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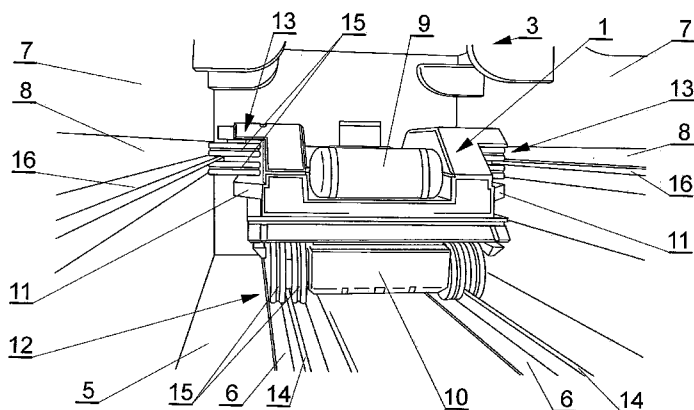


Fig. 2

(57) Abstract: The invention solves a problem of a carriage (1) assembly for an airplane transporting system on an airport apron, from a parking location to a runway and from a landing to the parking location with an airplane's engine off. The carriage assembly is formed by a guiding groove (3) with a rectangular cross-section, a floor (5) of which being provided with lower guide rails (6), and side walls (7) of which being provided with side guide rails (8), and the carriage (1) is constituted by a spatial structure (9), having a bottom part (10) and side parts (11), the carriage (1) being provided with a lower vehicle wheels set (12), fixed at the bottom part (10) of the carriage (1), and a side vehicle wheels set (13) fixed at both side parts (11) of the carriage (1).



A carriage assembly for an airplane transporting system on an
airport apron

The present invention relates to a carriage assembly for an airplane transporting system on an airport apron, from a parking to a take-off location or from a landing to the parking location. The solution is applicable in aviation.

Till now airplanes have been transported on an airport apron, from a parking location to a runway or to the parking location after landing, under their own power, with the engines on.

An assembly for transporting airplane on an airport apron from a parking to a take-off location and from a landing to the parking location with an aeroplane's engine off is known from the Polish patent application No. 390365. According to the solution the assembly comprises docking stations made in a surface of access ways (taxiways) to a runway of the airport and connected with guiding grooves located along a route of an airplane movement to the parking location. In the docking stations there are mounted leading mandrels, which are preferably fastened to a front wheel of the airplane after bringing it to the docking station. From the main transport route there are branched off terminal transport routes. Guiding grooves which constitute them are covered from the top with

pivotable gratings having a segmented structure. The pivotable gratings automatically open in front of the leading mandrel moving in the guiding groove. After passage of the leading mandrel, the pivotable gratings close. In places of the direction changes of the guiding grooves, in places of their abrupt curves and in junctions of the main transport route to the terminal transport route there are switching devices installed.

The objective of the solution according to the invention is the development of possibility to transport an airplane from a parking location to a runway or to leave the runway after landing and transport to the parking location without an engine set working. The objective of the solution is to develop a construction of an assembly that enables realization of this undertaking by the development of a carriage assembly which can move in a guiding groove.

Thanks to such a solution, an airplane will be lighter and more economical in operation.

According to the invention a carriage assembly is intended for an airplane transporting system on an airport apron, from a parking location to a runway and from a landing location to the parking location, wherein the airplane transporting system on the airport apron is constituted by guiding grooves. The leading mandrels installed in docking stations and latched to an airplane move in the guiding grooves, and guiding grooves are covered from the top with pivotable covers having a segmented structure.

The carriage assembly is formed by the guiding groove having a rectangular cross-section, a floor of which is provided with lower guide rails, and side walls of which are provided with side guide rails, and the carriage being a spatial structure. The structure of the carriage has its

bottom part and side parts. The carriage is provided with a lower vehicle wheels set fixed at the bottom part of the carriage, and a side vehicle wheels set fixed at both side parts of the carriage.

Preferably, the lower guide rails are provided with a limiting element, placed between the vehicle wheels of the lower vehicle wheels set.

Also preferably, the side guide rails are provided with the limiting element at both sides of the guiding groove, placed between the vehicle wheels of the side vehicle wheels set.

Also preferably, the carriage in its upper part is provided with the leading mandrel, which mandrel preferably has a changeable height and is preferably provided with a latch.

Also preferably, the guiding groove is provided with pivotable gratings substantially along its entire length, having a segmented structure, which are being opened in front of the moving leading mandrel and are being closed behind the moving leading mandrel, and, preferably, the opening and closing of the guiding groove being realized by the leading mandrel.

The subject of the invention is presented in an embodiment in the attached drawings, in which Fig. 1 shows an airport apron with a guiding groove located on its surface, with covers of this groove being closed; Fig. 2 shows a carriage in the guiding groove, without a leading mandrel; Fig. 3 shows the carriage in the guiding groove, with the leading mandrel; and Fig. 4 shows the leading mandrel with latching elements during its movement out from the carriage.

As it is shown in Fig. 1, the carriage 1 assembly for a system of moving airplanes on the airport apron 2, from a parking to a take-off location or from a landing to the parking location, moves in the guiding groove 3 made in the airport apron 2 and provided with the pivotable covers 4, closing the guiding groove 3 from the top.

The pivotable covers 4 close the guiding groove in which the carriage 1 moves, which carriage is equipped, which is seen in Fig. 3 and Fig. 4, with the leading mandrel 17 provided with a latch 18 for fastening to an undercarriage leg of an airplane transported on the airport apron 2.

The pivotable covers 4 have a segmented structure which allows opening the inside of the guiding groove 3 only within the area of the moving carriage 1 with the leading mandrel 17, wherein opening of the pivotable covers is triggered by the leading mandrel 17.

As it is shown in Fig. 2 and Fig. 3, the carriage 1 assembly for the system of moving airplanes on the airport apron 2 from the parking location to a runway or from the landing to the parking location, is placed in the guiding groove 3. The guiding groove 3 has a rectangular cross-section and is limited with two side walls 7, which are parallel to each other, and a floor 5, connecting the side walls 7 at their bottom parts. The section of the guiding groove 3 is open from the top and is closed by the pivotable covers 4.

The floor 5 of the guiding groove 3 is provided with lower guide rails 6. Two lower guide rails 6 form a track. The side walls 7 of the guiding groove 3 are also provided with side guide rails 8 at some height from the floor, one side guide rail 8 being located on each side wall 7. The carriage 1 moves on the lower guide rails 6 and the side guide rails 8.

The carriage 1 is constituted by a spatial structure 9 having a bottom part 10 and side parts 11. The carriage 1 is provided with a lower vehicle wheels set 12, placed at the bottom part 10 of the carriage 1, engaged with the lower guide rails 6, and a side vehicle wheels set 13, fixed at both side parts 11, engaged with the side guide rails 8.

The lower guide rails 6 are constituted by T-shaped section with its flange facing the floor 5 of the guiding groove 3. The web of the T-shaped section of the lower guide rails 6 faces the inside of the guiding groove 3 in such a way that it defines a limiting element 14 of the lower guide rails 6. The lower vehicle wheels set 12 is provided with vehicle wheels 15 such that two vehicle wheels 15 are placed adjacent to each other on one side of the bottom part 10 of the carriage 1, in such a way that after placing the carriage 1 in the guiding groove 3 each wheel of this pair is located at the opposite side of the limiting element 14 of the lower guide rail 6. On the other side of the bottom side 10 of the carriage 1, the structure of the lower vehicle wheels set 12 is analogous. The lower vehicle wheels set 12 includes two pairs of the vehicle wheels 15 per each side.

The side guide rails 7 are also constituted by T-shaped section with its flange facing the side wall 7 of the guiding groove 3. The web of the T-shaped section of the side guide rails 7 faces the inside of the guiding groove 3 in such a way that it defines the limiting element 16 of the side guide rails 7. The side vehicle wheels set 13 is provided with the vehicle wheels 15 in such a way that two vehicle wheels 15 are placed adjacent to each other on one side of the side part 11 of the carriage 1, in such a way, that after putting the carriage 1 in the guiding groove 3 each wheel 15 of this pair is placed at the opposite side of the limiting element 16 of the

side guide rail 7. The structure of the side vehicle wheels set 13 on the other side of the carriage 1, on the other side part 11 of the carriage 1, is analogous. The side vehicle wheels set 13 includes two pairs of the vehicle wheels 15 on each side part 11 of the carriage 1.

In this way the travelling carriage 1 is precisely and reliably guided in the guiding groove 3. The carriage 1 is provided with a driving mechanism (not shown) allowing to move the carriage 1 in the guiding groove 3 together with an airplane. To this end the travelling carriage 1 in its upper part is provided with the leading mandrel 17. The leading mandrel 17 is telescopically set on the carriage 1, on a hydraulic outrigger. It is provided with the latch 18 for fastening the airplane to the leading mandrel 17. Therefore, the carriage 1 can move in the guiding groove 3 with the airplane attached thereto and without the airplane as well. In the latter case the leading mandrel 17 is lowered and the whole carriage 1 together with the latch 18 is completely hidden in the guiding groove 3 such that the pivotable covers 4 can be closed during movement of the carriage 1.

In the case when the airplane is attached to the carriage 1 with the leading mandrel 17 and the latch 18, an automatic opening the pivotable covers 4 by the leading mandrel 17, with a lifting mechanism (not shown), takes place during movement of the carriage together with the airplane on the airport apron 2.

The airport apron 2 may be provided with a number of the guiding grooves 3 of this type, in which a number of the carriages 1 may move simultaneously either transporting the airplanes from the runway to the parking location and from the parking location to the runway on the airport apron 2, or without the load.

In such a case movement of the carriages 1 in the guiding grooves may be controlled by a central computer.

It is obvious that a person skilled in the art may without any additional inventive work in different ways modify and improve the set of the carriage 1 for the airplane transporting system on the airport apron² in the guiding groove 3, shown in the non-limiting embodiment, without departing from the scope of the claims.

Claims

1. A carriage assembly for an airplane transporting system on an airport apron, from a parking location to a runway and from a landing to the parking location, the system being formed by guiding grooves, in which leading mandrels move that are installed in docking stations, being latched to an airplane, the guiding grooves being covered from the top with pivotable covers having a segmented structure, characterised in that the carriage (1) assembly is formed by the guiding groove (3) with a rectangular cross-section, a floor (5) of which being provided with lower guide rails (6), and side walls (7) of which being provided with side guide rails (8) and the carriage (1) being a spatial structure (9), having a bottom part (10) and side parts (11), the carriage (1) being provided with a lower vehicle wheels set (12), fixed at the bottom part (10) of the carriage (1), and a side vehicle wheels set (13) fixed at both side parts (11) of the carriage (1).

2. The carriage assembly according to claim 1, characterized in that the lower guide rails (6) are provided with a limiting element (14) placed between vehicle wheels (15) of the lower vehicle wheels set (12).

3. The carriage assembly according to claim 1 or 2, characterized in that the side guide rails (7) are provided with a limiting element (16) at both sides of the guiding groove (3) placed between vehicle wheels (15) of the side vehicle wheels set (13).

4. The carriage assembly according to claim 1 or 2 or 3, characterized in that the carriage (1) is provided in its upper part with the leading mandrel (17).

5. The carriage assembly according to claim 4, characterized in that the leading mandrel (17) has a changeable height.

6. The carriage assembly according to claim 4, characterized in that the leading mandrel (17) is provided with a latch (18).

7. The carriage assembly according to claim 1, characterized in that the guiding groove (3) is provided with pivotable gratings (4) substantially along its entire length, having a segmented structure, which are being opened in front of the moving leading mandrel (17) and are being closed behind the moving leading mandrel (17).

8. The carriage assembly according to claim 7, characterized in that opening and closing the covers (4) of the guiding groove (3) is realized by the leading mandrel (17).

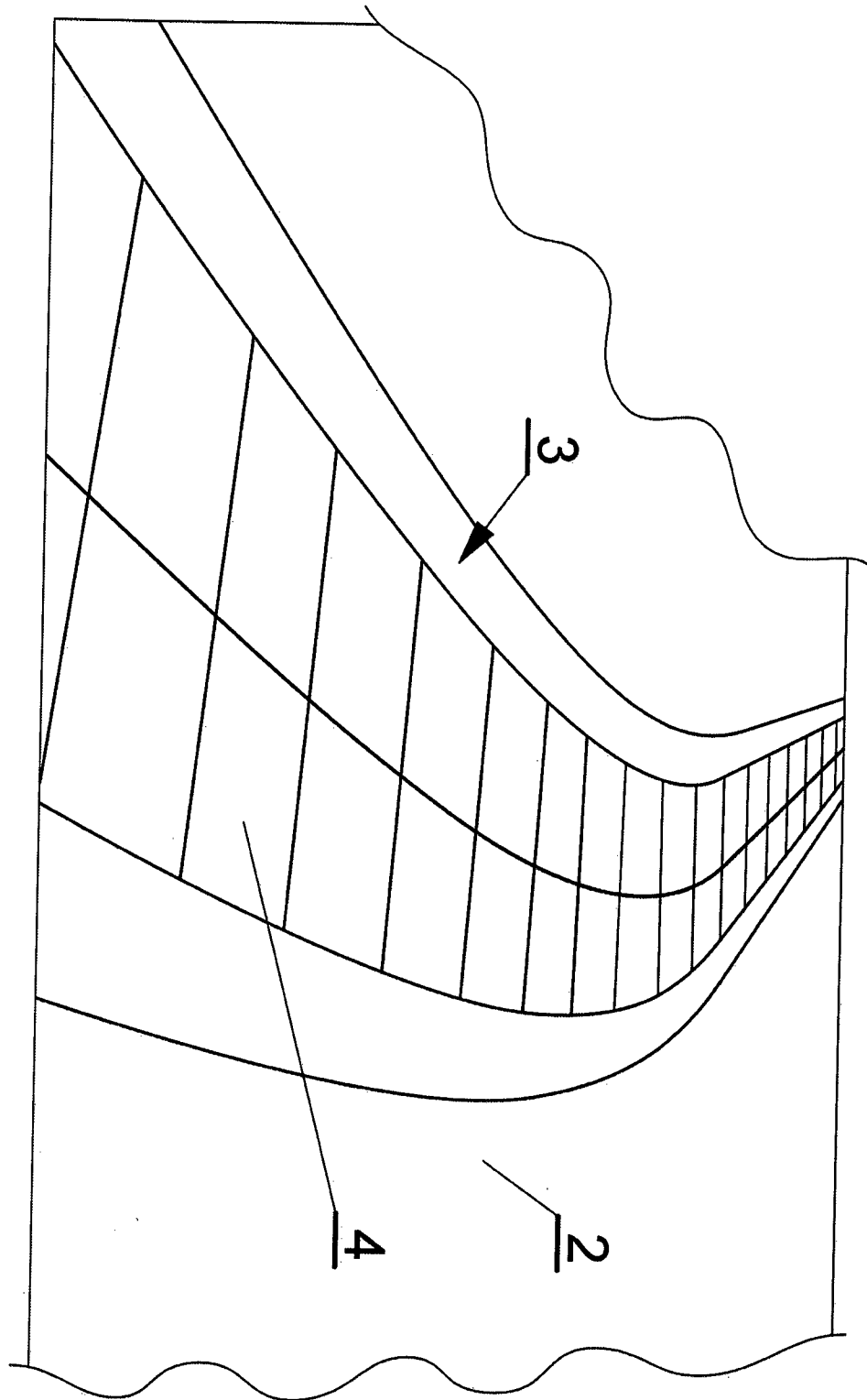


Fig. 1

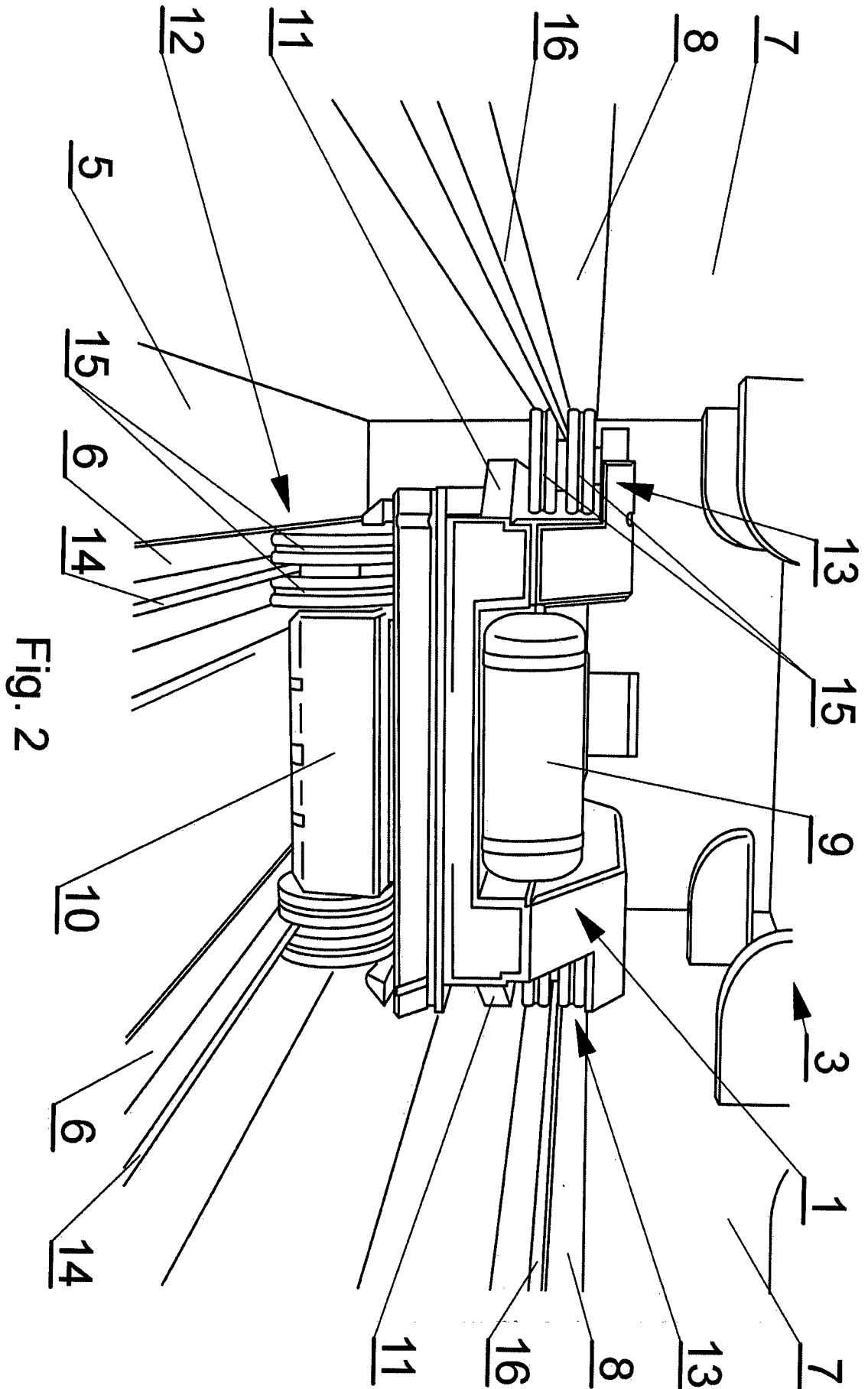


Fig. 3

