A device for returning derailed rail vehicles to the rails on which the vehicle runs which includes bridge means extending laterally of the rails and disposed fore and aft of the derailed wheel set of the vehicle. Trucks are mounted on the bridge means and having hoists thereon for engaging the underneath side of the vehicle to lift the vehicle so that the wheels are above the rails. With the vehicle so lifted, the trucks are moved on the bridge means to locate the bridge means over the rails and the vehicle is then set down so that the wheel set again engages the rails. The hoists are mounted on plates which are pivotal about vertical axes on the respective trucks while having freedom of movement on the respective trucks in a direction substantially parallel to the longitudinal axis of the vehicle.

10 Claims, 6 Drawing Figures
DEVELOPMENT FOR RERALeing RAIL VEHICLES

The present invention relates to a device for rerailing rail vehicles, especially heavy torpedo lade railway cars for the transport of liquid melts, which while employing hydraulic lifts in connection with railing bridges, block carrying trucks and displacing devices lifts the rail vehicle above the level of the tracks and subsequently pushes it laterally to the center of the track, then lowers it onto the track.

The present invention is based on a rerailing method according to which the derailed railway vehicle is alternately lifted from its front and rear end, is then laterally displaced in the direction toward the center of the track and is subsequently lowered again. The rerailing operation is completed as soon as the front and rear wheels of the rail vehicle again rest on the rails of the track.

The derailed rail vehicle, which always is lifted only at one end at a time while the ends are alternately lifted is laterally displaced and is then lowered again; thus, the vehicle will during a rerailing step at the start and at the end carry out a vertical tilting movement and once a horizontal pivoting movement about a pivot point which may, for instance, be located in the bearing of the stationary truck. The vertical pivot angle during the lifting and lowering of the vehicle is small in view of the minor lifting and lowering movement relative to the length of the vehicle and practically has no influence on the stability against tilting of the rail vehicle to be rerailed. The horizontal pivot angle which results from the lateral displacement of the lifted vehicle end is, however, relatively large since the lifted vehicle end carries out a relatively great pivot stroke in the horizontal plane.

With the customary rerailing devices the horizontal pivot movement of the lifted vehicle end is effected by means of at least one block carrying truck which is movable on a rerailing bridge arranged transverse to the derailed rail vehicle. This truck, however, in contrast to the lifted vehicle end, does not carry out a circular movement but carries out a straight movement; so that in view of the geometric conditions the truck with its hoist and the rerailing bridge are exposed to an eccentric load. Already with small lateral displacements of the lifted vehicle end, the block carrying truck with its hoist takes on an inclined position whereby the stability of the rail vehicle to be rerailed is greatly reduced. The danger of slipping of the load is further increased by the torque which during the pivoting of the lifted vehicle end has to be absorbed at the upper supporting surface of the hoist and by the block carrying truck.

It is, therefore, an object of the present invention to provide a rerailing device for rerailing derailed rail vehicles by means of which in particular the stability of the rail vehicle to be rerailed against tilting during the rerailing operation will be greatly improved.

This object and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 diagrammatically illustrates a top view of a derailed rail vehicle together with rerailing device according to the invention arranged at the derailing site.

FIG. 2 is a side view of a portion of the derailing device according to the invention with a partial section through the upper structure, FIG. 2 being seen in the direction of the arrow A of FIG. 1, but on a larger scale than the latter.

FIG. 3 is a section taken along the line III—III of FIG. 2.

FIG. 4 is a section taken along the line IV—IV of FIG. 2.

FIG. 5 is a top plan view of a portion of a rerailing bridge together with the arrangement of a steel plate track.

FIG. 6 shows a section taken along the line VI—VI of FIG. 5.

The device for rerailing rail vehicles according to the present invention, according to which with the aid of hydraulic hoists in connection with rerailing bridges, block carrying trucks and displacing devices the rail vehicle is lifted above the level of the track, is then laterally pushed to the center of the track and is subsequently lowered onto the rails, is characterized primarily in that each block carrying truck rolling on a rerailing bridge and driven by means of a displacing device carries a supporting plate which is rotatable about its vertical axis and is displaceable in a direction transverse to the rolling direction of the block carrying truck.

According to a further development of the invention, the supporting plate is equipped with a king-pin which is guided in a cross rail of the block carrying truck. Furthermore, the table plate of the block carrying truck and the supporting plate may be equipped with sliding plates of metal or synthetic material. Preferably, the table plate of the truck and the supporting plate may form a hydrostatic support.

Each displacing device of a block carrying truck expediently consists of two hydraulic cylinders arranged adjacent to each other.

The rerailing bridge may support a roller conveyor of hardened and ground steel plates each of which plate is advantageously extending at an angle to the rolling direction of the block carrying truck.

Referring now to the drawings in detail, it is assumed according to FIG. 1 that the derailed rail vehicle 10 with a front truck 11 and a rear truck 12, the front wheels 111 of which have left the rails 21, 22 of the track 20. To this end, the two rerailing bridges 31 which rest upon the rails 21, 22 and on a plurality of supporting rails 32, 33 are placed under the front end 13 of the vehicle. On each rerailing bridge 31 there are arranged two block carrying trucks 34 each of which is provided with a hoist 35 and two displacing devices 36.

The hoists 35 and the displacing devices 36 are connected to a pump and control unit 37 by means of connecting conduits 3701 to 3724. During the entire rerailing operation, wedges 38 secure the rear wheels 121 against rolling off.

After all elements of the rerailing device have been arranged at the derailing site in conformity with FIG. 1, the four hoists 35 on the block carrying truck 34 together lift the front end 13 of the vehicle with the front wheels 111 with the aid of one hardwood plate 351 each slightly above the level of the track 200. Thereupon, the trucks 34 driven by the displacing devices 36 are displaced on the rerailing bridges 31 until the rail vehicle center 101 coincides with the track center 201. Subsequently, successively the front truck 11 is aligned with regard to the center of the rail vehicle and of the
track 101, 201 and the front end 13 of the vehicle with its front wheels 111 is lowered onto the rails 21, 22. During the lifting and lowering of the front end 13 of the vehicle, the latter carries out each time one vertical pivoting movement and during the displacement one horizontal pivoting movement about the pivot point 1211 which is located in the bearing 122 of the rear truck 12.

According to FIGS. 2–4, each block carrying truck 34 is equipped with a supporting plate 39 which is rotatable about its vertical axis and is displaceable in the direction of the arrow 24 transverse to the rolling direction. During the horizontal pivoting movement of the front end 13 of the vehicle, the supporting plate 39 equalizes the rotary movement and the lateral displacement of the hoist 35 relative to the table plate 341 so that the hoist will remain centrally loaded and a tilting of the hoist 35 will be avoided.

The supporting plate 39 is equipped with a king-pin 391 which is guided in the transverse rail 3411 of the table plate 341. In order to assure a low frictional resistance between the table plate 341 and the supporting plate 39, all sliding and guiding surfaces are lubricated through bores 3901 and 3902. An annular seal 392 inserted into the supporting plate 39 prevents an excessive release of the lubricant. For improving the sliding conditions, the table plate 341 and the supporting plate 309 are provided with sliding plates 342, 393 of metal or synthetic material. Under certain circumstances, the equipping of the table plate 341 or supporting plate 39 solely with sliding plates 342, 393 will suffice. The sliding surfaces may also be produced by spraying metal or synthetic material onto the plates 341 or 39.

The table plate 341 and the supporting plate 39 may form a hydrostatic supporting bearing when the sliding surfaces are lubricated by a liquid pressure medium supplied through bores 3901, 3902.

The liquid pressure medium which below the annular seal 392 passes to the outside is collected in a collecting groove 3412 and is withdrawn through bore 3413 and a non-illustrated hose.

Each displacing device 36 consists of two hydraulic cylinders 361. The holder 311 which is adapted to be placed upon the rerailing bridge 31 is adapted to receive the two hydraulic cylinders 361 at the front and rear housing extension 3611 and 3612.

According to another embodiment illustrated in FIGS. 5 and 6, the rerailing bridge 31 which usually is made of light metal is equipped with a roller conveyor of hardened and ground steel plates 312, 313. Each steel plate joint extends at an angle with regard to the rolling direction of the block carrying truck 34. For retaining the steel plates 312, 313 on the rerailing bridge 31, stepped bolts 314 are provided which are placed into the bores 3101 of the rerailing bridge 31 and in the bores 3121, 3131 of the steel plates 312, 313.

As will be evident from the above, the present invention creates not only a favorable load support but also an advantageous distribution of the load onto the block carrying truck and onto the rerailing bridge so that these elements of the rerailing device can be made lighter and simpler. For driving the block carrying truck, a displacing device with a lower displacing force will suffice because the driving resistance is practically not increased by the lateral forces which occur at the supporting plate of the lifted rail vehicle.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. In a device for rerailing derailed rail cars, bridge means adapted to be disposed across the rails to which the car is to be returned, trucks movable on said bridge means in a direction substantially at right angles to the longitudinal axis of the car, hoist means on said trucks engageable with the underside of the car for elevating the car until the derailed wheels are above the level of the rails, power means connected between the bridge means and the trucks for moving the trucks on the bridge means in said direction, and a plate supporting each hoist on the respective truck, each plate being rotatable on the respective truck about a vertical axis and to displaceably bodily on the respective truck in a direction substantially at right angles to said direction of movement of the truck on said bridge means.

2. A device according to claim 1 which includes a king pin dependent from each plate, the axis of each king pin forming the axis of rotation for the respective plate, each truck having a slot extending in the direction of movement of the plate thereon and receiving the king pin of the respective plate.

3. A device according to claim 1 which includes planar slide plates interposed between each said platform and the respective truck.

4. A device according to claim 1 which includes oppositely facing interengaged planar surfaces on each said plate and the respective truck, and means for supplying lubricant under pressure between each said pair of interengaged planar surfaces.

5. A device according to claim 1 in which said power means includes fluid operable pistoneyler means extending in said direction of movement of the respective truck on the pertaining bridge means.

6. A device according to claim 1 in which each bridge means comprise hardened and ground steel plates thereon for supporting the trucks thereon.

7. A device according to claim 6 in which the adjacent ends of the plates are inclined relative to the direction of movement of the trucks on the respective bridge means.

8. A device according to claim 1 in which said bridge means comprises a bridge on each of the fore and aft sides of the derailed wheel set of the car, a pair of trucks on each bridge spaced in the lateral direction of said car, and each truck having a hoist engageable with the underside of the car.

9. A device according to claim 8 in which said power means comprises piston means connected to each truck, cylinder means receiving said piston means, and means for connecting said cylinder means to the respective bridge in adjusted positions along the bridge.

10. A device according to claim 8 which includes support means beneath each bridge distributed along the length thereof.