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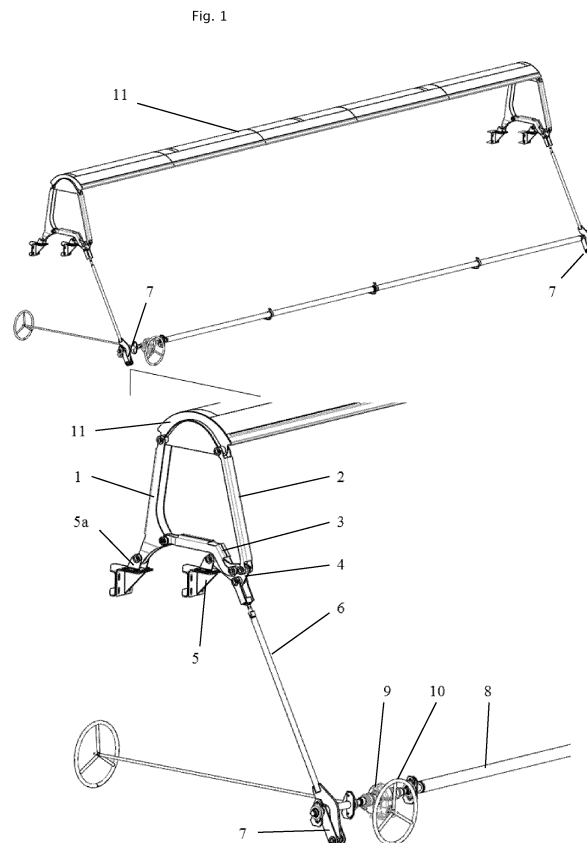
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(54) **MECHANISM FOR ROOF OPENING WITH SINGLE-SIDED VERTICAL FINAL CLOSING**

(57) Mechanism for opening of the roof with single-sided vertical final closing includes the manual wheel (10), which is connected to the control shaft (8) through the gear box (9), on both ends of the control shaft (8), the cranks (7) are installed and they are connected to the control draw rod (6), which is connected by means of an articulation with the lifting draw rod (2) for lifting of the roof (11) during opening on one edge of the nozzle of the filling opening, the other end of the lifting draw rod (2) is connected to the roof (11), the control draw rod (6) is also connected with the rotary arm (4), the rotary arm (4) is pivotally fixed in the first installation (5) and it is connected with the pushing draw rod (3), the second end of which is connected with the arm (1), the arm (1) is also connected with the second installation (5a) and the roof (11), whereby all connections are articulated ones.



Description

Field of technology

[0001] The technical solution relates to the mechanism for opening of the roof with single-sided vertical final closing that can be applied mainly for the roof of the wagon.

Actual state of the art

[0002] In the present solutions enabling opening of the roof on the circular path, vertical sitting of the roof on the nozzle of the filling opening does not occur, and thus the roof in the closed condition does not lie, on its whole length, on the nozzle of the filling opening. This negatively influences tightness and loading of the roof.

For the roof that lie in closed condition on the nozzle of the filling opening on their entire length, several gear boxes are used in the present solutions for the function of roof opening on the non-circular path. In one specific solution, the roof opening mechanism includes a control wheel, which is connected to the gear box by means of the control shaft, the gear box input shaft is connected with the crank, whereby the crank is connected to the connecting rod by means of the pivot bolt, said connecting rod being connected to the arm, the arm has two stops for supporting the connecting rod, the opposite end of the arm is equipped with the draw bar, whereby the other end of the draw bar is pivotally connected to the anchoring bracket of the whole mechanism, on the upper end of the arm, the fixed arm is connected with the opening roof.

Nature of the technical solution

[0003] The solution relates to the mechanism for opening of the roof of the wagons designed for transportation of different substrates. In the first stage of roof opening, the mechanism solution provides sufficient vertical stroke of the roof side, which goes over the nozzle of the filling opening during opening. In the second stage, the mechanism provides a fluent displacement of the roof over the nozzle of the filling opening on the circular path. Control of the whole process of opening and closing of the roof is realised by the manual wheel. The control shaft, which acts as the synchronizing shaft at the same time, is placed in the wagon bottom part.

This mechanism design enables to use only one gear box for driving of the whole mechanism.

Summary of figures in the drawings

[0004] In the Fig. 1, the mechanism scheme is displayed, and in the Fig. 2, the gradual opening of the roof with the movement trajectory is displayed.

Examples of embodiments of the technical solution

[0005] The mechanism for opening of the roof 11 consists of the arm 1 of the roof 11, lifting draw rod 2, pushing draw rod 3, rotary arm 4, installation 5, control draw rod 6, crank 7, control shaft 8, gear box 9, hand wheel 10 and the roof 11.

By turning the wheel 10, the gear box 9 and the control shaft 8 cause synchronic turning of the cranks 7 on both wagon ends. Rotary motion of the crank 7 will be transferred to the rotary arm 4 by means of the control draw rod 6. The initial position of the rotary arm 4, together with the lifting draw rod 2, will provide, in the first stage of opening, slightly vertical lifting of the roof 11 side, which goes over the nozzle of the filling opening during opening (Fig. 2b). Gradually, the rotary movement of the rotary arm 4 starts to be transferred through the pushing draw rod 3 to the arm 1 of the roof 11. After turning of the arm 1 of the roof 11, the roof 11 will move on the circular path beyond the nozzle of the wagon filling opening (Fig. 2c, d). After vertical final sitting of the roof 11 onto the nozzle of the filling opening in the final stage of the roof closing movement, the main assumption for tightening of the wagon roof 11 is provided.

In the first stage of roof opening, the mechanism provides sufficient vertical stroke of the roof 11 side, which goes over the nozzle of the filling opening during opening. In the second stage, the mechanism provides a fluent displacement of the roof 11 over the nozzle of the filling opening on the circular path. Control of the whole process of opening and closing of the roof 11 is realised by the manual wheel 10. The control shaft 8, which acts as the synchronizing shaft at the same time, is placed in the wagon bottom part. Mechanism for opening of the roof 11 with single-sided vertical final closing includes the manual wheel 10, which is connected to the control shaft 8 through the gear box 9, on both ends of the control shaft 8, the cranks 7 are installed and they are connected to the control draw rod 6, which is connected by means of an articulation with the lifting draw rod 2 for lifting of the roof 11 during opening on one edge of the nozzle of the filling opening, the other end of the lifting draw rod 2 is connected to the roof 11, the control draw rod 6 is also connected with the rotary arm 4, the rotary arm 4 is pivotally fixed in the first installation 5 and it is connected with the pushing draw rod 3, the second end of which is connected with the arm 1, the arm 1 is also connected with the second installation 5a and the roof 11, whereby all connections are articulated ones.

Claims

1. Mechanism for opening of the roof with single-sided vertical final closing, **characterised in that** it includes the manual wheel (10), which is connected to the control shaft (8) through the gear box (9), on both ends of the control shaft (8), the cranks (7) are

installed and they are connected to the control draw rod (6), which is connected by means of an articulation with the lifting draw rod (2) for lifting of the roof (11) during opening on one edge of the nozzle of the filling opening, the other end of the lifting draw rod (2) is connected to the roof (11), the control draw rod (6) is also connected with the rotary arm (4), the rotary arm (4) is pivotally fixed in the first installation (5) and it is connected with the pushing draw rod (3), the second end of which is connected with the arm (1), the arm (1) is also connected with the second installation (5a) and the roof (11), whereby all connections are articulated ones.

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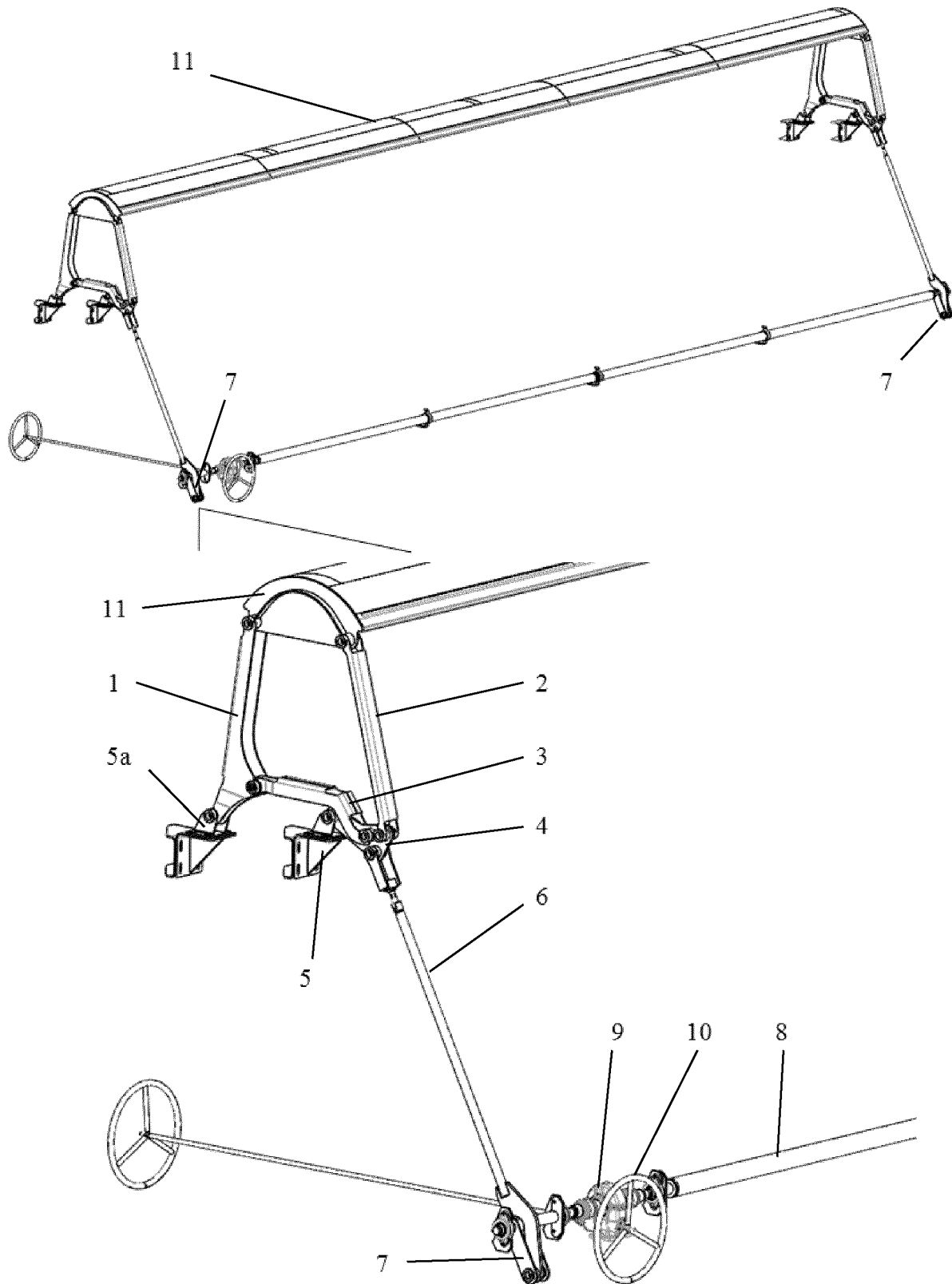
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Fig. 1



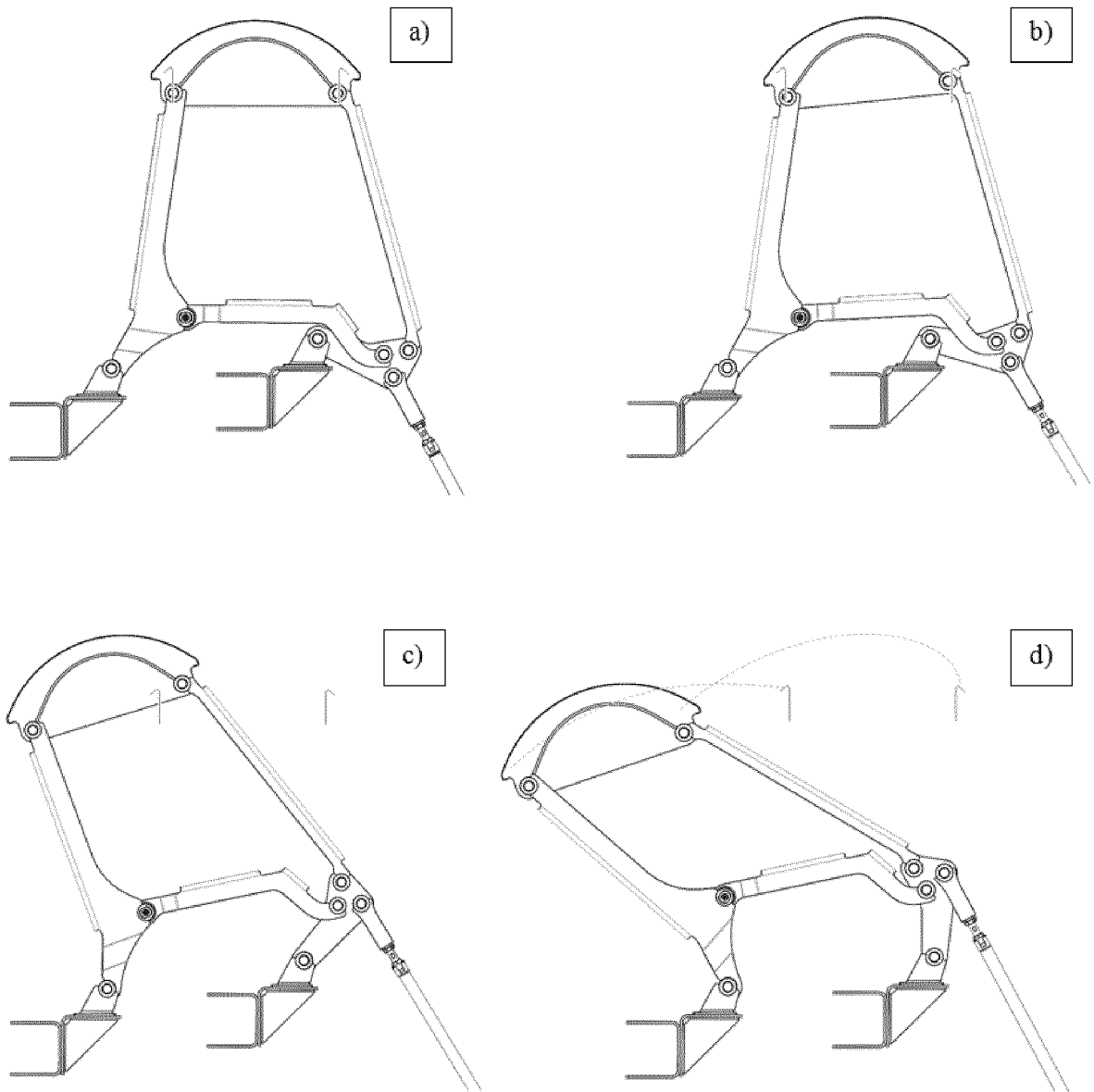


Fig.2



EUROPEAN SEARCH REPORT

Application Number
EP 17 47 5505

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A	SK 500 542 013 U1 (TATRAVAGONKA A S [SK]) 2 October 2013 (2013-10-02) * figures 1,2 *	1	
A	FR 2 718 698 A1 (ORVAL ATELIERS [FR]) 20 October 1995 (1995-10-20) * page 3, line 4 - page 4, line 9; figures 1,2 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B61D B60J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 February 2018	Examiner Verkerk, Ewout
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	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 47 5505

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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20-02-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82