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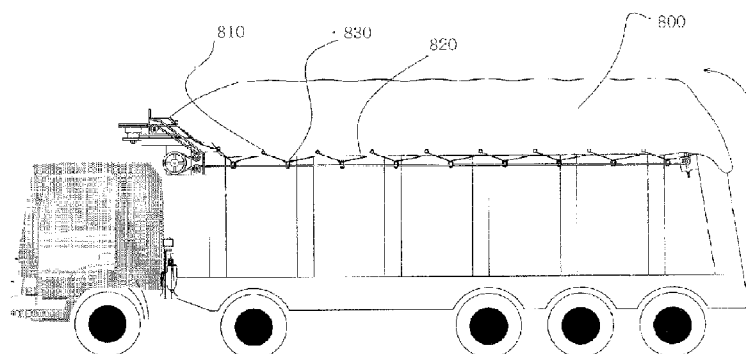
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(54) Title: VEHICLE BED COVER AND METHOD FOR OPENING AND CLOSING THE SAME

[Fig. 1]



(57) Abstract: a vehicle bed cover according to the present invention includes: a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed and spaced apart from each other at predetermined intervals, each of the arch-shaped pipes having wire passing pipes disposed at both side end portions thereof; a covering mounted above the plural arch-shaped pipes; wheels respectively mounted on lower end portions of the arch-shaped pipes; a front driving part driven by a driving motor mounted on the front face of the upper portion of the vehicle bed; a rear driving part and a rearmost pipe stopper mounted on the rear face of the upper portion of the vehicle bed and connected with the front driving part via a wire to guide the wire; a wire passing through the wire passing pipes formed on the lower end portions of each of the arch-shaped pipes, the wire being moved by the front driving part and the rear driving part; and a rearmost pipe part to which both end portions of the wire are fixed, the rearmost pipe part having a rear wing pipe and a rearmost pipe.



WO 2010/053224 A1

Description

VEHICLE BED COVER AND METHOD FOR OPENING AND CLOSING THE SAME

Technical Field

- [1] The present invention relates to a vehicle bed cover and a method for opening and closing the vehicle bed cover, which includes a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed in a tunnel form, a covering mounted above the arch-shaped pipes formed like the tunnel, and a wire connected to lower end portions of the arch-shaped pipes and side portions of the covering in such a way as to move back and forth, so that the arch-shaped pipes are moved forward when the wire moves forward and the covering is moved backward when the wire moves backward to thereby open and close the vehicle bed cover. The vehicle bed cover according to the present invention can be applied to various industrial fields (for instance, vehicle beds for transporting industrial wastes, construction materials, industrial materials, agricultural and marine products, and so on)

Background Art

- [2] In general, vehicles for transporting grains must have their own covers not only when grains are loaded thereon but also when grains are not loaded thereon.
- [3] Since the grains get wet and are deteriorated in their quality due to rainwater or moisture if rainwater or moisture exists in a vehicle bed in case of rain, the vehicles must have their own covers even though grains are not loaded thereon.
- [4] Furthermore, in case of a dump truck, since goods dropping from a bed of the dump truck during traveling obstruct traffic on a road and cause damage to neighboring vehicles, which travel on the road, a cover necessarily mounted on the upper portion of the truck bed when the truck travels in a state where goods are loaded on the truck bed.
- [5] A conventional dump truck bed cover of all kinds includes a covering support frame and a covering supported by the covering support frame and bars. Moreover, since the dump truck bed is fixed to the dump truck, an opening and closing device is attached to a side of the dump truck bed or a winding roll of the cover is fixed on the front upper portion of the dump truck bed to open and close the cover.
- [6] In case where the cover is mounted on the side of the dump truck bed, it may cause an accident since a radius of rotation is wide, surrounding topographical matters, such as electric wires, may have influences on the cover, and a great load is applied to a rotary shaft and a motor and a motor of an excessive capacity is needed since the cover rotates with a wide radius. Accordingly, due to uneconomic results of the conventional cover, various attempts to solve such problems have been made.

- [7] As an example, Korean Utility Model Laid-open No. 1993-0025409 discloses a covering device for a dump truck bed, which includes a plurality of metal plates vertically and horizontally mounted on side frames and a back frame of the dump truck bed, comprising: I-beams 13 formed on both side frames 11 and 12 of the bed 10; pipes 16 opened at both ends and fixed to an upper face of bodies 15, each of which is mounted on the I-beam 13 and has a roller 14 mounted therein; and cover holders 17 of a predetermined shape inserted into the pipes 16 in a height-adjustable manner.
- [8] Moreover, Korean Utility Model Laid-open No. 1997-49397 discloses an automatic cover for a dump truck bed including: a frame rotatably mounted on a side of the dump truck bed; a support bar formed integrally with rotary shafts; wires connected to an end of the support bar; a cover connected to the other end of each wire; and rotating means controlled in such a way that the wires and the cover connected to the wires are wound or released according to rotation of the support bar to thereby open and close the dump truck bed cover.
- [9] Furthermore, Korean Utility Model Laid-open No. 1994-786 discloses a device for automatically opening and closing a tent cover of a dump truck bed, which includes a tent connected to an air cylinder and a motor mechanically mounted on an outer face of the truck bed and a switch mounted inside a driver's seat, thereby automatically opening and closing the truck bed cover by a manipulation of the switch.
- [10] Additionally, Korean Utility Model Laid-open No. 1997-1092 discloses a device for automatically opening and closing a vehicle bed cover, in which a hydraulic and electric motor is connected to a cover line winding shaft using oil pressure and electric power of a vehicle and a line attached to a cover and a roller is connected to holes of both partitions, so that a driver can open and close the vehicle bed cover at the driver's seat through automatic winding and releasing actions along a cover support groove according to rotation, reverse rotation and stop of the hydraulic and electric motor.
- [11] In addition, Korean Utility Model Registration No. 20-0368354 discloses a dump truck bed for loading grains, which includes a loading frame formed on the lower portion thereof and a truck bed mounted on the loading frame in such a way as to be elevated by an action of a hydraulic cylinder, wherein the truck bed includes an upper bed and a lower bed, which can be detachably joined with each other by means of a connector, so that heavy goods can be loaded on the lower bed and grains can be loaded on the upper bed.

Disclosure of Invention

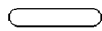
Technical Problem

- [12] However, the above-mentioned prior arts relate with a device for opening and closing a dump truck bed cover used in a dump truck, in which a truck bed is fixed, and have

several problems in that the opening and closing device for the dump truck bed cover is complicated in structure, and in that the truck bed cover and the cover opening and closing device are not used for an open-type truck bed, whose upper portion is opened, since the truck bed cover is made for a box-type truck bed, whose upper portion is completely sealed, to protect grains from moisture and prevent a deterioration in quality of the grains during transport.

Technical Solution

- [13] Accordingly, the present invention has been made in an effort to solve the above-mentioned problems occurring in the prior arts, and it is an object of the present invention to provide a vehicle bed cover and a method for opening and closing the vehicle bed cover, in which a "



"-shaped wire passing through a wire passing pipe of a lower end portion of each of arch-shaped pipes is moved and a rearmost pipe part (C) to which both end portions of the wire are fixed moves back and forth when a front driving part (A) is driven by driving of a driving motor mounted on the front face of the upper portion of the vehicle bed and a rear driving part (D) connected to the front driving part (A) via a wire and mounted on the rear face of the upper portion of the vehicle bed to guide the wire is also driven together with the front driving part (A), thereby opening and closing the vehicle bed cover.

Advantageous Effects

- [14] As described above, the vehicle bed cover according to the present invention is mounted on the upper portion of the bed of a vehicle for loading grains, and can easily move the covering mounted above the arch-shaped pipes via the wire mounted on the lower end portions of the arch-shaped pipes without rails, move the pipes from an upper jaw of the vehicle bed using wheels mounted on lower ends of the pipes, and clean the grains, which are piled up on the upper rail of the vehicle bed, with air using the air nozzles mounted on the lower end portions of the arch-shaped pipes, whereby the present invention is very sanitary and can automatically fold and unfold a rear wing.

Brief Description of the Drawings

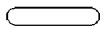
- [15] FIG. 1 is a detailed view showing a state where a vehicle bed cover according to the present invention covers a vehicle bed.
- [16] FIG. 2 is a detailed view showing a state where the vehicle bed cover opens the vehicle bed.
- [17] FIG. 3 is a detailed view showing states of arch-shaped pipes and a rearmost pipe when the vehicle bed cover is closed.

- [18] FIG. 4 is a detailed view showing state of the arch-shaped pipes and the rearmost pipe when the vehicle bed cover is opened.
- [19] FIG. 5 is a detailed view of a front driving part (A) of the vehicle bed cover according to the present invention.
- [20] FIG. 6 is a detailed view of a pipe lower end part (B) of the vehicle bed cover.
- [21] FIG. 7 is a detailed view of a rearmost pipe part (C) of the vehicle bed cover.
- [22] FIG. 8 is a side sectional view of the rearmost pipe part (C) of the vehicle bed cover.
- [23] FIG. 9 is a view showing an operational state of the rearmost pipe part (C).
- [24] FIG. 10 is a detailed view of air supply pipes and air nozzles of the vehicle bed cover.
- [25] FIG. 11 is a plan detailed view of FIG. 1.
- [26] FIG. 12 is a detailed view of a spring of the vehicle bed cover.
- [27] FIG. 13 is a detailed view of the rear face of the vehicle bed, to which the rearmost pipe part (C) is covered.
- [28] <Explanation of essential reference numerals in drawings>
- [29] Vehicle bed: 1, driving motor: 101, driving gear: 102, driving shaft: 103, front horizontal roller: 110, front perpendicular roller: 115, front guide roller: 130, wire: 200, rear horizontal roller: 310, rear perpendicular roller: 315, rear guide roller: 320, arch-shaped pipe: 400, pipe supporting portion: 401, wire passing pipe: 420, wheel: 430, wheel fixing portion: 440, rearmost pipe: 500, rearmost pipe supporting portion: 501, spring fixing frame: 502, rear wing pipe: 510, rear wing pipe fixing frame: 511, rear wing pipe stopper: 515, wire passing pipe: 520, spring: 530, air supply pipe: 600, air nozzle: 660, first and second wire fastener: 598, 599, rearmost pipe stopper: 700, covering: 800, covering connection hole: 810, covering connection rope: 820, covering connection ring: 830, rear wing covering: 880, front driving part: A, pipe lower end part: B, rearmost pipe part: C, rear driving part: D

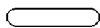
Best Mode for Carrying Out the Invention

- [30] To achieve the above objects, the present invention provides a vehicle bed cover and a method for opening and closing the vehicle bed cover, which includes a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed in a tunnel form, a covering mounted above the arch-shaped pipes formed like the tunnel, and a wire connected to lower end portions of the arch-shaped pipes and side portions of the covering in such a way as to move back and forth, so that the arch-shaped pipes are moved forward when the wire moves forward and the covering is moved backward when the wire moves backward to thereby open and close the vehicle bed cover.
- [31] In more detail, the vehicle bed cover according to the present invention includes: a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed and

spaced apart from each other at predetermined intervals, each of the arch-shaped pipes having wire passing pipes disposed at both side end portions thereof; a covering mounted above the plural arch-shaped pipes; wheels respectively mounted on lower end portions of the arch-shaped pipes; a front driving part driven by a driving motor mounted on the front face of the upper portion of the vehicle bed; a rear driving part mounted on the rear face of the upper portion of the vehicle bed and connected with the front driving part via a wire to guide the wire; a "



"-shaped wire passing through the wire passing pipes formed on the lower end portions of each of the arch-shaped pipes, the "



"-shaped wire being moved by the front driving part and the rear driving part; and a rearmost pipe part fixed to the center of the wire.

[32] In the vehicle bed cover according to the present invention, in which the covering is mounted above the tunnel formed by the plural arch-shaped pipes mounted on the upper portion of the vehicle bed in the tunnel form and the wire is connected to the lower end portion of each of the arch-shaped pipes and the side portions of the covering, the wire moves back and forth by driving of the front driving part and the rear driving part, to which the wire is guided, so that the arch-shaped pipes and the covering are moved forward when the wire moves forward and the covering and the arch-shaped pipes are moved backward when the wire moves backward to thereby open and close the vehicle bed cover.

[33] The wire is fixed to the rearmost pipe of the plural arch-shaped pipes, and passes through the wire passing pipes formed on both lower end portions of the arch-shaped pipes excepting the rearmost pipe.

[34] When the wire is moved by rotation of the front and rear driving rollers after passing the front and rear driving rollers mounted on the front and rear faces of the vehicle bed, namely, when the wire moves forward by a forward rotation of the front and rear driving rollers, the rearmost pipe, to which the wire is fixed, is moved forward, and the other pipes are all moved forward together with the rearmost pipe.

[35] When the front and rear driving rollers are rotated reversely, the rearmost pipe is moved backward by a backward movement of the wire, and hence, the covering located above the arch-shaped pipes is moved backward and the remaining pipes are all moved backward.

[36] When the front and rear driving rollers are rotated forward in order to open the vehicle bed cover, the rearmost pipe covered with the covering advances toward a driver's seat while the wire moves forward. While the rearmost pipe moved forward, the other arch-shaped pipes mounted in front of the rearmost pipe are all moved

forward, and the covering located above the arch-shaped pipes is also moved forward to thereby open the vehicle bed cover.

[37] On the contrary, in order to close the vehicle bed cover, when the front and rear driving rollers are rotated reversely, while the wire moves backward, the rearmost pipe is also moved backward toward the end of the vehicle bed. While the rearmost pipe is moved backward, the covering connected to the rearmost pipe is also moved backward, and at the same time, the other arch-shaped pipes connected to the lower portion of the covering are all moved backward to thereby close the vehicle bed cover.

[38] Since a rear wing pipe is mounted on the rearmost pipe, when the rearmost pipe reaches the rearmost face of the vehicle bed, the rear covering mounted above the rear wing pipe and the rearmost pipe covers a space of the rear part of the arch-shaped tunnel while the rear wing pipe goes over backwardly.

[39] In this instance, since the air nozzles are mounted on both lower portions of the rearmost pipe, when the vehicle bed cover is opened and closed, the air nozzles mounted on the rearmost pipe jet air according to the back and forth movement of the rearmost pipe to thereby clean the grains piled up on the rail of the vehicle bed.

[40] Now, a movement of the arch-shaped pipes will be described. Each of the arch-shaped pipes has the wire passing hole formed on one side of the lower portion thereof in such a way that the wire passes through the wire passing hole. Accordingly, when the wire connected to the rearmost pipe is moved back and forth, the arch-shaped pipes are moved back and forth together with the moving rearmost pipe. In this instance, the wheels (rollers) mounted on the lower portions of each of the arch-shaped pipes guide that pipes are moved back and forth along the upper jaw of the vehicle bed.

[41] In order to prevent free-spinning of the wire on the front driving rollers, grooves are formed in such a way as to be fit to the wire, and front guide rollers are mounted in the grooves.

[42] In the wire, which moves in two rows and in a caterpillar manner along the front driving part (A) and the rear driving part (D), the wire moving at the upper portion passes the wire passing pipes of the plural arch-shaped pipes, the wire moving at the lower portion in a state where one side of the wire is fixed to the rearmost pipe part is guided to the front driving part (A) and the rear driving part (D) to be moved back and forth, and the wire moving at the central portion has the covering connection rings 830 joined to the side portion of the covering and fit onto the central portion of the wire, so that the vehicle bed cover can be opened and closed while the rearmost pipe, to which one side of the wire is fixed, is moved back and forth according to the back and forth movement of the wire.

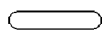
[43] In order to jet air, when a user presses a closing switch of a controller, a solenoid valve of an air tank is opened and the covering moves backward to thereby jet air.

When the covering is completely covered, the above-mentioned operation is automatically stopped and the solenoid valve stops the air, and hence, the air jetting device does not cause inconvenience in traveling the vehicle since the air is completely stopped when the vehicle bed cover is not used.

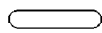
Mode for the Invention

[44] Reference will be now made in detail to the preferred embodiment of the present invention with reference to the attached drawings.

[45] As shown in FIGS. 1 to 11, a vehicle bed cover according to the present invention includes: a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed and spaced apart from each other at predetermined intervals, each of the arch-shaped pipes having wire passing pipes disposed at both side end portions thereof; a covering mounted above the plural arch-shaped pipes; wheels respectively mounted on lower end portions of the arch-shaped pipes; a front driving part driven by a driving motor mounted on the front face of the upper portion of the vehicle bed; a rear driving part and a rearmost pipe stopper mounted on the rear face of the upper portion of the vehicle bed and connected with the front driving part via a wire to guide the wire; a "



"-shaped wire passing through the wire passing pipes formed on the lower end portions of each of the arch-shaped pipes, the "



"-shaped wire being moved by the front driving part and the rear driving part; and a rearmost pipe part to which both end portions of the wire are fixed, the rearmost pipe part having a rear wing pipe and a rearmost pipe.

[46] As shown in FIG. 5, the front driving part (A) includes: a driving motor 101 mounted on the upper portion of the front face of the vehicle bed; a driving shaft 103 having a driving gear 102 mounted at the center thereof in such a way as to be connected by a pulley of a shaft of the driving motor 101; two front driving rollers 120 respectively mounted at both end portions of the driving shaft 103 for moving the wire 200 back and forth; upper and lower front guide rollers 130 respectively mounted in front of the front driving rollers 120 in such a way as to be spaced apart from each other at a predetermined interval; front perpendicular rollers 115 respectively mounted above and in front of the front driving rollers 120 in such a way as to be spaced apart from the front driving rollers 120 at a predetermined interval; and front horizontal rollers 110 respectively mounted above and in front of the front perpendicular rollers 115.

[47] As shown in FIGS. 7 and 9, the rear driving parts (D) are mounted at both end portions of the upper portion of the vehicle bed, and each of the rear driving parts (D) includes: a rear horizontal roller 310, to which the wire 200 is guided; a rear per-

pendicular roller 315 respectively mounted below and in front of the rear horizontal rollers 310; a rear guide roller 320 mounted below the rear perpendicular roller 315; and a plate-shaped rearmost pipe stopper 700 having a pipe extending inwardly from the upper portion thereof.

[48] As shown in FIGS. 3, 4 and 6, each of the arch-shaped pipes 400 includes wheels 430 mounted at both end portions thereof, so that the arch-shaped pipe 400 can be moved back and forth according to a back and forth movement of the wheels 430. Now, the back and forth movement structure will be described in more detail.

[49] For the back and forth movement, the structure includes the wheels 430 moving back and forth along the upper portion of the vehicle bed; a pipe supporting portion 401 mounted on each of the wheels 430 via a wheel fixing portion 440; the arch-shaped pipe 400 attached and fixed to one side of the pipe supporting portion 401; and the wire passing pipe 420 mounted on the other side of the pipe supporting portion 401.

[50] As shown in FIGS. 1, 2, 11 and 13, the covering 800 includes: covering connection holes 810 formed on the edge thereof in such a way as to be spaced apart from one another at predetermined intervals; a covering connection rope 820 joined to the covering connection holes 810; and covering connection rings 830 joined to covering connection holes 810 in such a way that the covering connection rope 820 passes through the covering connection holes 810 and the covering connection rings 830 in a zigzag form.

[51] The front portion of the covering 800 is fixed to the upper portion of the vehicle bed, the rear portion of the covering 800 is fixed to the rear wing pipe 510, both side portions are fixed to the wire 200 in such a way that the covering connection rings 830 joined with the covering connection rope 820 inserted into the covering connecting holes 810 are fit onto the wire, which moves at the lower portion when the wire moves in two rows in a caterpillar form, and the inside of the central portion of the covering 800 is fixed to the arch-shaped pipes 400 by fasteners (not shown) of the arch-shaped pipes 400.

[52] As shown in FIGS. 7 to 9, the rearmost pipe parts (C) are respectively mounted on both side end portions of the vehicle bed, and each of the rearmost pipe parts (C) includes: the wheel 430 moving back and forth along the upper portion of the vehicle bed; a rearmost pipe supporting portion 501 mounted on the upper portion of the wheel 430 via the wheel fixing portion 440; first and second wire fasteners 598 and 599 mounted in front and in the rear of the rearmost pipe supporting portion 501 for fastening the wire; the rearmost pipe 500 fixed to one side of the upper portion of the rearmost pipe supporting portion 501; a spring fixing frame 502 extending outwardly from the central portion of the rearmost pipe 500 and having a spring 530 fixed on the outer face thereof; the wire passing pipe 420 mounted on and inside the rearmost pipe

supporting portion 501; a rear wing pipe fixing frame 511 mounted above the rearmost pipe supporting portion 501 and connected to the outer face of the rearmost pipe 500; a rear wing pipe stopper 515 extending downwardly from the central portion of the rear wing pipe fixing frame 511; and the rear wing pipe 510 extending upwardly while wrapping the rear wing pipe fixing frame 511 of a rectangular-shaped frame form.

[53] As shown in FIGS. 7, 8 and 12, the spring 530 wraps the spring fixing frame 502, and has a structure that one side of the spring 530 is fixed to the spring fixing frame 502 and the other side is fixed to one side of the center of the lower portion of the rear wing pipe 510.

[54] As shown in FIGS. 3, 4 and 7, the wire 200 is mounted in such a way that in a state where one side thereof is fixed to the rearmost pipe supporting portion 501, the wire passes through the wire passing pipe 420 of the pipe supporting portions 401 mounted at both end portions of the plural arch-shaped pipes 400, which are mounted in front of the rearmost pipe supporting portion 501, passes the front horizontal roller 110 located on the upper portion of the front face of the vehicle bed, passes the front perpendicular roller 115 located in the rear of and below the front horizontal roller 110, passes the front driving roller 120 after passing the lower front guide roller 130, passes the rear guide roller 320 mounted on the rear face of the vehicle bed after passing the upper front guide roller 130, passes the rear perpendicular roller 315 located above the rear guide roller 320, passes the rear horizontal roller 310 located in the rear of and above the rear perpendicular roller 315, and then, is fixed to the rearmost pipe supporting portion 501.

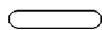
[55] As shown in FIGS. 7, 8 and 10, in the above state, the vehicle bed cover further includes: an air supply pipe 600 mounted inside the covering in such a way that one side thereof is connected with a compressor (not shown); and air nozzles 660 connected to another air supply pipe diverged from the air supply pipe 600 to both sides at a position corresponding to the upper portion of the rearmost pipe 500 inside the rearmost pipe 500, the air nozzles 660 being joined to the air supply pipe 600 at both lower portions of the rearmost pipe part (C).

[56] An operation and a used state of the vehicle bed cover according to the present invention will be described as follows.

[57] A plurality of the arch-shaped pipes are mounted on the upper portion of the vehicle bed in a tunnel form, and the covering is mounted above the tunnel-form arch-shaped pipes. In the wire, which moves in two rows and in a caterpillar manner along the front driving part (A) and the rear driving part (D), the wire moving at the upper portion passes the wire passing pipes of the plural arch-shaped pipes, the wire moving at the lower portion in a state where one side of the wire is fixed to the rearmost pipe part is guided to the front driving part (A) and the rear driving part (D) to be moved back and

forth, and the wire moving at the central portion has the covering connection rings 830 joined to the side portion of the covering and fit onto the central portion of the wire, so that the vehicle bed cover can be opened and closed while the rearmost pipe, to which one side of the wire is fixed, is moved back and forth according to the back and forth movement of the wire.

- [58] The front driving part (A) is actuated by driving of the driving motor mounted on the front face of the upper portion of the vehicle bed, and at the same time, the rear driving part (D) mounted on the rear face of the upper portion of the vehicle bed and connected with the front driving part (A) via the wire to guide the wire is also actuated, so that the "



"-shaped wire passing through the wire passing pipe of each arch-shaped pipe is moved and the rearmost pipe part (C) to which both end portions of the wire are fixed moves back and forth to thereby open and close the vehicle bed cover. A method for opening and closing the vehicle bed cover will be described in more detail as follows.

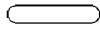
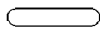
- [59] In order to open the vehicle bed cover, referring to FIGS. 1, 3, 9 and 11, when the driving motor 101 mounted on the front face of the upper portion of the vehicle bed is rotated reversely, the driving gear 102 connected to the driving motor by the pulley of the shaft of the driving motor 101 is rotated, the driving shaft 103 connected to the driving gear 102 and the two front driving rollers 120 mounted at both end portions of the driving shaft 103 are also rotated, the wire moves to the lower front guide roller 130 of the two front guide rollers 130 located in front of each front driving roller 120, the rear guide roller 320 of the rear driving part (D), the rear perpendicular roller 315 located above the rear guide roller 320, and the rear horizontal roller 310 located above and in the rear of the rear perpendicular roller 315 in order while wrapping them, the rearmost pipe part (C) and the covering located above the rearmost pipe part (C) are moved backward to thereby open the cover when the wire 200 whose one side is fixed to the first and second wire fasteners 598 and 599 of the rearmost pipe part (C) is pulled backwardly, the plural arch-shaped pipes located beneath the cover are also moved backward to thereby cover the upper portion of the vehicle bed, the wire goes upwardly while wrapping the rear wing pipe fixing frame 511 when the rear wing pipe stopper 515, which downwardly extends from the central portion of the rear wing pipe fixing frame 511 of the rearmost pipe part (C), abuts against the plate-type rearmost pipe stopper 700, the frame-shaped rear wing pipe 510 of the rectangular form perpendicularly mounted is inclined rearward to thereby cover a rear space portion formed by the arch-shaped pipes (see FIG. 13). In this instance, the spring 530 wraps the spring fixing frame 502 in such a way that one end portion of the spring 530 is fixed to the spring fixing frame 502 and the other end portion is fixed to a side of a lower central

portion of the rear wing pipe 510, whereby the covering covers the upper portion of the vehicle bed in a state where the spring 530 is expanded.

[60] On the contrary, (referring to FIGS. 2, 4 and 7), in order to open the vehicle bed cover, the above-mentioned operation is carried out reversely, and it will be described in brief. When the driving motor 101 mounted on the front face of the upper portion of the vehicle bed is rotated reversely, the driving gear 102 connected to the driving motor by the pulley of the shaft of the driving motor 101 is rotated, the driving shaft 103 connected to the driving gear 102 and two front driving rollers 120 mounted at both end portions of the driving shaft 103 are also rotated, the wire is guided to the upper front guide roller 130 of the two front guide rollers 130 located in front of each front driving roller 120, the front perpendicular roller 115 located above the upper front guide roller 130, and the front horizontal roller 110 mounted above and in front of each front perpendicular roller 115, the rearmost pipe part (C) moves forward when the wire, which passes through the wire passing pipes 420 of the plural arch-shaped pipes 400 and is fixed to the first and second wire fasteners 598 and 599, is pulled, the expanded spring 530 is restored and the rear wing pipe 510 is vertically returned to its original position while the rearmost pipe part (C) is separated from the rearmost pipe stopper 700 in a state where the rear wing pipe stopper 515 downwardly extending from the central portion of the rear wing pipe fixing frame 511 of the rearmost pipe part (C) abuts against the rearmost pipe stopper 700, and then, the plural arch-shaped pipes are pushed in the forward direction of the vehicle bed (toward a driver's seat), so that the covering 800 located above the arch-shaped pipes is folded and closely moves toward the front face of the vehicle bed together with the arch-shaped pipes to thereby open the vehicle bed cover.

[61] In this instance, the vehicle bed cover further includes: the air supply pipe 600 mounted inside the covering in such a way that one side thereof is connected with the compressor (not shown); and air nozzles 660 connected to another air supply pipe diverged from the air supply pipe 600 to both sides at the position corresponding to the upper portion of the rearmost pipe 500 inside the rearmost pipe 500, the air nozzles 660 being joined to the air supply pipe 600 at both lower portions of the rearmost pipe part (C), so that the air nozzles mounted on the lower portion of the rearmost pipe jet air to thereby clean the grains piled on the rail of the vehicle bed while the rearmost pipe moves back and forth when the vehicle bed cover is opened or closed.

Claims

- [1] A vehicle bed cover comprising:
- a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed and spaced apart from each other at predetermined intervals, each of the arch-shaped pipes having wire passing pipes disposed at both side end portions thereof;
 - a covering mounted above the plural arch-shaped pipes;
 - wheels respectively mounted on lower end portions of the arch-shaped pipes;
 - a front driving part driven by a driving motor mounted on the front face of the upper portion of the vehicle bed;
 - a rear driving part and a rearmost pipe stopper mounted on the rear face of the upper portion of the vehicle bed and connected with the front driving part via a wire to guide the wire;
 - a "
 - "-shaped wire passing through the wire passing pipes formed on the lower end portions of each of the arch-shaped pipes, the "
 - "-shaped wire being moved by the front driving part and the rear driving part; and
 - a rearmost pipe part to which both end portions of the wire are fixed, the rearmost pipe part having a rear wing pipe and a rearmost pipe.
- [2] The vehicle bed cover according to claim 1, wherein the front driving part comprises: a driving motor (101) mounted on the upper portion of the front face of the vehicle bed; a driving shaft (103) having a driving gear (102) mounted at the center thereof in such a way as to be connected to the driving shaft (103) by a pulley of a shaft of the driving motor (101); two front driving rollers (120) respectively mounted at both end portions of the driving shaft (103) for moving the wire (200) back and forth; upper and lower front guide rollers (130) respectively mounted in front of the front driving rollers (120) in such a way as to be spaced apart from each other at a predetermined interval; front perpendicular rollers (115) respectively mounted above and in front of the front driving rollers (120) in such a way as to be spaced apart from the front driving rollers (120) at a predetermined interval; and front horizontal rollers (110) respectively mounted above and in front of the front perpendicular rollers (115).
- [3] The vehicle bed cover according to claim 1, wherein the rear driving parts are mounted on both end portions of the vehicle bed, and each comprises: a rear

horizontal roller (310), to which the wire (200) is guided; a rear perpendicular roller (315) respectively mounted below and in front of the rear horizontal rollers (310); a rear guide roller (320) mounted below the rear perpendicular roller (315); and a plate-shaped rearmost pipe stopper (700) having a pipe extending inwardly from the upper portion thereof.

[4] The vehicle bed cover according to claim 1, wherein each of the arch-shaped pipes (400) comprises wheels (430) mounted at both end portions thereof in such a way that the arch-shaped pipes (400) can be moved back and forth according to a back and forth movement of the wheels (430), and wherein the back and forth movement structure comprises: the wheels (430) moving back and forth along the upper portion of the vehicle bed; a pipe supporting portion (401) mounted on each of the wheels (430) via a wheel fixing portion (440); the arch-shaped pipe (400) attached and fixed to one side of each pipe supporting portion (401); and the wire passing pipe (420) mounted on the other side of each pipe supporting portion (401).

[5] The vehicle bed cover according to claim 1, wherein the covering (800) comprises: covering connection holes (810) formed on the edge thereof in such a way as to be spaced apart from one another at predetermined intervals; a covering connection rope (820) joined to the covering connection holes (810); and covering connection rings (830) joined to covering connection holes (810) in such a way that the covering connection rope (820) passes through the covering connection holes 810 and the covering connection rings (830) in a zigzag form, and

wherein the front portion of the covering (800) is fixed to the upper portion of the vehicle bed, the rear portion of the covering (800) is fixed to the rear wing pipe (510), both side portions are fixed to the wire (200) in such a way that the covering connection rings (830) joined with the covering connection rope (820) inserted into the covering connecting holes (810) are fit onto the wire, which moves at the lower portion when the wire moves in two rows in a caterpillar form, and the inside of the central portion of the covering (800) is fixed to the arch-shaped pipes (400) by fasteners of the arch-shaped pipes (400).

[6] The vehicle bed cover according to claim 1, wherein the rearmost pipe parts are respectively mounted on both side end portions of the vehicle bed, and each of the rearmost pipe parts comprises: the wheel (430) moving back and forth along the upper portion of the vehicle bed; a rearmost pipe supporting portion (501) mounted on the upper portion of the wheel (430) via the wheel fixing portion (440); first and second wire fasteners (598; 599) mounted in front and in the rear of the rearmost pipe supporting portion (501) for fastening the wire; the rearmost

pipe (500) fixed to one side of the upper portion of the rearmost pipe supporting portion (501); a spring fixing frame (502) extending outwardly from the central portion of the rearmost pipe (500) and having a spring (530) fixed on the outer face thereof, the spring (530) wrapping the spring fixing frame (502) and being mounted in such a way that one side of the spring (530) is fixed to the spring fixing frame (502) and the other side is fixed to one side of the center of the lower portion of the rear wing pipe (510); the wire passing pipe (420) mounted on and inside the rearmost pipe supporting portion (501); a rear wing pipe fixing frame (511) mounted above the rearmost pipe supporting portion (501) and connected to the outer face of the rearmost pipe (500); a rear wing pipe stopper (515) extending downwardly from the central portion of the rear wing pipe fixing frame (511); and the rear wing pipe (510) extending upwardly while wrapping the rear wing pipe fixing frame (511) of a rectangular-shaped frame form.

[7] The vehicle bed cover according to claim 1, wherein the wire (200) is mounted in such a way that in a state where one side thereof is fixed to the rearmost pipe supporting portion (501), the wire passes through the wire passing pipe (420) of the pipe supporting portions (401) mounted at both end portions of the plural arch-shaped pipes (400), which are mounted in front of the rearmost pipe supporting portion (501), passes the front horizontal roller (110) located on the upper portion of the front face of the vehicle bed, passes the front perpendicular roller (115) located in the rear of and below the front horizontal roller (110), passes the front driving roller (120) after passing the lower front guide roller (130), passes the rear guide roller (320) mounted on the rear face of the vehicle bed after passing the upper front guide roller (130), passes the rear perpendicular roller (315) located above the rear guide roller (320), passes the rear horizontal roller (310) located in the rear of and above the rear perpendicular roller (315), and then, is fixed to the rearmost pipe supporting portion (501).

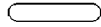
[8] The vehicle bed cover according to claim 1, further comprising:
an air supply pipe (600) mounted inside the covering in such a way that one side thereof is connected with a compressor; and
air nozzles (660) connected to another air supply pipe diverged from the air supply pipe (600) to both sides at a position corresponding to the upper portion of the rearmost pipe (500) inside the rearmost pipe (500), the air nozzles (660) being joined to the air supply pipe (600) at both lower portions of the rearmost pipe part (C).

[9] A method for opening and closing a vehicle bed cover, which comprises a plurality of arch-shaped pipes mounted on the upper portion of a vehicle bed in a tunnel form and a covering mounted above the tunnel-form arch-shaped pipes in

such a way that the covering is opened and closed by a back and forth movement of the arch-shaped pipes, the method comprising the steps of:

driving the front driving part (A) by a driving of the driving motor mounted on the front face of the upper portion of the vehicle bed, and at the same time, driving the rear driving part (D) mounted on the rear face of the upper portion of the vehicle bed and connected with the front driving part (A) via the wire to guide the wire;

moving the "



"-shaped wire passing through the wire passing pipe of each arch-shaped pipe;

and

moving the rearmost pipe part (C), to which both end portions of the wire are fixed, in back and forth directions, whereby the vehicle bed cover is opened and closed.

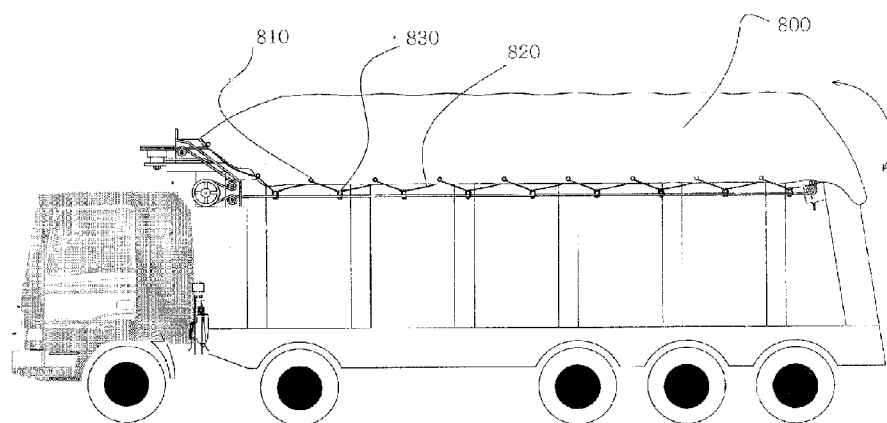
- [10] The method according to claim 9, wherein the vehicle bed cover is closed in such a way that when a driving motor (101) mounted on the front face of the upper portion of the vehicle bed is rotated reversely, a driving gear (102) connected to the driving motor by a pulley of a shaft of the driving motor (101) is rotated, and the driving shaft (103) connected to the driving gear (102) and two front driving rollers (120) mounted at both end portions of the driving shaft (103) are also rotated, the wire moves to a lower front guide roller (130) of the two front guide rollers (130) located in front of each front driving roller (120), a rear guide roller (320) of the rear driving part (D), a rear perpendicular roller (315) located above the rear guide roller (320), and a rear horizontal roller (310) located above and in the rear of the rear perpendicular roller (315) in order while wrapping them, a rearmost pipe part (C) and the covering located above the rearmost pipe part (C) are moved backward to thereby open the cover when the wire (200) whose one side is fixed to first and second wire fasteners (598; 599) of the rearmost pipe part (C) is pulled backwardly, the plural arch-shaped pipes located beneath the cover are also moved backward to thereby cover the upper portion of the vehicle bed, the wire goes upwardly while wrapping a rear wing pipe fixing frame (511) when a rear wing pipe stopper (515), which downwardly extends from the central portion of a rear wing pipe fixing frame (511) of the rearmost pipe part (C), abuts against a plate-type rearmost pipe stopper (700), a frame-shaped rear wing pipe (510) of the rectangular form perpendicularly mounted is inclined rearward to thereby cover a rear space portion formed by the arch-shaped pipes, and wherein the spring (530) wraps a spring fixing frame (502) in such a way that one end portion of the spring (530) is fixed to the spring fixing frame (502) and the other

end portion is fixed to a side of a lower central portion of the rear wing pipe (510), whereby the covering covers the upper portion of the vehicle bed in a state where the spring (530) is expanded.

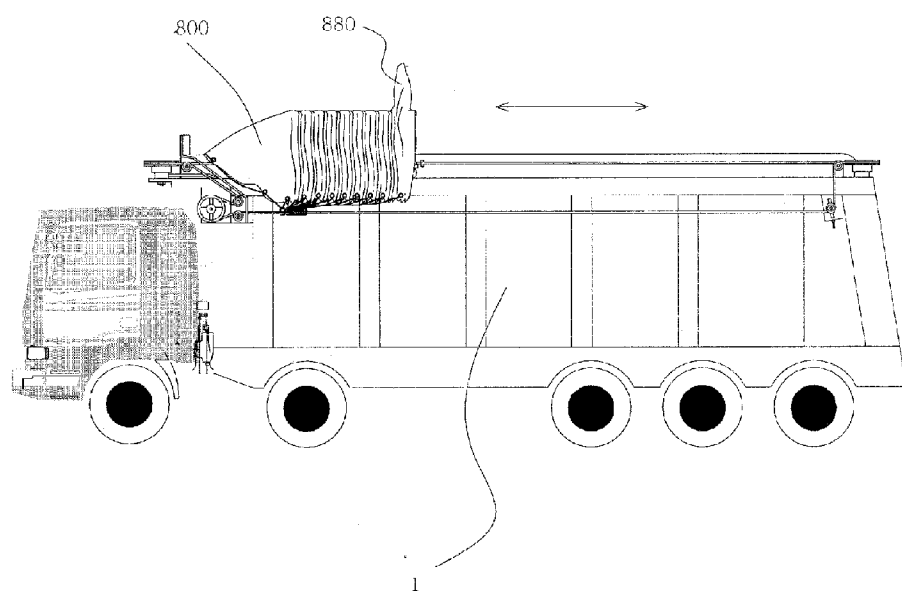
- [11] The method according to claim 9, wherein the vehicle bed cover is opened in such a way that when the driving motor (101) mounted on the front face of the upper portion of the vehicle bed is rotated reversely, the driving gear (102) connected to the driving motor by the pulley of the shaft of the driving motor (101) is rotated, the driving shaft (103) connected to the driving gear (102) and two front driving rollers (120) mounted at both end portions of the driving shaft (103) are also rotated, the wire is guided to the upper front guide roller (130) of the two front guide rollers (130) located in front of each front driving roller (120), a front perpendicular roller (115) located above the upper front guide roller (130), and a front horizontal roller (110) mounted above and in front of each front perpendicular roller (115), the rearmost pipe part (C) moves forward when the wire, which passes through wire passing pipes (420) of the plural arch-shaped pipes (400) and is fixed to the first and second wire fasteners (598; 599), is pull, the expanded spring (530) is restored and the rear wing pipe (510) is vertically returned to its original position while the rearmost pipe part (C) is separated from the rearmost pipe stopper (700) in a state where the rear wing pipe stopper (515) downwardly extending from the central portion of the rear wing pipe fixing frame (511) of the rearmost pipe part (C) abuts against the rearmost pipe stopper (700), and then, the plural arch-shaped pipes are pushed in the forward direction of the vehicle bed (toward a driver's seat), so that the covering (800) located above the arch-shaped pipes is folded and closely moves toward the front face of the vehicle bed together with the arch-shaped pipes to thereby open the vehicle bed cover.

- [12] The method according to claim 9, wherein the vehicle bed cover further comprises: an air supply pipe (600) mounted inside the covering in such a way that one side thereof is connected with a compressor; and air nozzles (660) connected to another air supply pipe diverged from the air supply pipe (600) to both sides at a position corresponding to the upper portion of the rearmost pipe (500) inside the rearmost pipe (500), the air nozzles (660) being joined to the air supply pipe (600) at both lower portions of the rearmost pipe part (C), so that the air nozzles mounted on the lower portion of the rearmost pipe jet air to thereby clean the grains piled on the rail of the vehicle bed while the rearmost pipe moves back and forth when the vehicle bed cover is opened or closed.

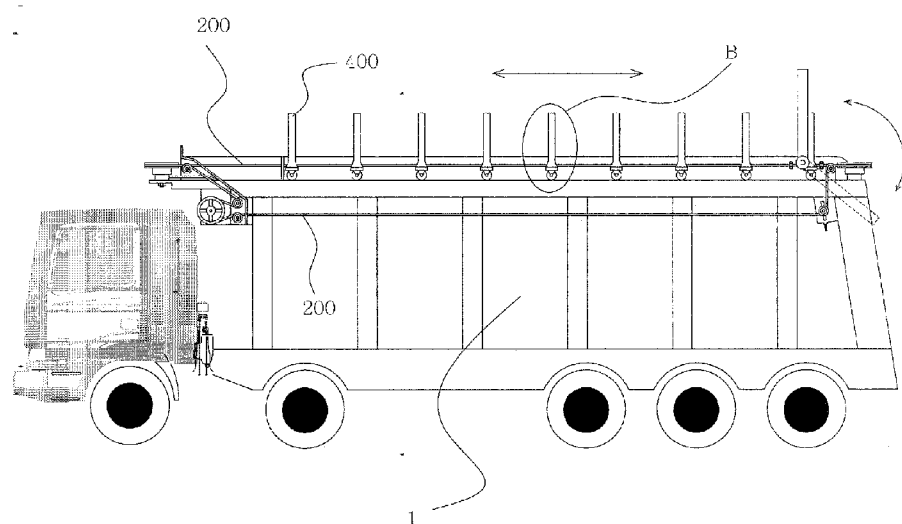
[Fig. 1]



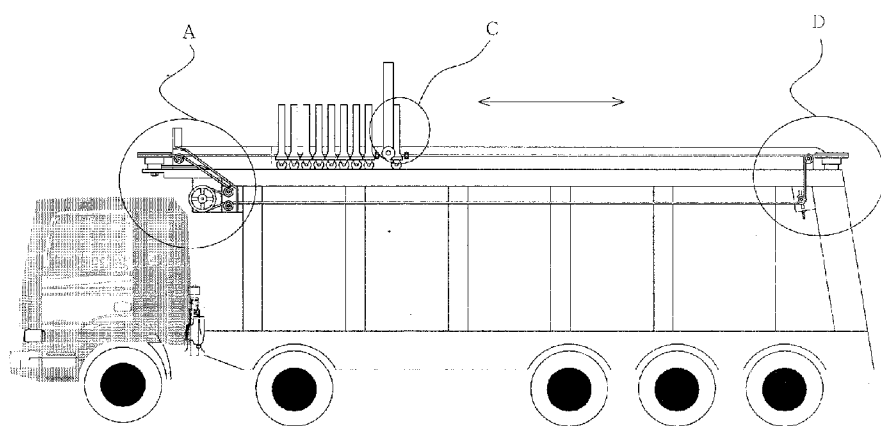
[Fig. 2]



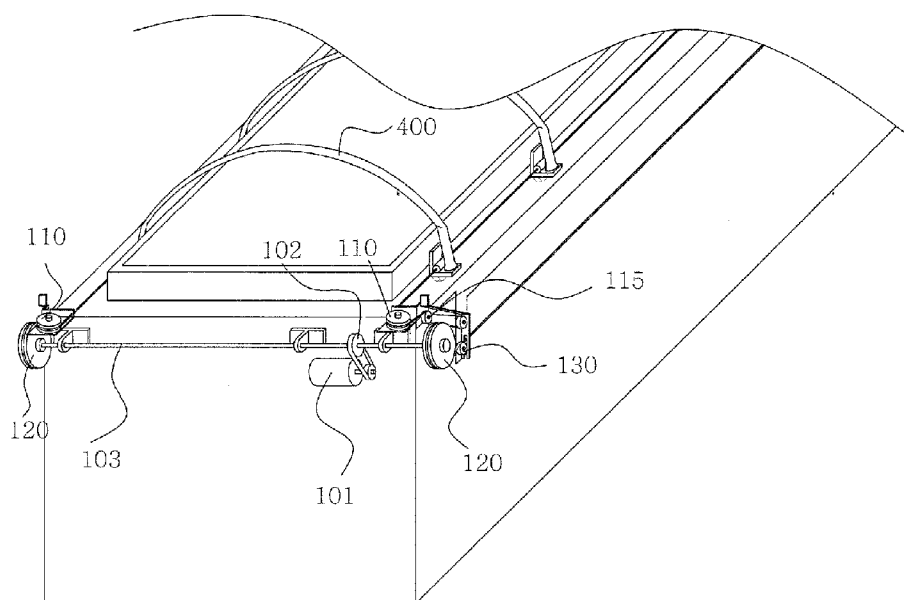
[Fig. 3]



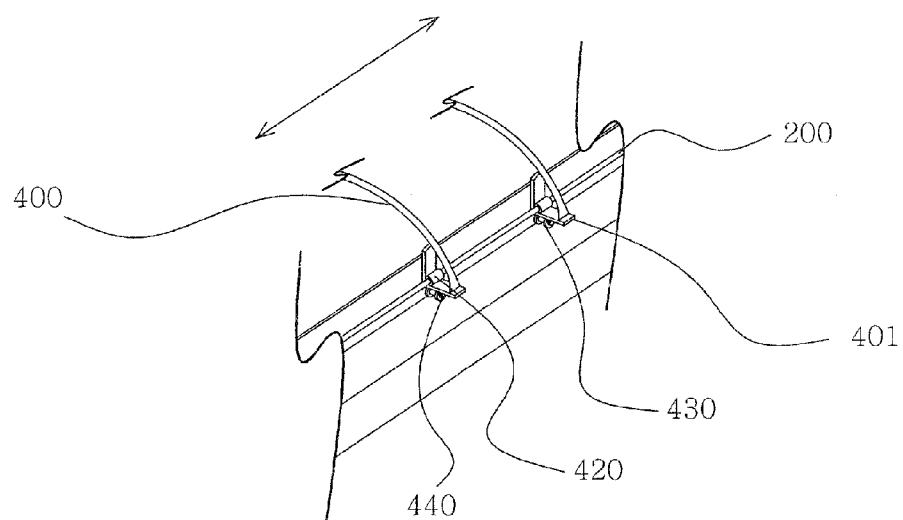
[Fig. 4]



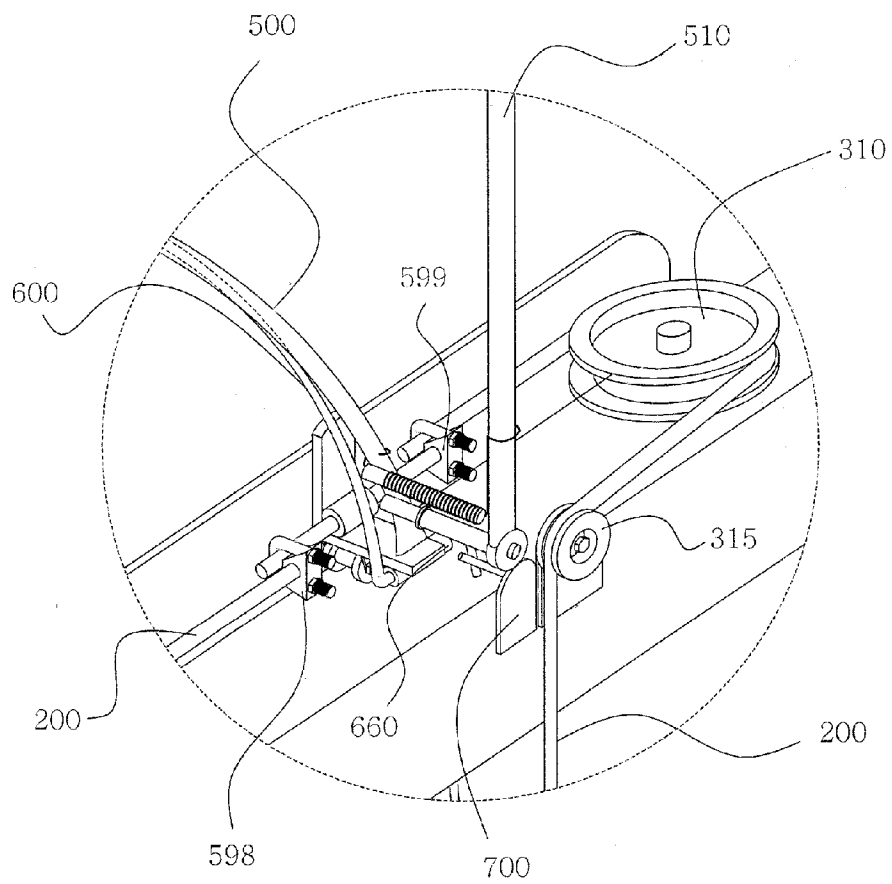
[Fig. 5]



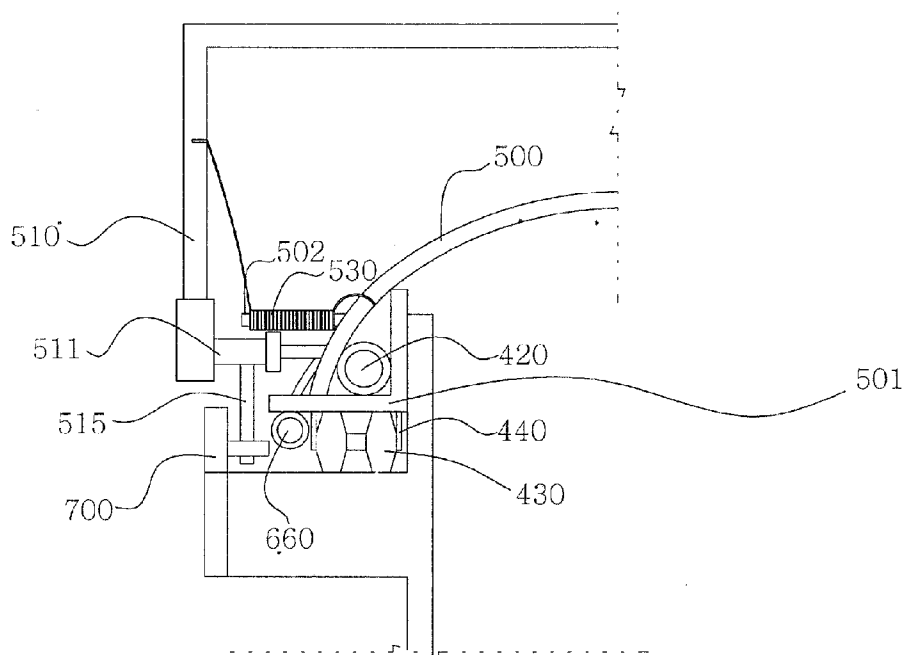
[Fig. 6]



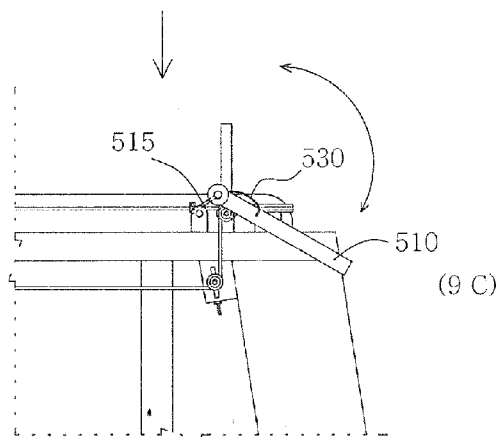
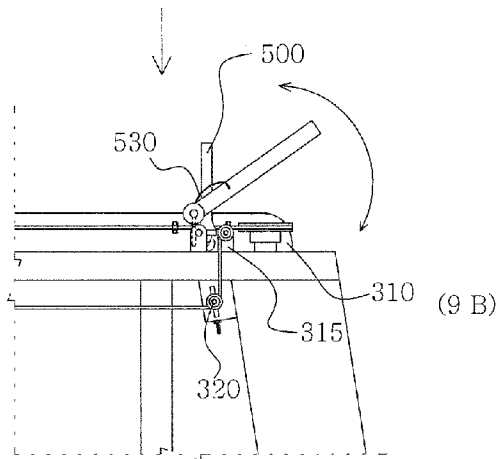
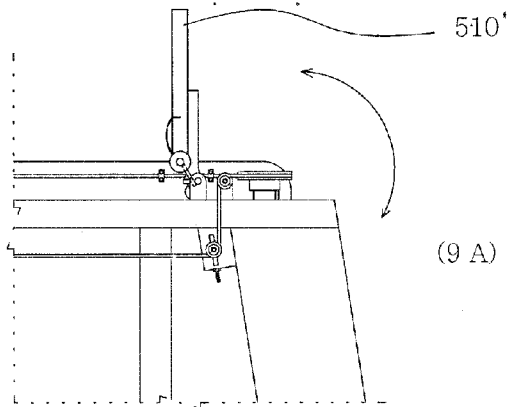
[Fig. 7]



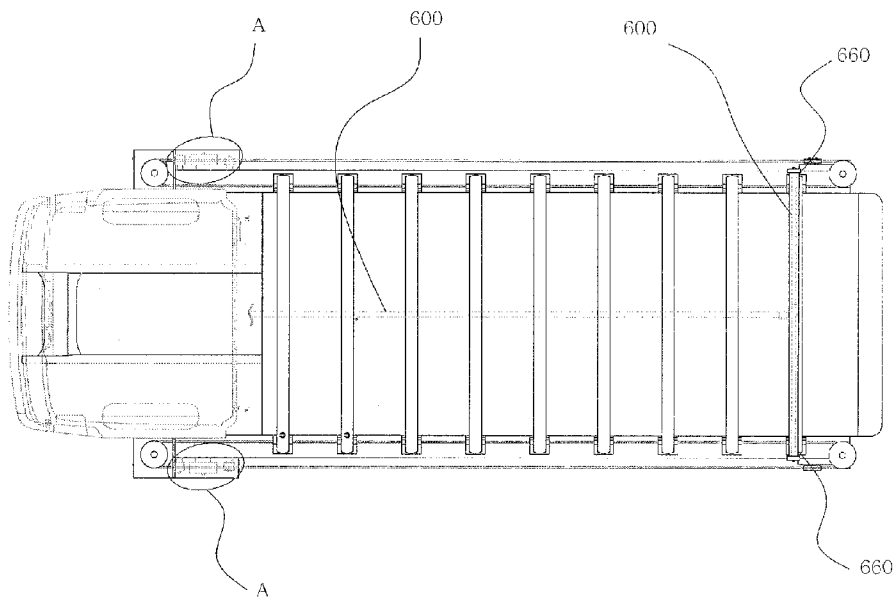
[Fig. 8]



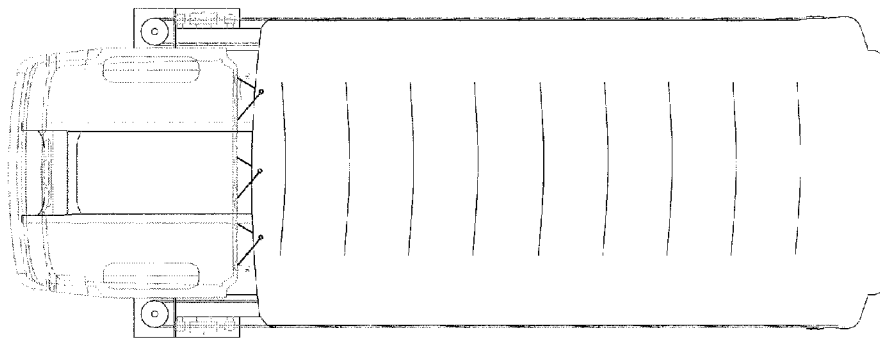
[Fig. 9]



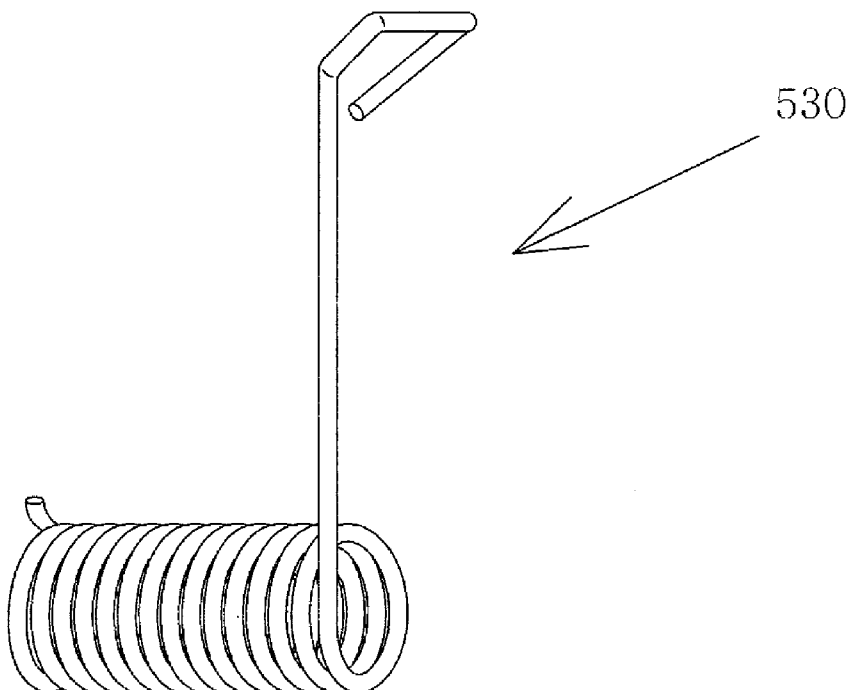
[Fig. 10]



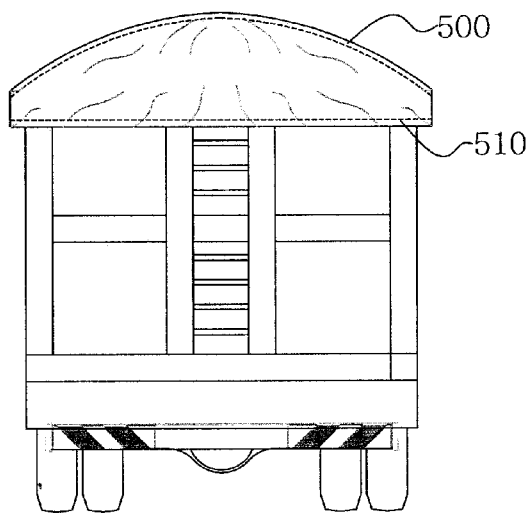
[Fig. 11]



[Fig. 12]



[Fig. 13]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/006778

A. CLASSIFICATION OF SUBJECT MATTER		
<i>B60P 7/02(2006.01)i</i>		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC9 B60P 7/02, B60P 7/00, B60J 11/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean Utility models and applications for Utility models since 1975. Japanese Utility models and applications for Utility models since 1975.		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKIPASS (KIPO INTERNAL) "truck" , "cover"		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	KR 10-1995-005628 A (SIM, SANG MOG) 20 March 1995 See page 1, line 10 to page 1, line 16; claims 1-2	1,9 2-8,10-12
Y A	KR 10-1998-065143 A (JIN, CHOON SIK) 07 October 1998 See page 2, line 49 to page 4, line 7; claims 1-2	1,9 2-8,10-12
A	US 4046416 A1 (JACOB PENNER) 06 September 1977 See column 2, line 17 to column 4, line 10; claims 1-5	1-12
A	JP 11-105615 A (HARA SHIGEO; HARA TERUFUMI) 20 April 1999 See paragraph 18 to paragraph 49; claims 1-5	1-12
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
Date of the actual completion of the international search 21 JULY 2009 (21.07.2009)	Date of mailing of the international search report 22 JULY 2009 (22.07.2009)	
Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer CHOI Eun Serk Telephone No. 82-42-481-5860 	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/006778

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-1995-005628 A	20.03.1995	None	
KR 10-1998-065143 A	07.10.1998	None	
US 4046416 A1	06.09.1977	None	
JP 11-105615 A	20.04.1999	None	