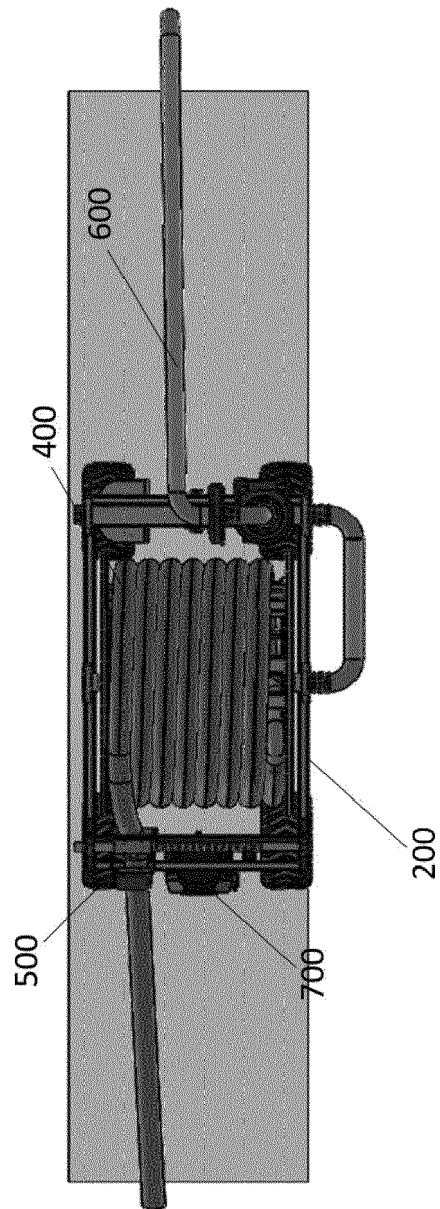
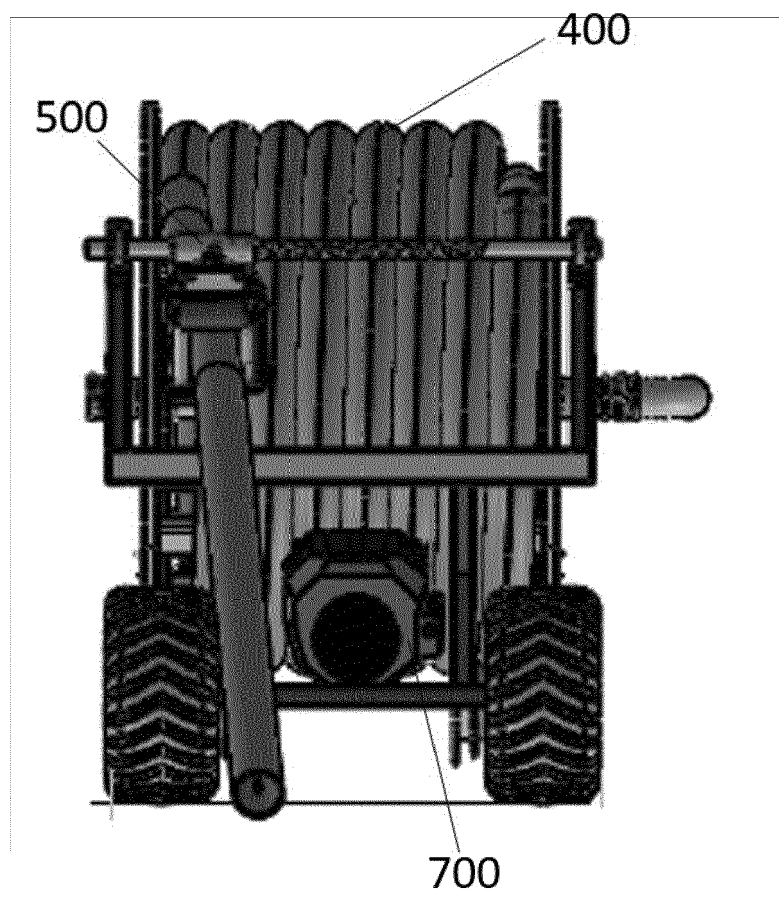


Fig. 2



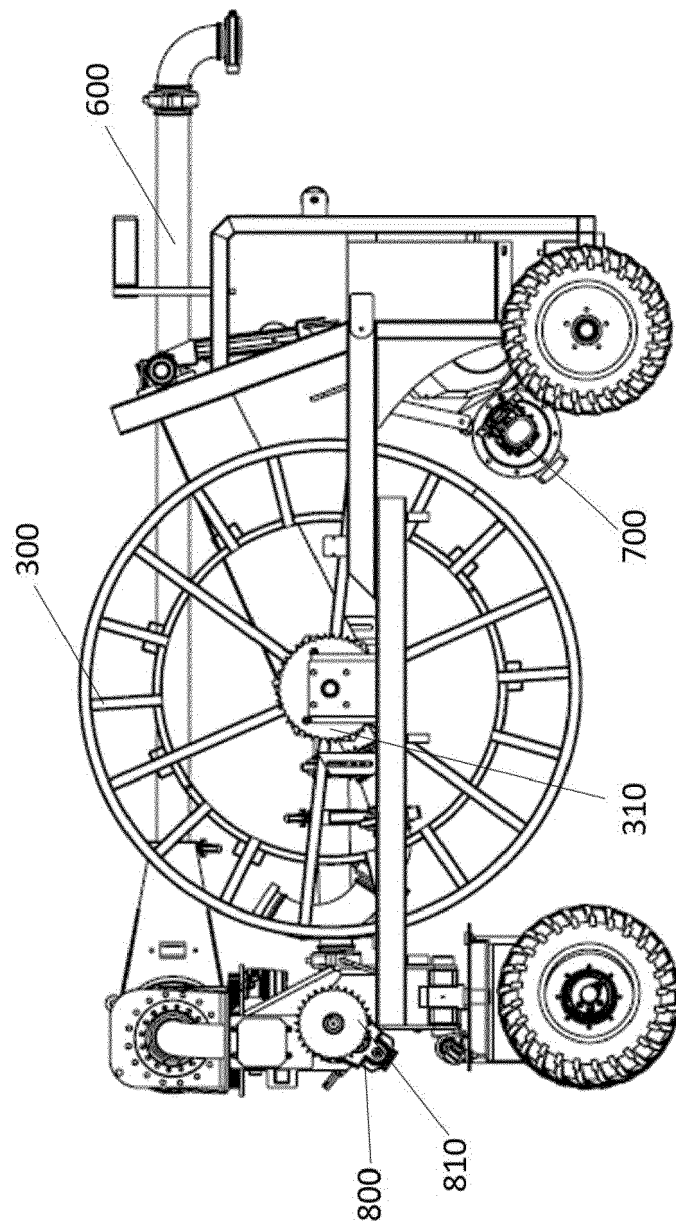


Fig. 4

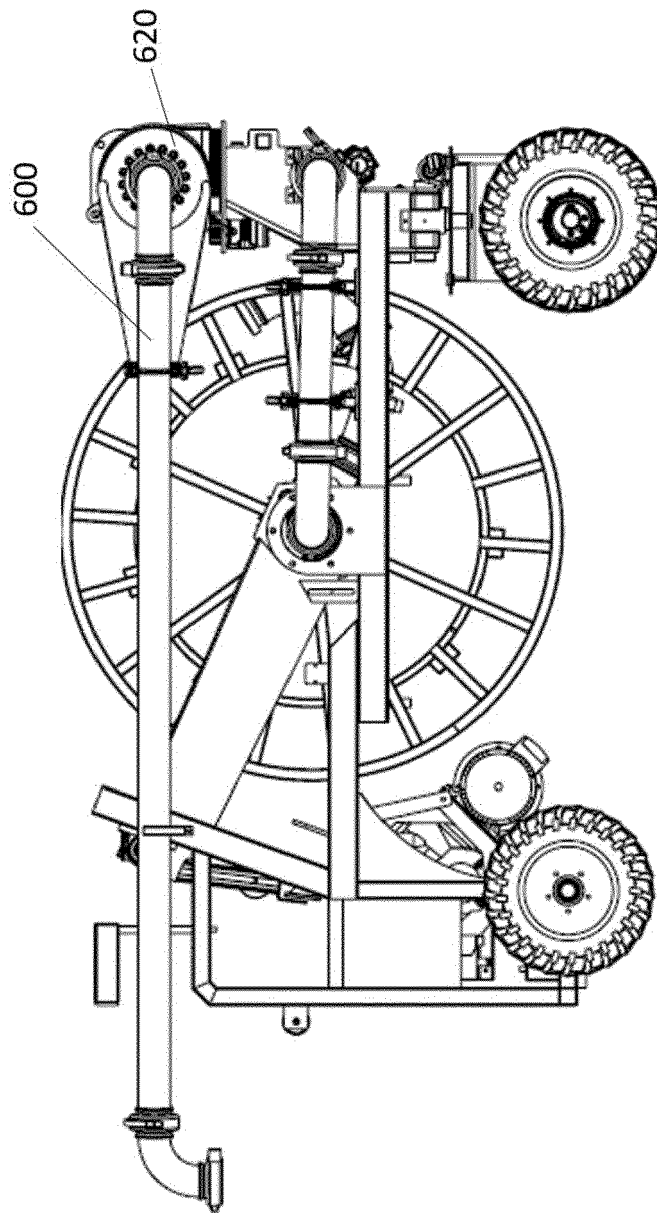


Fig. 5

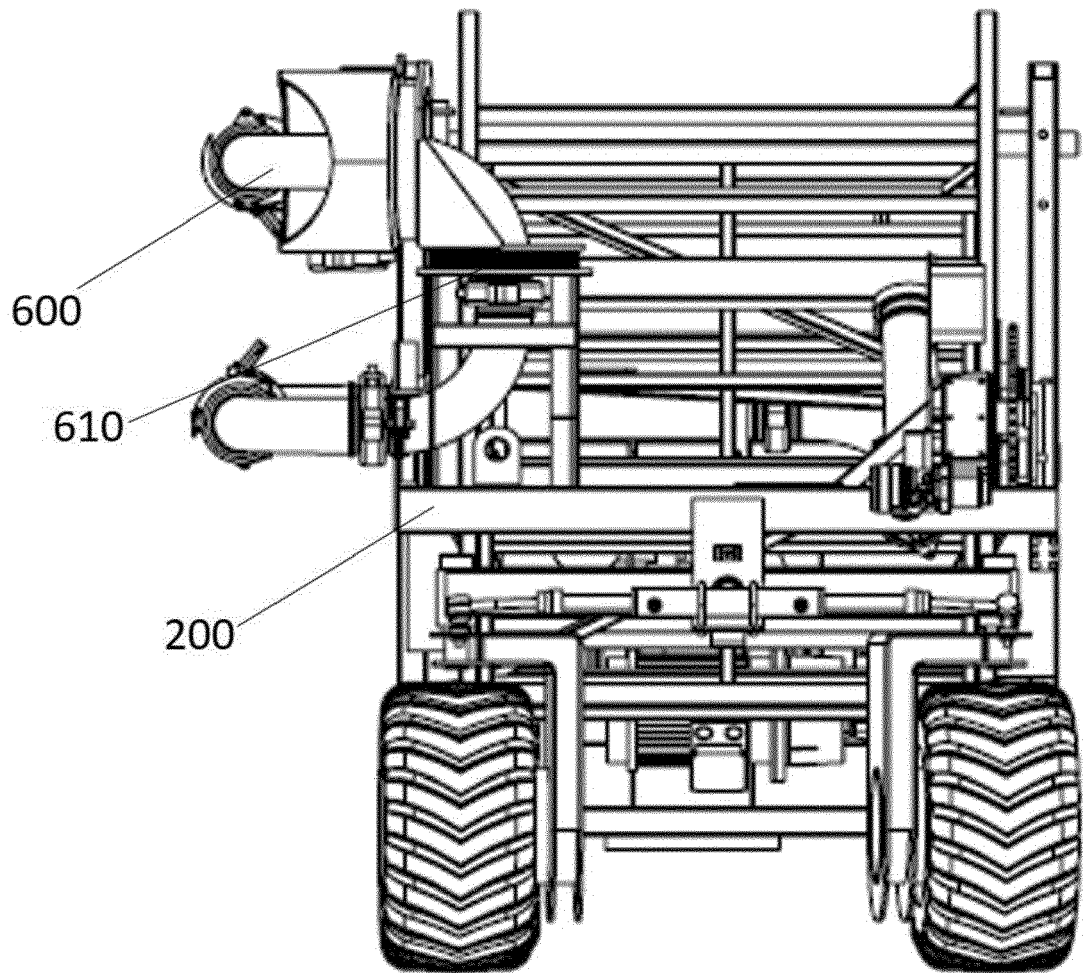


Fig. 6



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 15 3251

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP H07 207941 A (MITSUI CONSTR) 8 August 1995 (1995-08-08) * figures 2, 3, 6 *	1-14	INV. E04G21/04 A01G25/09 B65H75/00
A	US 4 655 399 A (HARVEY VERNON B W [GB]) 7 April 1987 (1987-04-07) * figures 1, 2 *	1,14	
A	US 4 488 683 A (CHIEL DAVID [IL]) 18 December 1984 (1984-12-18) * figure 1 *	1,7,8	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04G A01G B65H E21D E02D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 May 2017	Examiner Tryfonas, N
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 15 3251

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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23-05-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H07207941 A	08-08-1995	NONE	
US 4655399 A	07-04-1987	NONE	
US 4488683 A	18-12-1984	AR 226746 A1	13-08-1982
		AU 541975 B2	31-01-1985
		BR 8105733 A	25-05-1982
		ES 8205522 A1	01-11-1982
		IL 61002 A	31-03-1983
		MX 153607 A	03-12-1986
		US 4488683 A	18-12-1984
		ZA 8106238 B	25-08-1982