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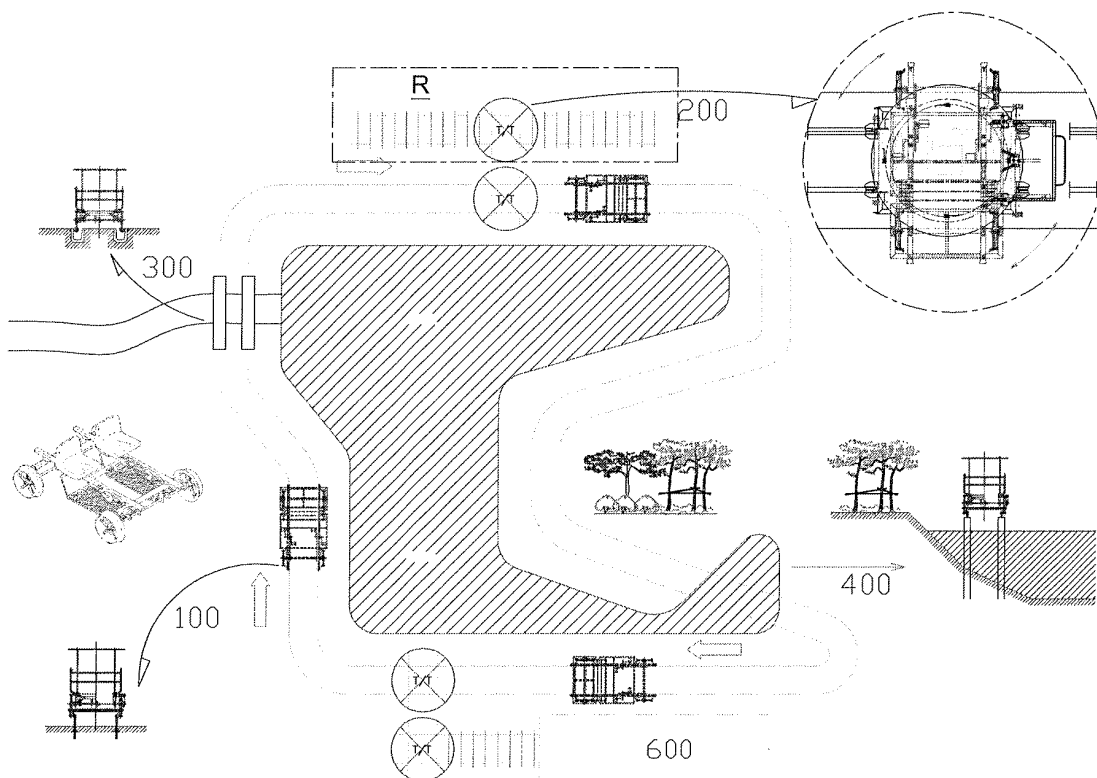
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(54) **Cart management system and rail track maintenance method**

(57) A tour and leisure cart management system capable of allowing large numbers of tourists to access nature reserves without damaging ecologically sensitive areas, the cart system comprising a driving track (100) con-

figured for rail carts to drive thereon, a turntable (200) for allowing the rail carts to turn around, a road crossing structure (300) for the running track, a waterside track (400) installed alongside a water body, and a cart storage unit (600).

Fig.1



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a cart management system which is installed in regions such as nature reserves, inhabited by animals and plants requiring that extreme care be taken, undeveloped regions difficult for humans to access, and swamps where traffic, such as vehicles, cannot travel, so that sightseeing is made possible without destroying the ecosystem of various resident animals and plants. More particularly, the present invention relates to a cart management system which can also be utilized as leisure sport equipment, by which a user can drive a rail cart using his/her own strength through a scenically beautiful region while enjoying the scenery.

Description of the Related Art

[0002] Many railroad tracks installed in areas producing coal, cement and wood have been decommissioned and neglected because they have become unprofitable. Such areas are mostly located on mountains difficult for ordinary people to access, and thus a rail cart capable of driving on the railroad tracks has been developed in order to develop such areas as tourist facilities and many other areas almost impossible to come nearby.

[0003] The inventor has developed Korean Utility Registration No. 368841, entitled "Manually Controlled Power Train on Railroad" and No. 371751, entitled "Rail Cart Powered by Wind," and has been managing such equipment in regions such as Jeong-seon, Gang-won Province, Korea.

[0004] Such a rail cart system, which is installed to use abandoned railroad tracks and is driven manually without additional power, can attract many tourists to flourish the regional economies because of the various tourists coming and enjoying the manually driving railroad cart system.

[0005] However, the rail carts of the above type can be managed only in regions where railroad tracks are installed. In addition, such railroad tracks are mostly single sets of tracks, so that a large number of people cannot drive rail carts without having to wait for a long time.

[0006] As another problem, after the rail carts are used, they must be returned to their starting place by additional workers and/or other devices for hauling the rail carts. Such drawbacks substantially decrease profitability.

[0007] As a further problem, it is impossible to use the rail carts in areas where rail tracks are not installed.

[0008] That is, there is an increasing number of people who want to experience scenes in beautiful areas such as lakesides, beaches, tree farms, resort towns, and ecological parks. However, such an experience can be had merely by walking or boating through swamps, valleys,

lakes and so on. Roads or footpaths installed for people to access the interior of the swamps, the valleys, the lakes and so on inevitably destroy nature. The surrounding environment is heavily destroyed by road construction or people who drive cars or walk on the road. Thus, development is often prohibited. Recently, after large numbers of tourists and vehicles caused the extinction of many trees and birds in the Korea National Arboretum, vehicle access was prohibited and the number of tourists per day is also limited.

[0009] In the case of famous mountains visited by large numbers of people, a gap year system for prohibiting access by people has unavoidably been introduced. Even though tourist tracks in the mountains are restricted to particular regions, the tracks are inevitably widened or destroyed by large numbers of seasonal tourists, and thus foliage surrounding the tracks perishes. Accordingly, the gap year system was introduced to protect nature by prohibiting access by people. In addition, natural swamps and protected forests are basically prohibited from access so that their natural state can be preserved.

[0010] However, blocking tourists has not only the positive aspect of conserving nature, but also the negative aspect of impoverishing nearby areas. Furthermore, it is effective to provide access areas rather than blocking access to nature reserves. Although the need to set aside areas to encourage the conservation of nature is increasing, suitable measures therefor have not yet been proposed. Accordingly, longstanding conflicts between developers and environmentalists are deepening, because the conservation of nature cannot coexist with development.

SUMMARY OF THE INVENTION

[0011] The present invention has thus been made to solve the aforementioned problems with the prior art, and an object of the present invention is to provide a tourist system capable of allowing large numbers of tourists to access nature reserves without injuring the ecological systems.

[0012] Another object of the invention is to provide a system capable of allowing easy access to sightseeing areas which are difficult to access and where railroad tracks are not installed, by installing a simple support structure and a rail track and developing carts for driving on the rail track.

[0013] A further object of the invention is to provide a tour cart management system that includes a multiple structure of two or more sets of rail tracks, in which a turntable or a resting place is installed so that tourists can take a rest while enjoying tours on carts.

[0014] Another object of the invention is to provide a tour cart management system including a multiple structure of two or more sets of rail tracks, so that the number of users can be greatly increased without having to destroy nature.

[0015] Yet another object of the invention is to provide

a rail system enabling tours and leisure, for which one need not construct a tunnel, build a bridge or remove a protruding part of a mountain for the purpose of road or footpath construction, and in which running rails are installed a preset distance from the ground, which is required in order to conserve nature, thus permitting tourism without injuring the ground, so that the ecological paths of animals can be preserved.

[0016] According to an aspect of the invention for realizing the object, the cart driving rail system of the invention can be installed in areas having excellent scenery, places where various memorials or educational materials are displayed, nature reserves where wildlife resides and access is restricted, undeveloped areas that are difficult to access, swamps which are difficult to access using typical vehicles and so on, in order to enable tours for various natural resources, animals, plants and educational materials, without having to consume a massive amount of construction costs for road construction and rail installation.

[0017] The invention provides a rail system which is installed a preset distance from the ground so that the rail system does not directly contact the ground or animals/plants in nature reserves.

[0018] The invention provides a rail system that includes turntable structures in specific places so that a cart can reverse its direction or move from one rail to another one if necessary in order to access a desired place, which is an improvement on the a conventional system, in which carts can move only in one direction.

[0019] The invention also provides a rail system which is installed a preset distance from the ground using rails made of square iron pipes, which are suitably bent according to the installation site, and a pillar structure capable of fixing the rails at a specific location in the ground.

[0020] The invention further provides a rail system capable of allowing tours regardless of obstacles such as swamps, steep slopes and rivers, using a pillar structure to fix rails above the swamp, an additional support structure to support rails on the steep slope, or a simple reinforcement structure attached to the edge of a bridge in the case of a river.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0022] FIG. 1 is a schematic view illustrating the rail system of the invention installed around a lake;

[0023] FIG. 2 is a cross sectional view illustrating a rail track of the invention;

[0024] FIG. 3 is a plan view illustrating the rail track of the invention;

[0025] FIG. 4 is a cross sectional view illustrating a flat rail track of the invention, which is installed directly on the ground;

[0026] FIG. 5 is a side elevation view illustrating the rail system of the invention installed in an area of uneven ground;

[0027] FIG. 6 is a cross sectional view illustrating a light road crossing structure installed at a road crossing;

[0028] FIG. 7 is a cross sectional view illustrating carts traveling on the light road crossing structure installed at a road crossing;

[0029] FIG. 8 is a cross sectional view illustrating a heavy road crossing structure installed at a road crossing;

[0030] FIG. 9 is a perspective view illustrating a common joining block of the invention;

[0031] FIG. 10 is a perspective view illustrating a repair joining block of the invention;

[0032] FIG. 11 is a front elevation view illustrating a repair rail of the invention;

[0033] FIG. 12 is a cross sectional view illustrating running rails of the invention, which are installed on a bridge;

[0034] FIG. 13 is a front elevation view illustrating a turntable of the invention;

[0035] FIG. 14 is a side elevation view illustrating the turntable of the invention;

[0036] FIG. 15 is a plan view illustrating the turntable of the invention;

[0037] FIG. 16 is a cross sectional view illustrating the rail track of the invention installed water body;

[0038] FIG. 17 is a cross sectional view illustrating the rail track of the invention installed over a water body;

[0039] FIG. 18 is a process view illustrating the procedure for repairing a rail track in case of damage thereto;

[0040] FIG. 19 is a plan view illustrating a cart wheel running toward a rail track joint of the invention;

[0041] FIG. 20 is a plan view illustrating the cart wheel running on a rail track joint of the invention; and

[0042] FIG. 21 is a process view illustrating the procedure of assembling the rail track of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0043] The present invention will now be described more fully with reference to the accompanying drawings, in which preferred embodiments of the invention are shown.

[0044] Referring to FIG. 1, an exemplary embodiment of the invention includes a track 100 having rails installed directly on the ground or at a preset distance from the ground, a turntable 200 provided at a preset position in the track 100 to allow a cart running on the track 100 to be turned around, a road crossing structure 300 configured to cross a road and the like, on which heavy objects such as vehicles travel, a waterside track 400 installed near a water body, such as a river or a lake, and a cart storage unit 600.

[0045] The track 100 of the invention is implemented using adjustable rails installed a preset distance from the ground, as shown in FIGS. 2 and 3, or flat rails installed

directly on the ground, as shown in FIG. 4. In addition, FIG. 5 is a side view illustrating the track of the invention installed on an area of uneven ground.

[0046] In the case where the adjustable rails are installed on ground which is not flat but is uneven, that is, has height differences, holders for fixing the rails 50 to pillars 1 are adjusted in position to make the rails parallel with the horizon. Sinkage prevention plates 3 are provided to prevent the pillars 1 from sinking into the ground. The sinkage prevention plates 3 have a wide and planar base structure to prevent sinking. On the other hand, if the ground where the rails will be installed is flat, ties are installed directly on the ground without the use of additional pillars, and then the rails are installed on the ties. In the case of soft ground, which is not strong enough to withstand the load of running carts, auxiliary bases are installed to prevent deformation of the rails.

[0047] Referring to the flat rails shown in FIG. 4, ties 7a made of wood members or steel pipes are installed at a preset interval, and the rails 50 are seated on and fixed to the ties 7a using fixing bolts 8 and coupling nuts 9. This installation technique is used to directly install the rails on ground which is relatively flat, in which case the rails are not deformed much by the running of the carts.

[0048] When installing the rails of the invention, the rails 50 are cut to have inclined sections at each end thereof, as shown in FIG. 11, and a joining block 13 such as that shown in FIG. 9 is inserted into one rail 50 through the inclined section (see FIG. 21). Then, as shown in FIG. 21, the joining block 13 is assembled with the rail 50 by using a bolt engaged with a nut so that the bolt extends through an assembly hole 32 in the joining block and an assembly hole 51 in the track rail, and the holders 5 for fixing the rails to the pillars 1 are assembled therewith. As another aspect of the invention, an indentation 13a is formed in the bottom wall of the joining block to form a rainwater drain path when assembled. Then, rainwater that enters the space inside the rail can be drained out through the rainwater drain path defined by the indentation 13a.

[0049] The turntable 200 is configured to allow a cart to be moved to another track without having to obstruct a following running cart, by which a user can drive the cart to a resting place R as shown in FIG. 1 to take a rest for a while, or can turn the cart around to run in the opposite direction.

[0050] The detailed installation position and operation of the turntable 200 are illustrated in FIGS. 13 to 15. The turntable 200 has turntable rails 210 fixed to respective running rails 211 by locking devices 212, as shown in FIG. 14, in order to allow a cart C running on the rail to be turned around. Each of the turntable rails 210 is provided at a lower central portion thereof with a rotation shaft 220, and is configured to be rotatable around the rotation shaft 220. The turntable rail 210, in a turned position, can be moved toward an adjacent rail, indicated by the arrow D, by an additional conversion rail 215. The locking device 212 installed between the turntable rail

and the running rail is locked and unlocked using a lock 214 connected with a lever 202 of a handle 201. When the user pulls the lever 202, the lock, connected to the lever, moves back to unlock the locking device 212. The locking device 212 is locked when the lever 202 is returned to its original position. The locking technique using the lever can be replaced by an electronic control system having a magnetic clutch or a mechanical control system having a gear assembly. It will be appreciated that any structure implementing the locking and unlocking can be adopted as long as it works and can endure outdoor conditions. In the case where it is desired to drive the cart on the running rails installed in the resting place R, the locking device 212 is unlocked and the turntable rails are turned to face the resting place, as indicated by the arrow 250 in FIG. 15. Then, the cart C is moved, as indicated by the arrow D, from the rails on which it is currently running to the resting place. When leaving the resting place, the above procedures are repeated to move the cart to the running rails again so that the cart runs on the running rails again.

[0051] The road crossing structure 300 is as shown in FIGS. 6 to 8, and is installed at a place where the track crosses an existing road or footpath. The road crossing structure 300 is configured to allow free passage to vehicles, other carts, pedestrians and the like who cross over the running rails and to sustain the impact applied to the running rails under the weight of the vehicles without being deformed. The road crossing structure 300 is installed differently corresponding to the load encountered at different installation places. That is, a place where vehicles cross places a larger load on the road crossing structure 300 than a place where pedestrians cross. In greater detail, FIG. 6 shows a light road crossing structure installed in a place where the track crosses a footpath or a cycle path where relatively lighter objects, such as pedestrians or bicycles, cross. The road crossing structure has U-shaped support structures 8 installed in the ground 2, each of the support structures 8 being open upward and implemented as a U-shaped gutter. FIG. 8 shows a heavy road crossing structure installed in a place where the track crosses a road for relatively heavier objects such as vehicles. The road crossing structure has bases 6 installed to support the entire bottom of the running rails. In each of the bases 6, vertical and horizontal reinforcement members 9 and 9a are provided. In an inside space defined by the vertical reinforcement member 9, the rail 50 is installed so as to be connected to a linking member 5c of the pillar 1 by a connector 9b. This structural feature acts to prevent a heavy object such as a vehicle from directly contacting the rails 50 as well as to disperse and remove a large vertical load using the vertical and horizontal reinforcement members 9 and 9a and the bases 6.

[0052] The waterside track 400 of the invention is installed beside a water body such as a river or lake, and in particular, on a slope, or at least partially fixed underwater. The waterside track 400 also includes a bridge

crossing a river. The installation position of the waterside track 400 will be described below with reference to FIGS. 16 and 17.

[0053] FIG. 16 shows a row of pillars installed underwater, and FIG. 17 shows both rows of pillars installed underwater.

[0054] Referring to FIG. 16, a row of pillars on the ground is provided with sinkage prevention plates, which are stuck in the ground. In the case of underwater installation, underwater pillars 410 are provided to support the corresponding rail. The underwater pillars can be implemented with or fixed by wood pillars, iron frames or iron frame concrete structures which are rust-resistant, such as those commonly used in bridges and engineering work.

[0055] Referring to FIG. 17, both rows of pillars are installed underwater and can be implemented with or fixed using wood pillars, iron frames or iron frame concrete structures, which are rust-resistant.

[0056] Another embodiment of the waterside track of the invention can be realized using a simple additional structure in a swamp or lake so that the running rails can be installed without causing interference to pedestrians or vehicles crossing an existing bridge on the swamp or lake.

[0057] In more detail, referring to FIG. 12, an extension 301 is fastened to the edge of an existing bridge 500, and is supported by a reinforcement 302 braced against a pillar 501 of the bridge 500. With this arrangement, the running rails of the rail track 50 are installed on the extension 301, so that carts can travel along the rail track 50.

[0058] This aspect of the invention allows the running rails to be installed on an existing structure, such as an overpass or a bridge, so that the tour carts can drive on the rails as desired.

[0059] In another aspect of the invention, joints of the running rails are slanted in order to suppress vibration and noise occurring at the joints of the running tracks, thereby greatly improving driving comfort.

[0060] In more detail, as shown in FIG. 19, the assembly contact surfaces of the running rails are cut at an angle of 45°, thereby forming inclined sections 12 and 12a. The inclined sections 12 and 12a of joining rails are formed to match each other, and a joining block 13 is inserted into the joining rails through the inclined sections 12 and 12a. Then, the joining block 13 is assembled with the joining rails to provide smooth running rails to afford smooth cart driving.

[0061] Referring to FIG. 20, when a cart wheel moves on the joint where the cut inclined sections contact each other, the wheel surface WH contacts both of the inclined sections 12 and 12a at the same time. This has the consequence of minimizing rattling during driving, which may be caused by a height difference, minute center displacement or distortion of the rails in conventional rails, in which the ends of the rails are joined at vertical sections.

[0062] According to another aspect of the invention, the running rails are implemented as hollow iron mem-

bers, unlike conventional rails, and thus can be easily installed, disassembled and modified. In particular, curved rails can be modified before installation so as to match various conditions at installation sites.

[0063] As a measure to facilitate the continuous assembly of running rails, the joining block 13 is used to assemble the rails with 45° inclined sections. Furthermore, the invention also proposes a cutting and replacement structure, by which a broken or damaged rail can be easily cut or removed from the rail track and a new rail can be easily installed.

[0064] In greater detail, as shown in FIG. 18, the damaged rail track can be repaired by following procedures of:

[0065] cutting a damaged rail portion 16 at an inclination of 45° from a main rail M when the rail portion 16 is broken or damaged to the extent that rail function is lost;

[0066] preparing a repair rail portion 55 having a length matching that of the damaged track portion 16 and end sections corresponding to cut sections of the main rail M;

[0067] inserting repair joining blocks 31 into the main rail M through the cut sections and connecting the repair rail portion 55 to the main rail M;

[0068] inserting jigs into adjustment holes 33 in both side faces of the repair rail portion 55 (see FIG. 10) and aligning main assembly holes 32 of the repair joining blocks 31 with main assembly holes 51 of the main rail M; and

[0069] when the aligning has been accomplished, fixing the repair joining blocks 31 to the main rail M by fixing bolts.

[0070] Another aspect of the invention is that the height of pillars for curved running rails can be adjusted according to the direction and degree of curves to the outer circumference of the rails in order to obtain a suitable inclination angle, thereby helping the cart safely and stably drive along the curved rail track. Unlike train rails, the running rails of the invention are designed such that vertical positions of the holders and the pillars can be adjusted in order to properly disperse vertical and lateral weight caused by the radius of the curve.

[0071] A further aspect of the invention serves to overcome the drawback in which it is difficult for carts to run on the rails when the top surface of the rails freezes, by providing slits in the top surface of the rails in the direction perpendicular to the running direction (i.e., perpendicular to the longitudinal direction of the rail). The slits may include small protrusions or indentations on the top surface of the rails to create a suitable level of frictional force with the drive wheels of the carts when they contact the slits in order to ensure safe driving.

[0072] Another aspect of the invention is to provide sensors at specific points along the rails to detect the passage of carts. In this way, when a sensor detects a cart arriving at a specific place, it is possible to make an announcement to the cart about the name of the place, tell stories associated with the place, describe famous sights, and so on.

[0073] Since the tour and leisure cart management

system of the invention may be installed generally in famous sightseeing areas, nature reserves, wildlife preserves and the like, guidance and publication for regional development and sightseeing tours can be provided, focusing on animals/plants inhabiting the corresponding region and on various information pertaining to the corresponding region.

[0074] In the case of a flat installation technique, if the ground meets a predetermined strength requirement and does not easily sink, the pillars or sinkage prevention plates need not be installed, but common iron pipes are arranged sequentially to support rails, thereby constructing ties 7a (see FIG. 4), and then rails can be fixed onto the ties 7a.

[0075] In the case where the ground is sloped and thus rails are not arranged horizontally, the height difference between the two pillar rows is measured so that the measured height difference can be compensated for. If sufficient support cannot be provided by the pillar rows, suitable auxiliary pillars 1a are provided to the pillar rows to ensure reinforcement. The auxiliary pillars are shown in FIG. 5, or may be installed to be suitable for installation sites in the case of a steep slope, as shown in FIG. 16.

[0076] According to the rail system of the invention as set forth above, it is possible to use carts irrespective of whether railroad rails were previously installed, as an improvement over the prior art, in which the carts can be driven only on existing rails previously used for trains. Accordingly, tourists can access areas that are difficult to access but have excellent scenery, using manually powered carts instead of internal combustion engines, in order to allow tourism while still prohibiting actual pedestrian or vehicle access to these areas, thereby enabling the preservation of nature.

[0077] The installation operation of the invention can be carried out while retaining the wilderness and natural environments, unlike in conventional railroad or road construction, and furthermore, the rail system can be installed so that it does not contact the ground, merely using pillars. This arrangement basically prohibits tourists from contacting the ground in order to prevent damages to natural areas. This can satisfy both the need to preserve nature and the need to stimulate tourism based on the natural areas, thereby ensuring tax revenues for local governments while enabling the preservation of nature.

[0078] In particular, the invention uses a cart system capable of operating without a power supply (e.g., electricity and gasoline), and thus is easily installed in remote areas. Furthermore, no complicated mechanism or process is needed to manage the cart system.

[0079] Because the cart system is driven manually, slight deformation or distortion of the rails may make driving difficult. To cope with this, the rails are connected together at a slight angle so that the deformation or distortion of the rails does not obstruct driving.

Claims

1. A tour and leisure cart management system, comprising:

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a driving track configured for rail carts to drive thereon, the driving section comprising hollow, square, rod-shaped running rails each having an inclined cross section at an end to be assembled with another one of the running rails, and a joining block inserted into the end of the hollow rail through the inclined cross section, the rails being assembled sequentially to define the driving track;

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a turntable for allowing the rail carts to turn around, the turntable comprising turntable rails and locking devices fixing the turntable rails to respective running rails, each of the turntable rails having a rotation shaft installed in a lower central part thereof, each of the locking devices capable of being locked and unlocked by a rod-shaped lock connected with a lever of a handle; a road crossing structure for the running track, the road crossing structure comprising a gutter-shaped reinforcement structure installed in ground, wherein a connector fixedly connects a pillar fixed to an outer underground with a holder at an outer edge of the reinforcement structure; a waterside track installed alongside a water body, and having an underwater pillar for supporting a portion of the running track alongside the water body; and a cart storage unit for storing the carts.

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2. The tour and leisure cart management system according to claim 1, wherein an indentation is formed in a bottom of the joining block inserted into the end of the hollow rail.

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3. The tour and leisure cart management system according to claim 1, wherein the pillar of the driving track is provided at a lower portion, fixed underground, with a sinkage prevention plate, and is connected at an upper end to a corresponding one of the running rails by the holder.

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4. The tour and leisure cart management system according to claim 1, wherein ties are arranged with a predetermined distance therebetween, and the running track is fixed onto the ties by fixing bolts and nuts.

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5. The tour and leisure cart management system according to claim 1, wherein the road crossing structure comprises a base in a form of a gutter for supporting a bottom of the running track by using vertical and horizontal reinforcement members, and a linking member of the pillar is connected to a corresponding

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one of the rails by a connector, in an inside space defined by the vertical reinforcement member.

6. A rail track maintenance method for a tour and leisure cart management system, the method comprising steps of: 5

cutting a damaged rail portion from a main rail at an angle of 45° when the rail portion is broken or damaged to an extent that rail function is lost; 10
preparing a repair rail portion having a same length as a damaged track portion and end sections corresponding to cut sections of the main rail;
inserting repair joining blocks into the main rail 15
through the cut sections and connecting the repair rail portion to the main rail;
inserting jigs into adjustment holes in both side faces of the repair rail portion and aligning main assembly holes of the repair joining blocks with 20
main assembly holes of the main rail; and
when alignment is accomplished, fixing the repair joining blocks to the main rail using fixing bolts.

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Fig.1

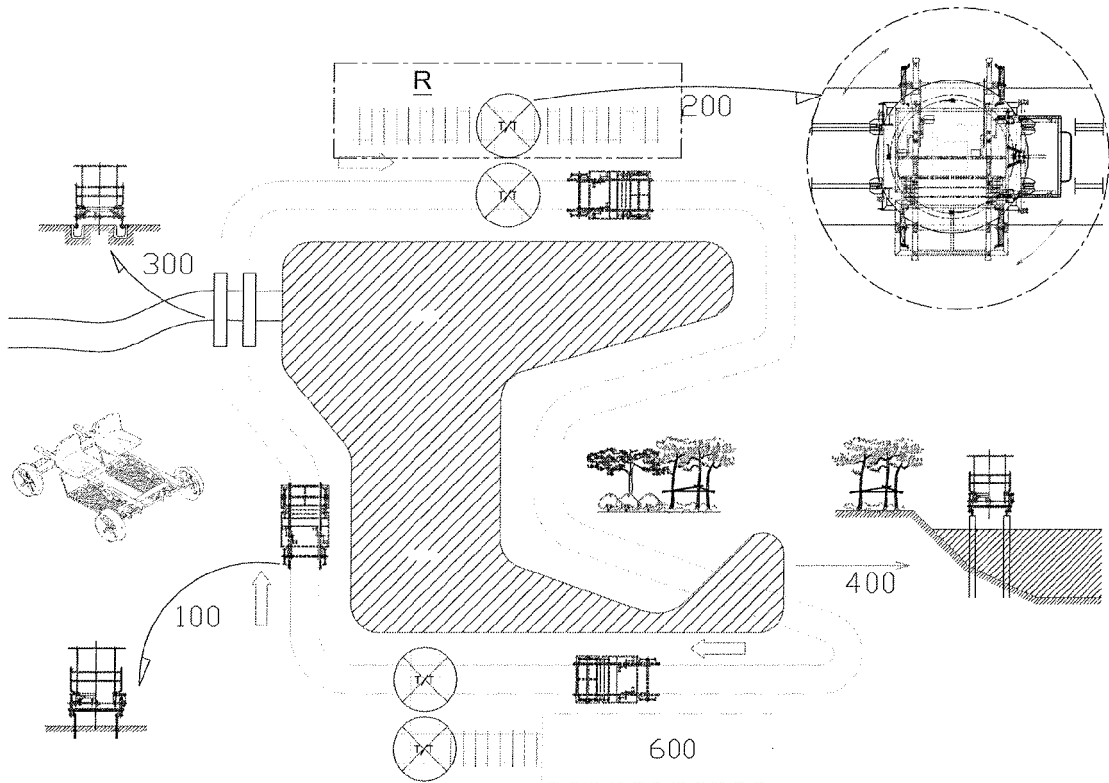


Fig.2

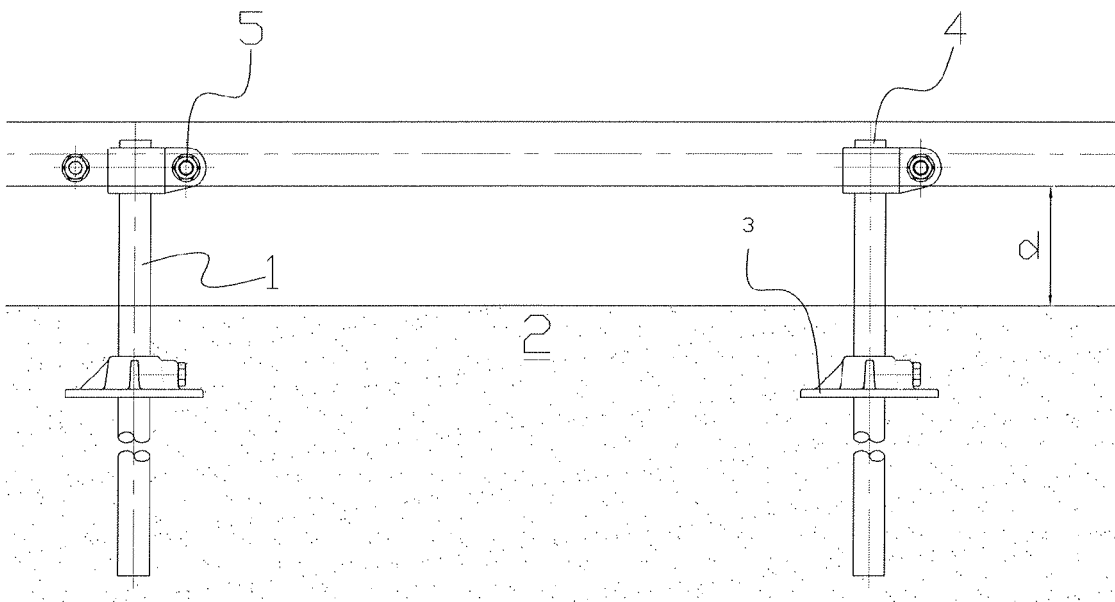


Fig.3

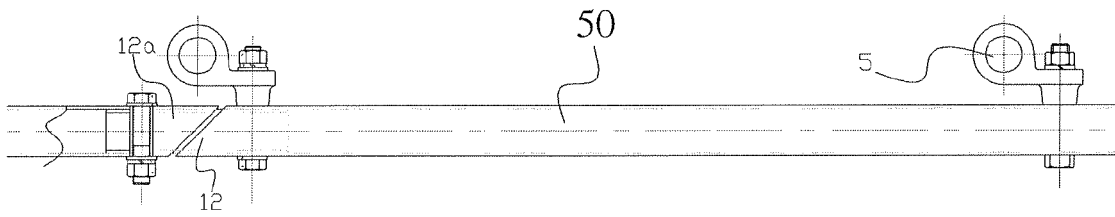


Fig.4

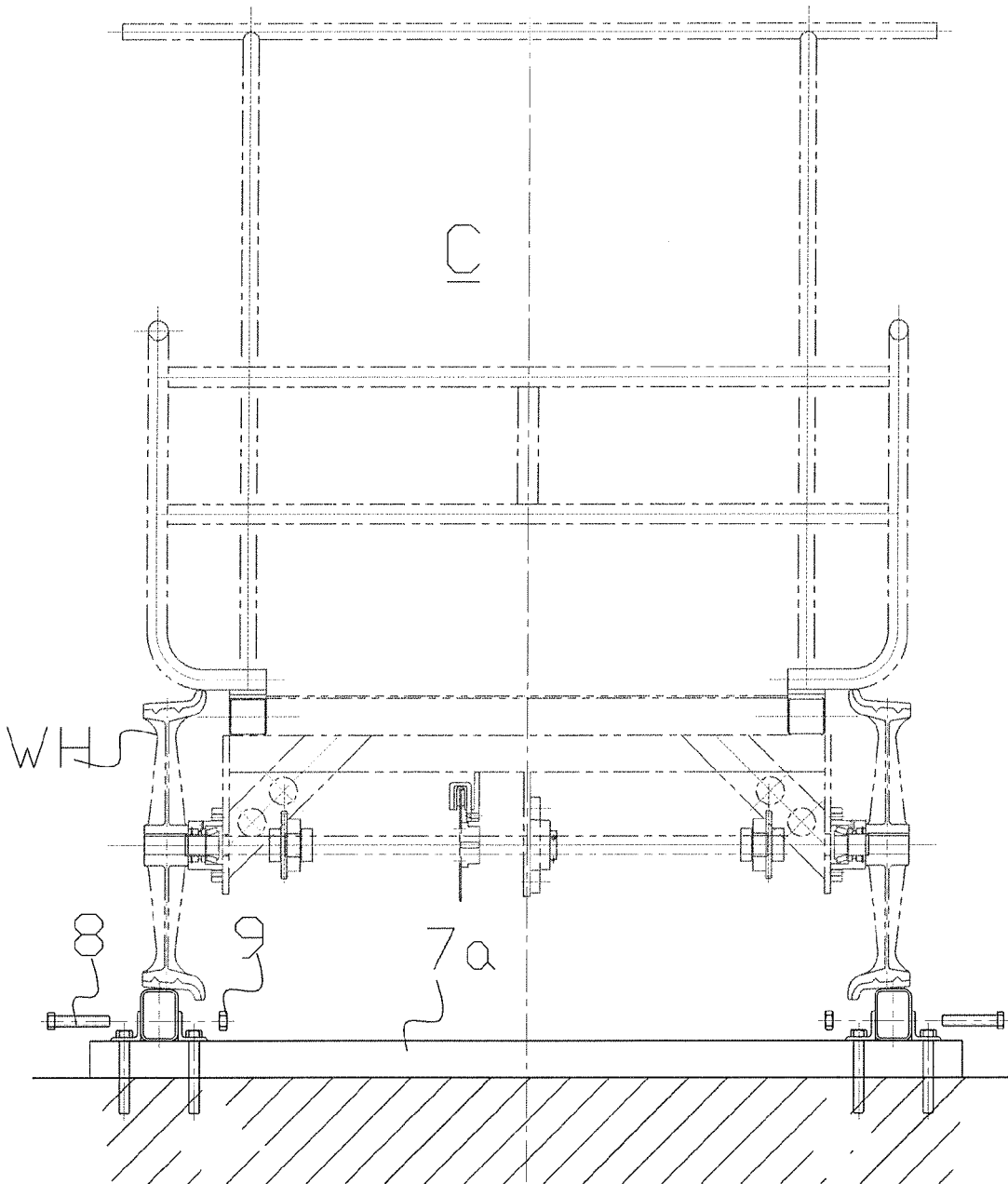


Fig.5

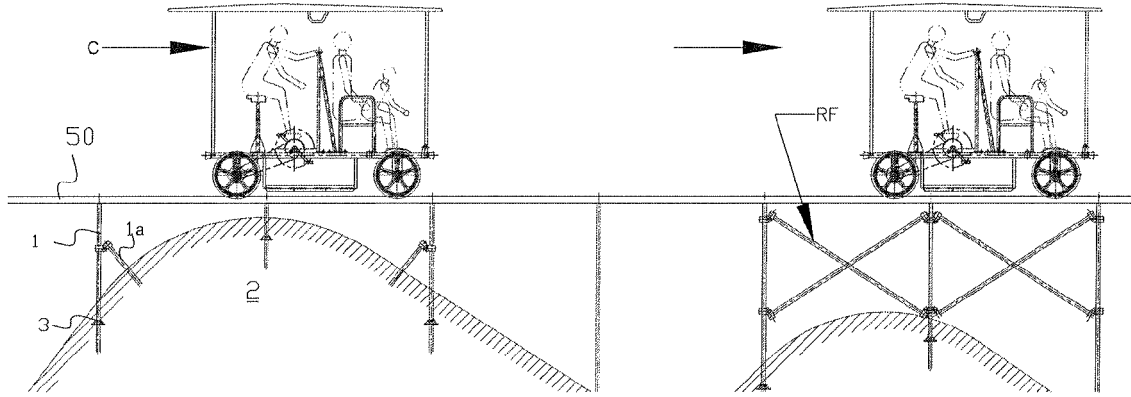


Fig.6

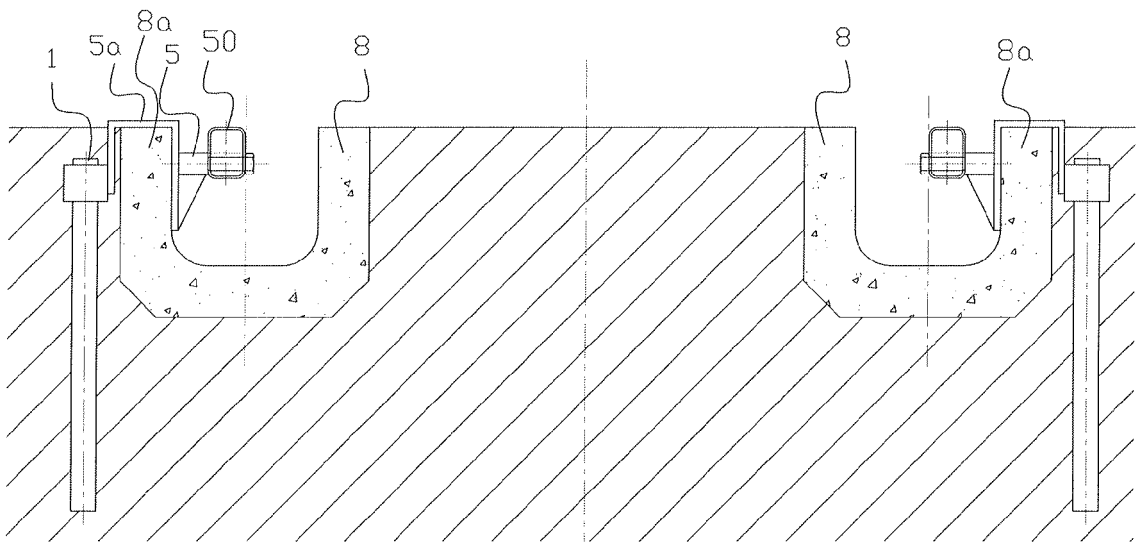


Fig.7

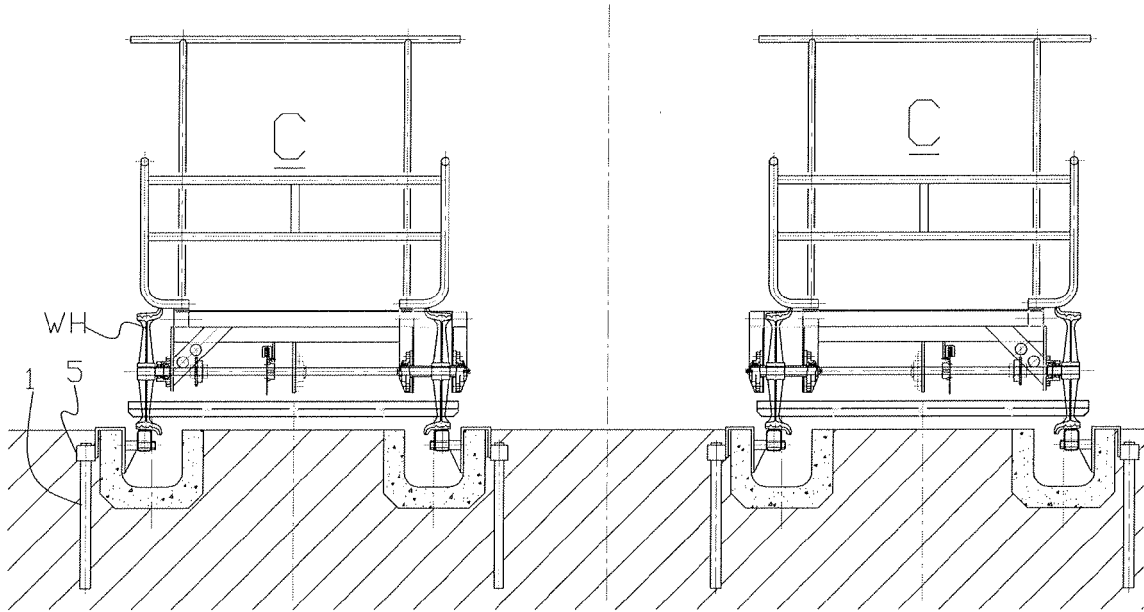


Fig.8

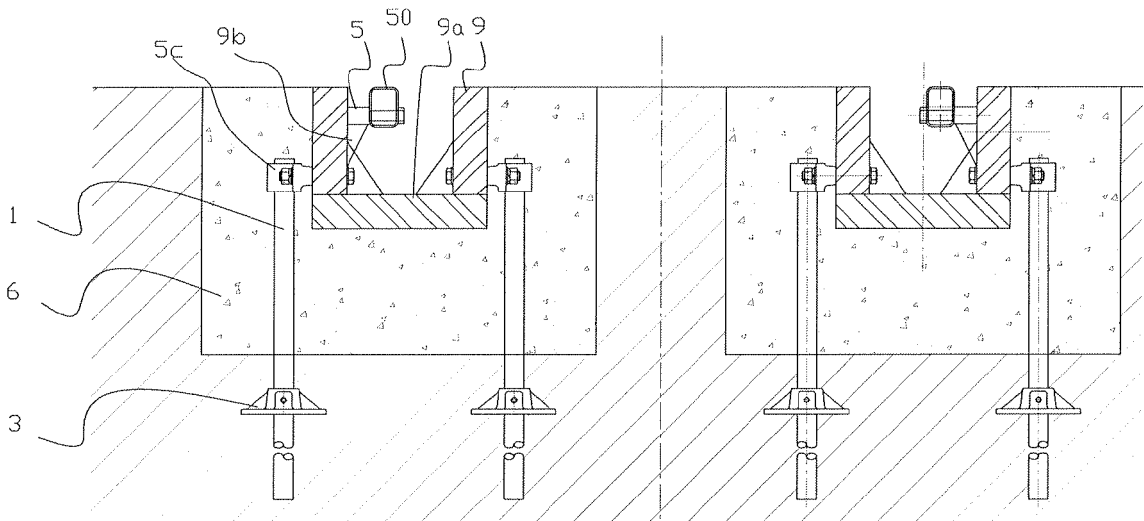


Fig.9

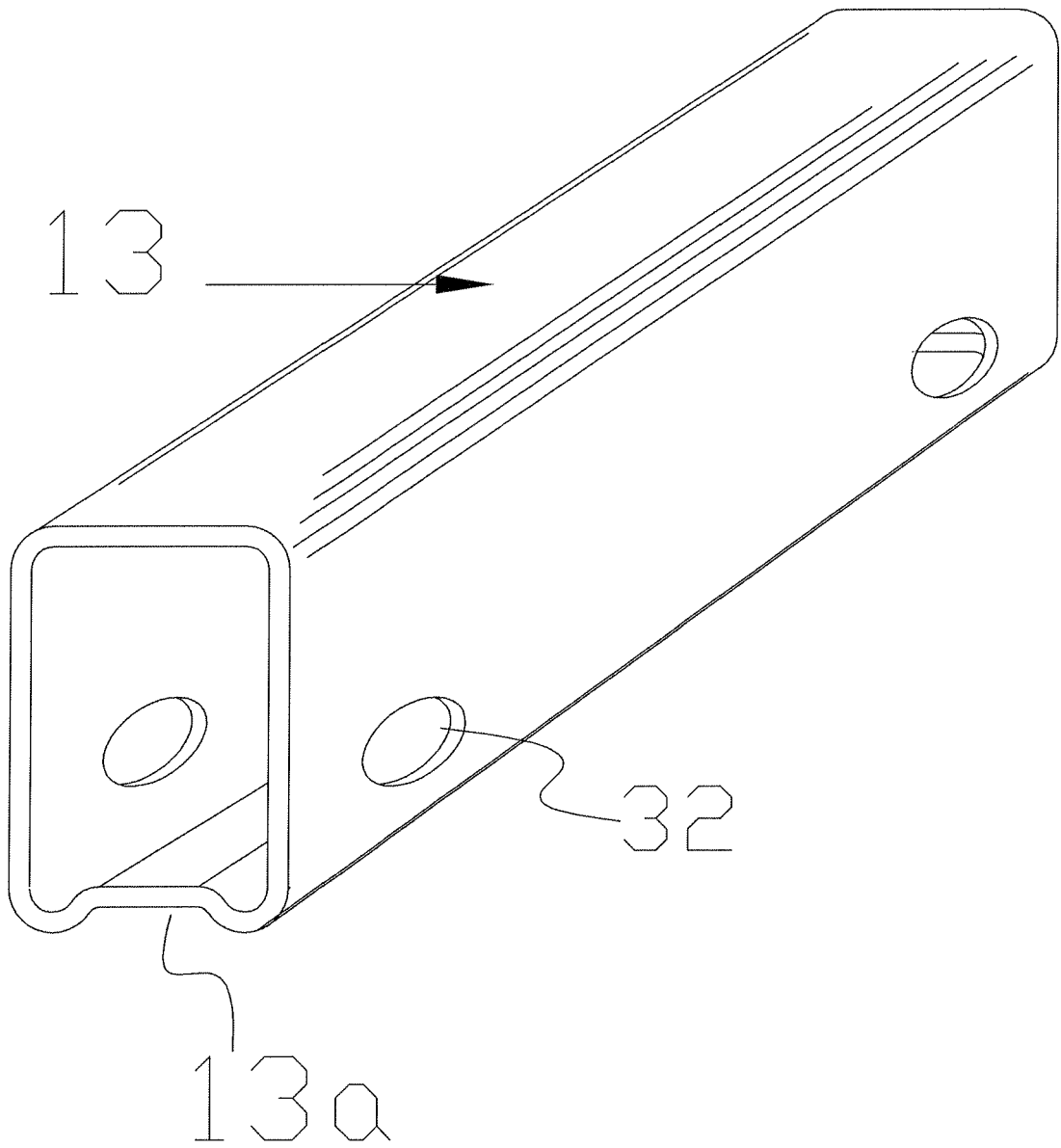


Fig.10

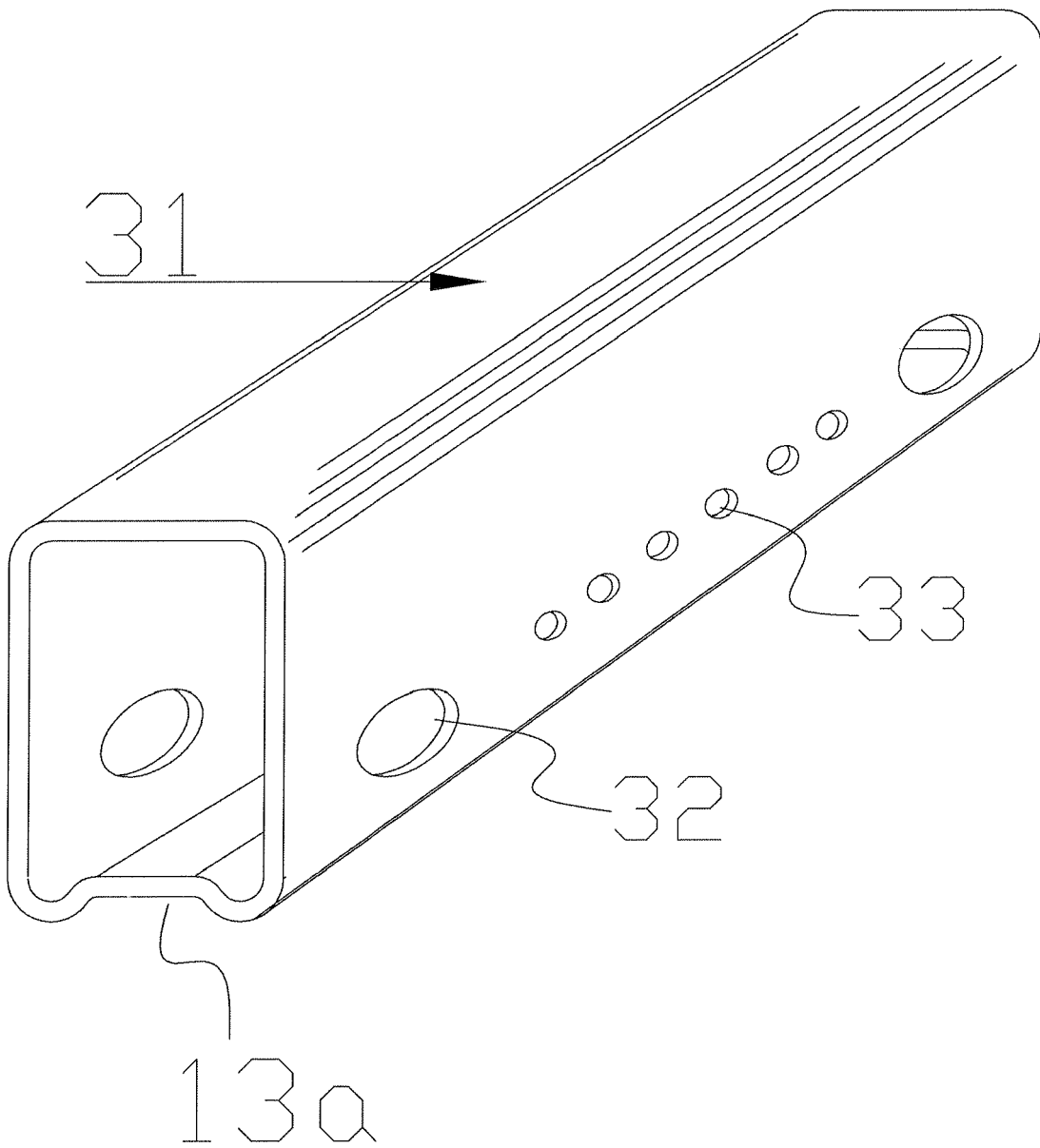


Fig.11

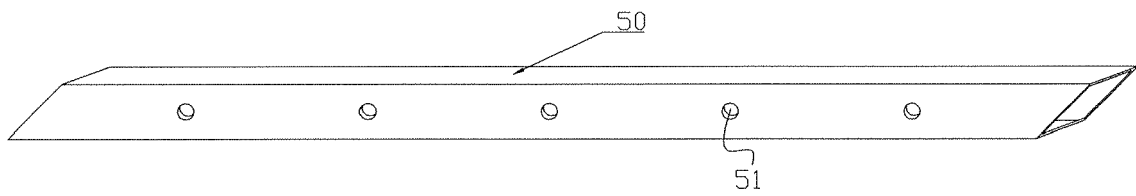


Fig.12

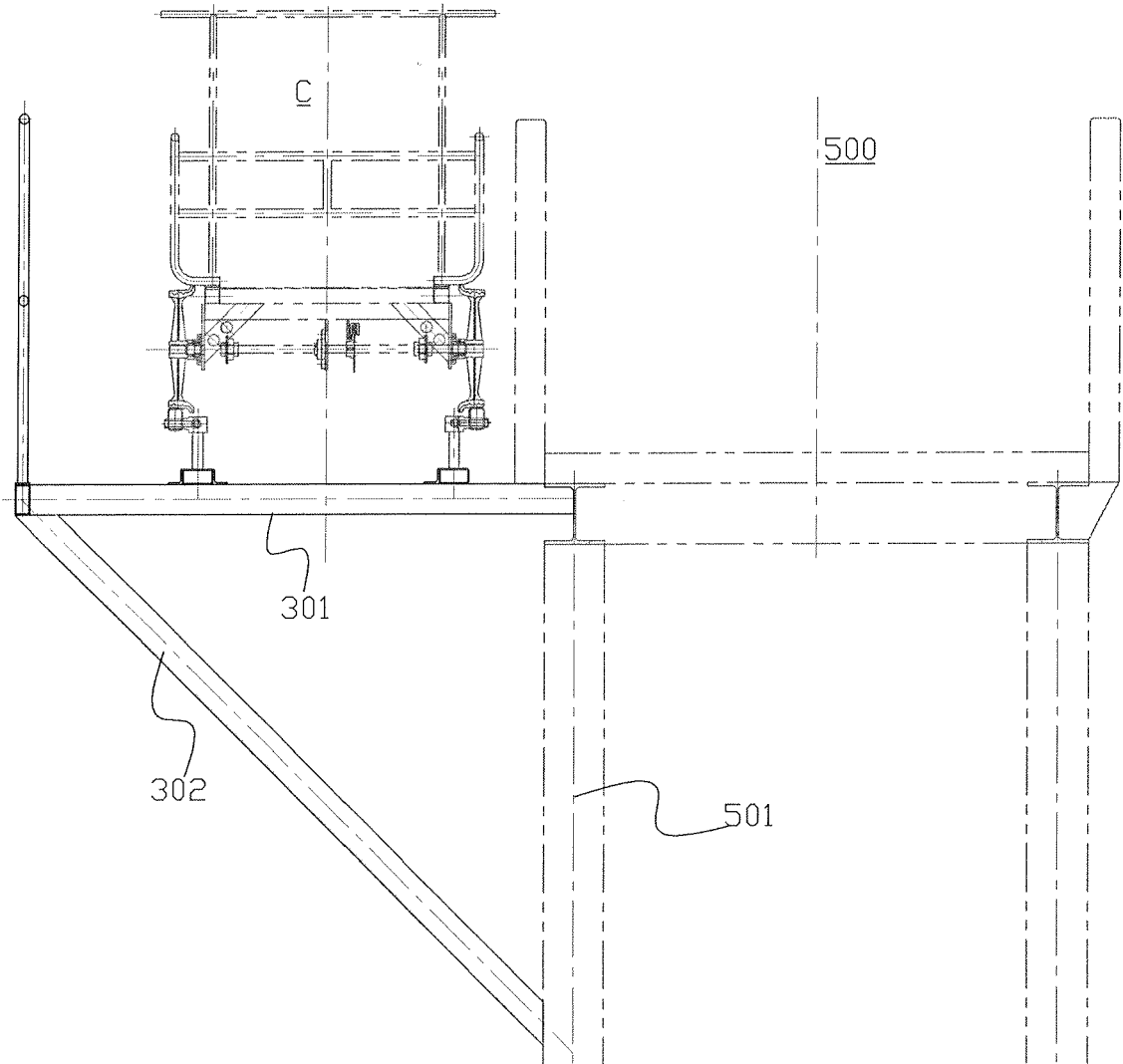


Fig.13

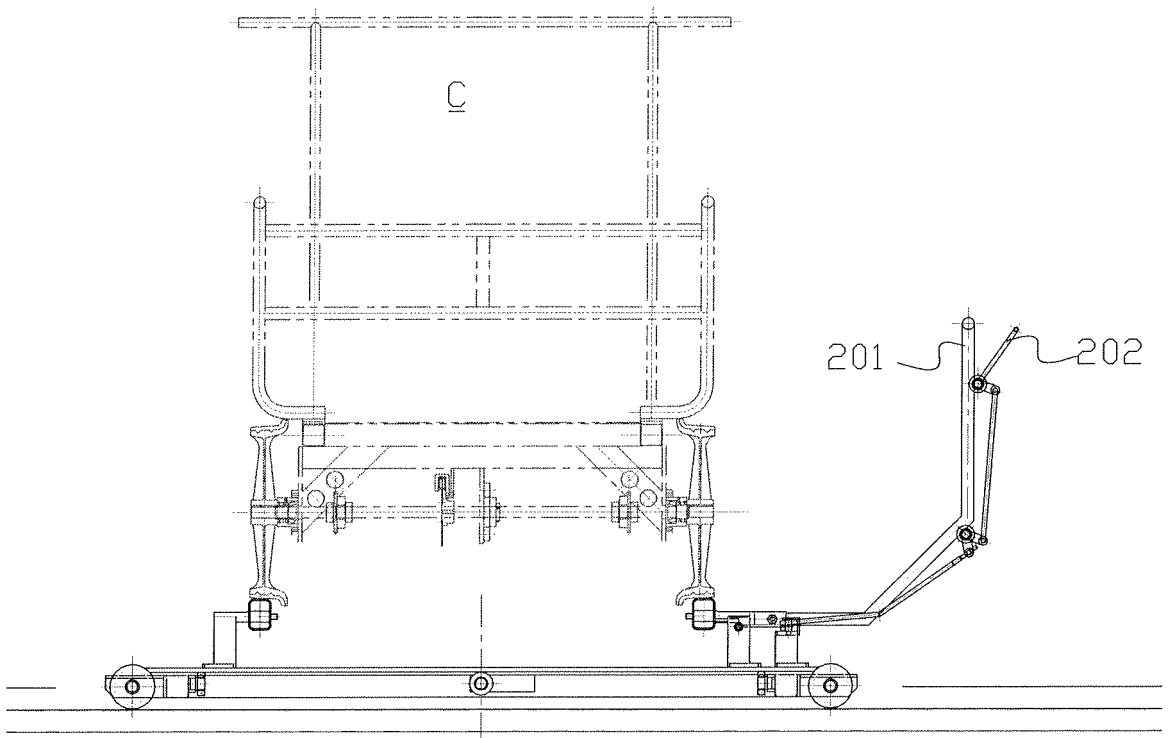


Fig.14

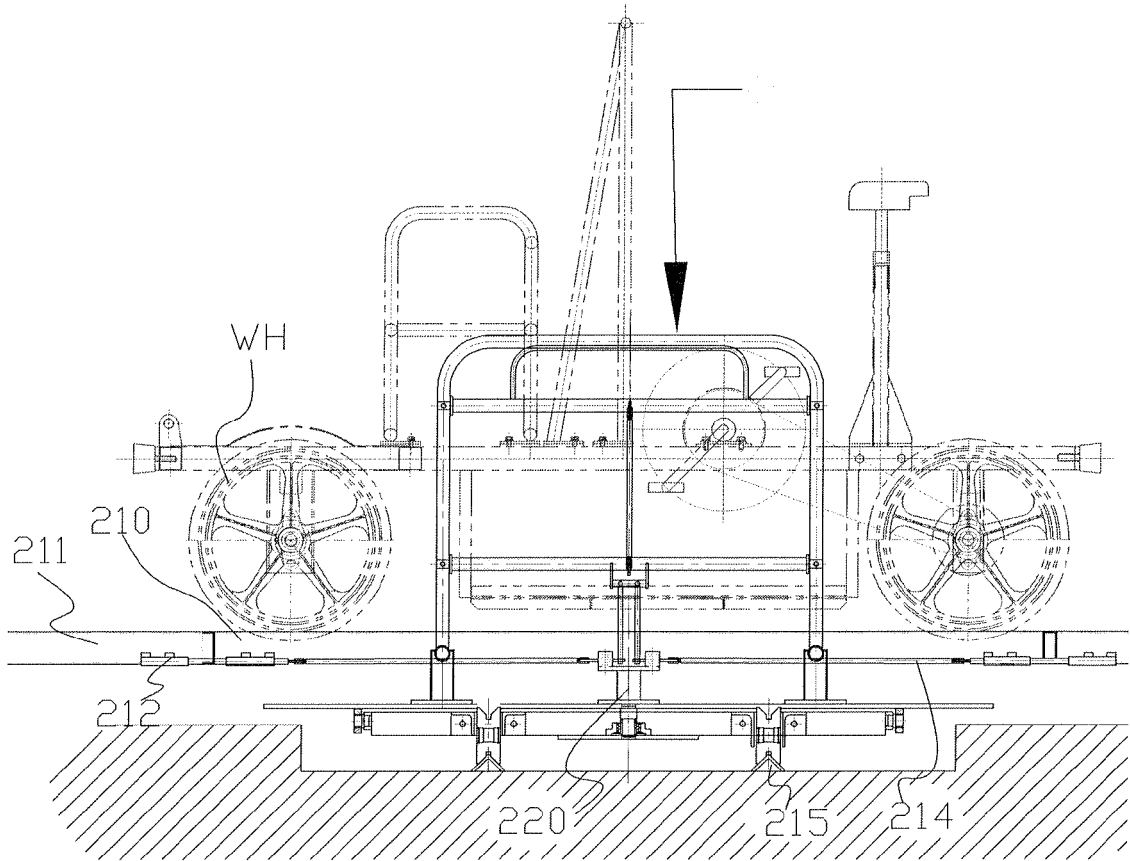


Fig.15

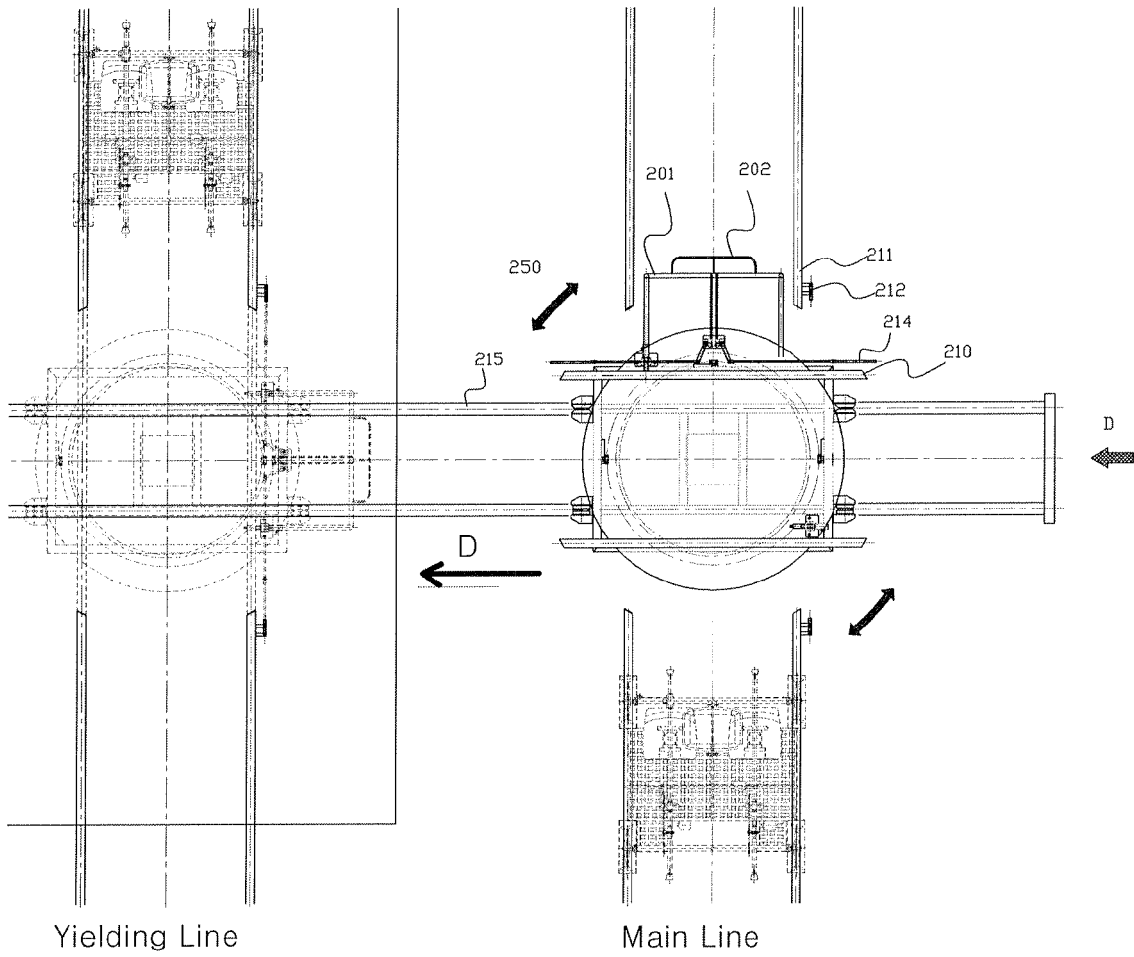


Fig.16

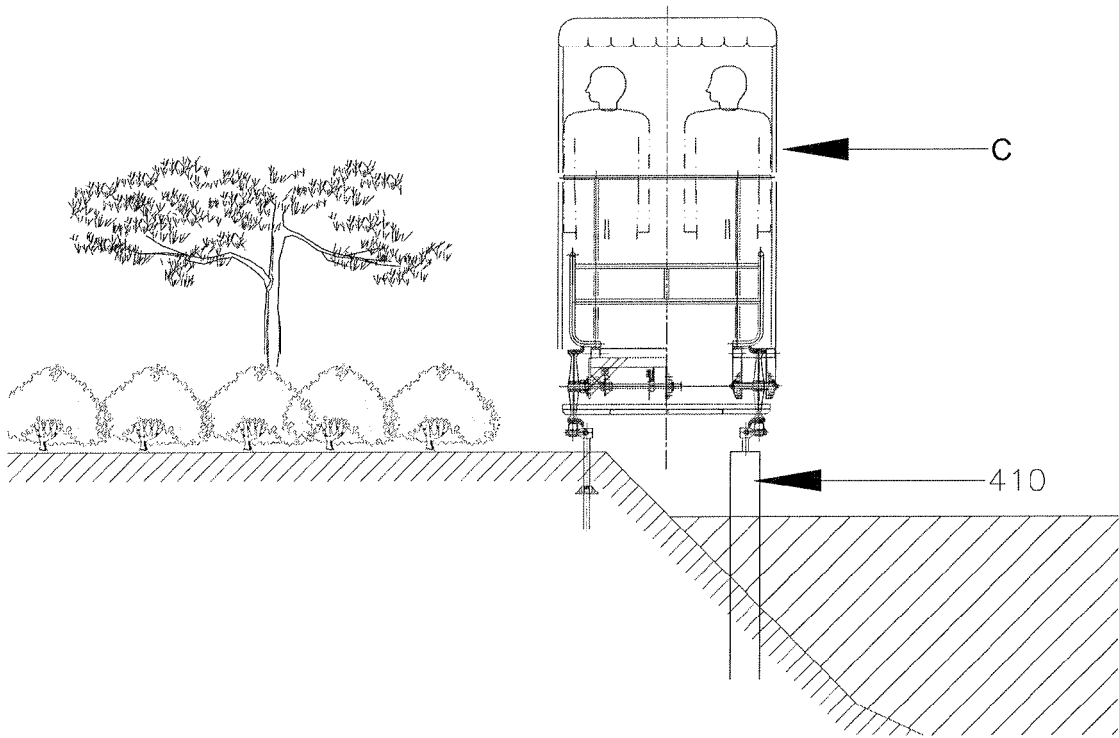


Fig.17

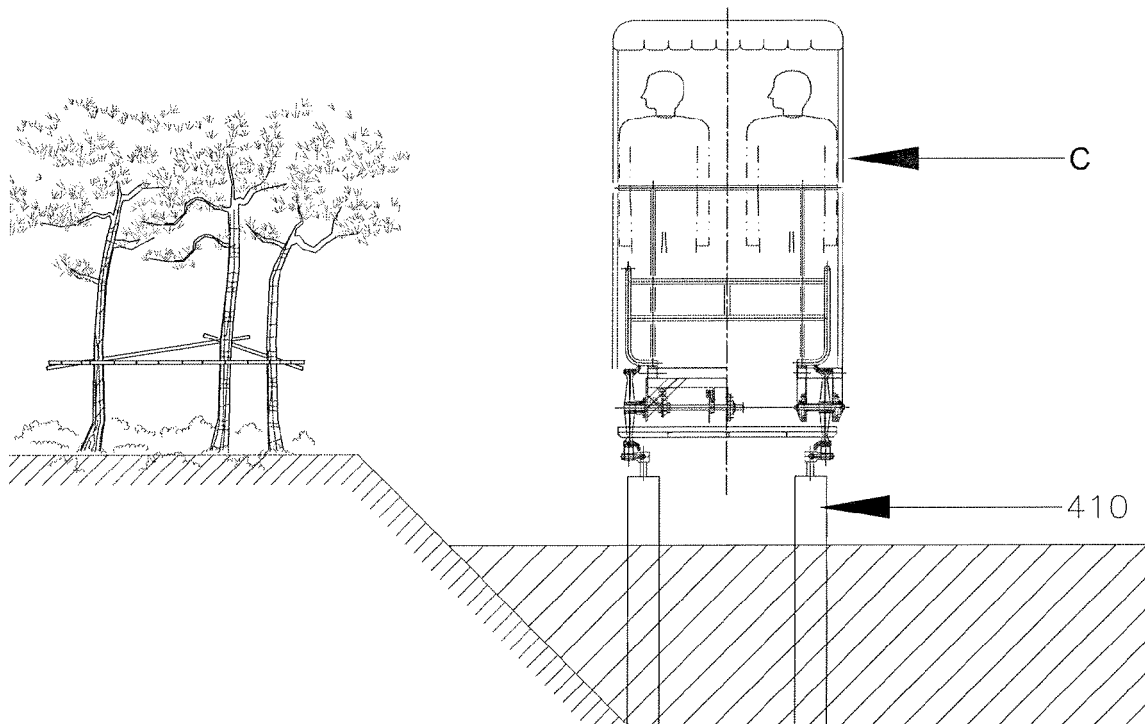


Fig. 18

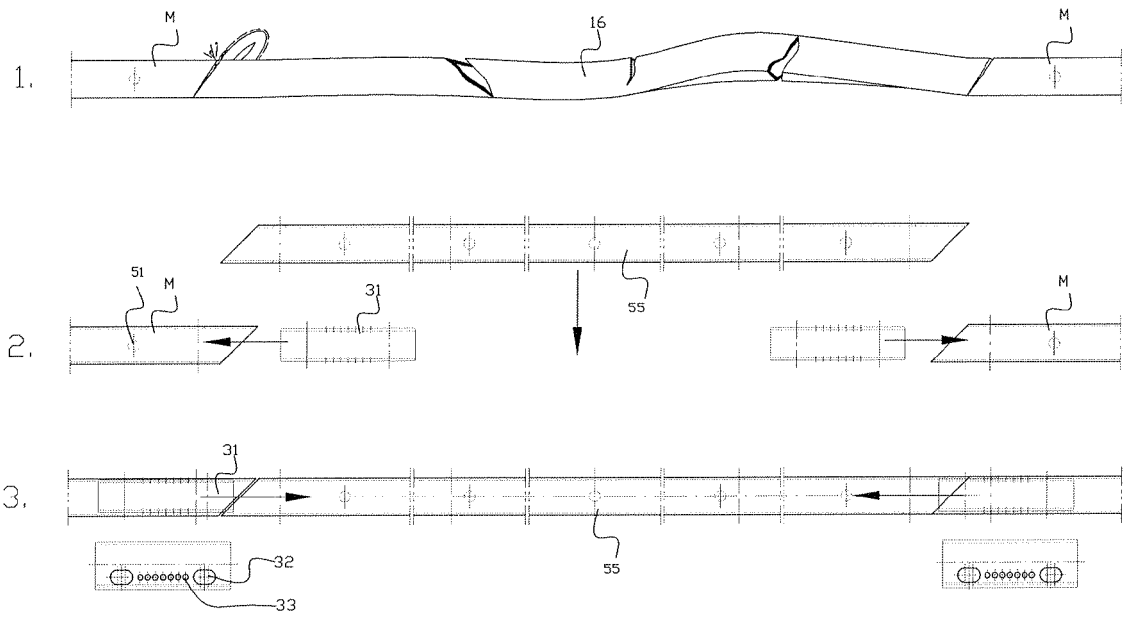


Fig.19

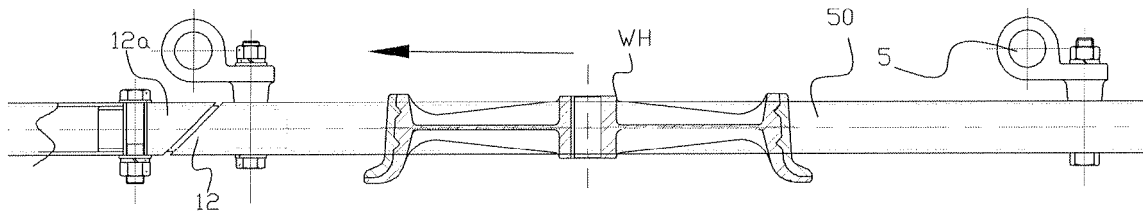


Fig.20

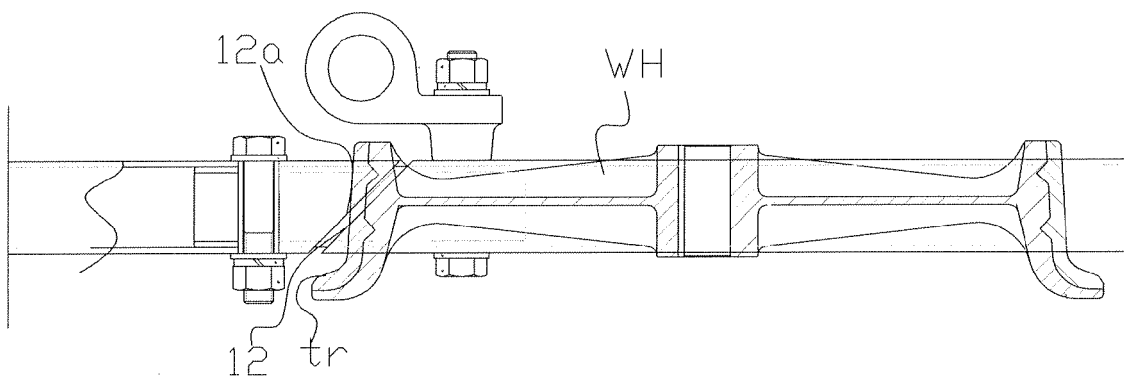
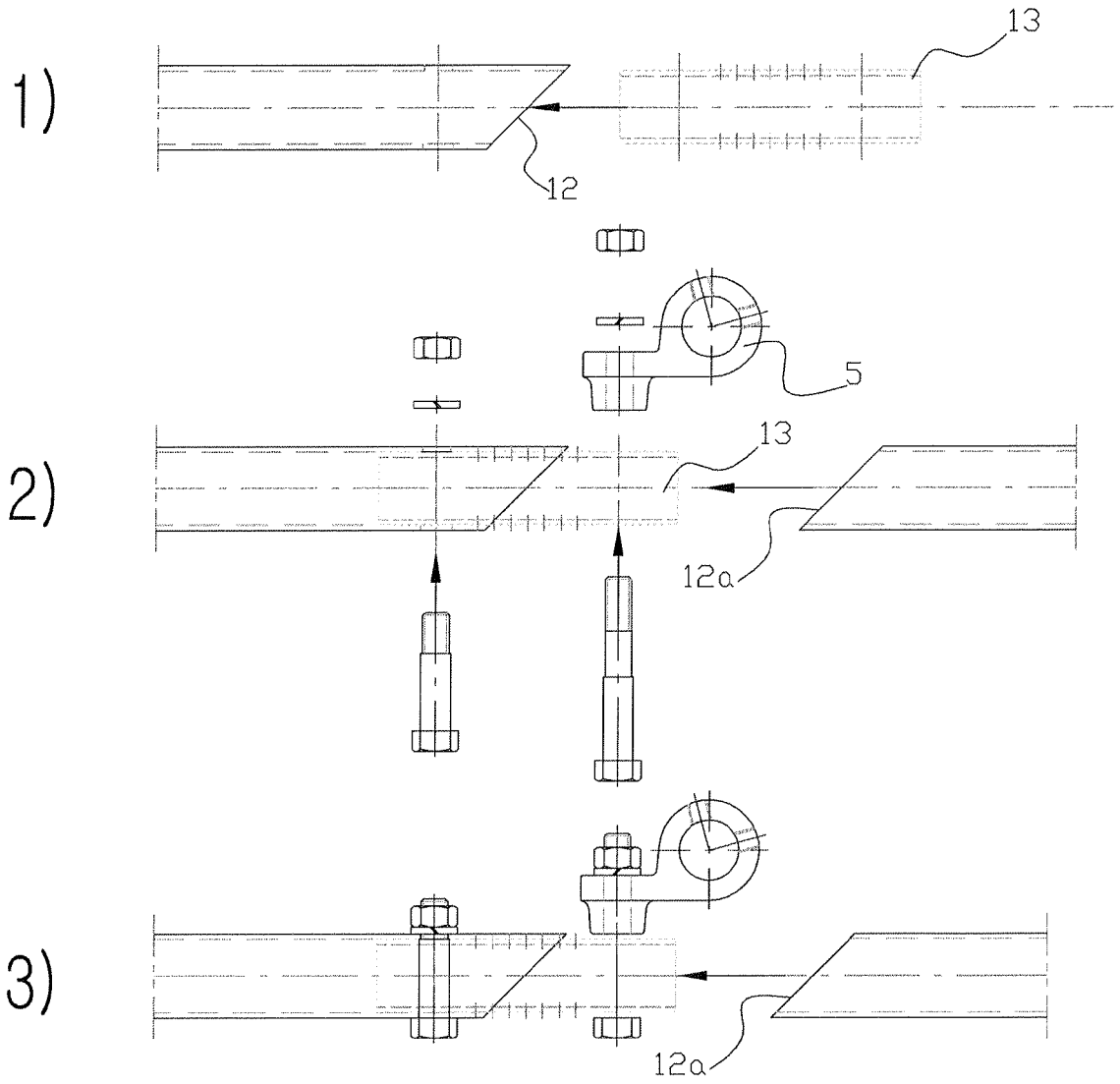


Fig.21



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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