APPLIANCE FOR THE TRANSPORT OF RAILWAY CARS ON STREETS

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Fig. 11

Fig. 12

Fig. 13

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The present invention refers to an appliance for the transport of railway cars on streets.

The known appliances for transporting railway cars on streets suffer from serious drawbacks not only in regard to the low position of the railway car in view of the headway or under-frame, but also regarding the steering capacity, the necessary distribution of the load and elasticity of springs. In frequent cases steering capacity is provided by means of a bogie-like superstructure with continuous axles, sometimes even without springs, resulting in a comparatively great construction depth. The wheels are also not able to adapt themselves sufficiently to the defects of the roads. The stresses on the underframe, on the axles and especially on the road are in that case comparatively great. As a result, such appliances will permit only transportation of low railway cars with small loads in view also of the high dead-weight of the appliance itself.

The present invention does away with these drawbacks and defects by using in the appliance as a carrying unit for each wheel of every railway car axles or every two wheels lying one behind the other of multiple axle railway cars one separate rail piece provided with street wheels. An advantage is obtained by reducing the construction depth and guiding also axles of the railway car wheels by not using standard rail piece for the latter purposes, but substituting for the same a flat running tread with side cheeks, and, especially if further the respective rail sections are given through shape, a very robust construction will be obtained. The load may be placed still lower if these rail sections are underslung or provided with parts that may be lowered by parallel or shearing motion so that the railway cars will be as little elevated above the floor as possible.

In order to assure connection between the street underframes carrying the single axles, without necessitating the transmission of all forces over the axles and the underframe of the railway car, and in order also to guide the underframe so that the play of the railway axles does not add to any disturbances in the running of the street vehicle, the street underframes carrying the single axles or the bogies of the railway car are, according to the invention, connected by means of a fixed intermediate element. This may be a frame piece hung on both underframes or may consist only of a brace, more especially a cross-brace between the underframes, providing the latter with sufficient guidance and connection under the existing operating conditions. The intermediate connecting elements may be kept in stock of various standardized length or adjustable in length, or of a telescoping character, so that the whole street vehicle can be adjusted to the usual lengths or axle distances of railway cars. For transporting empty cars the intermediate element may be detached and placed upon the individual underframe after pushing the latter together. In this manner it is also possible to transport parcels alone, in which case the intermediate element supplies sufficient strengthening of the underframe without the necessity even of making the intermediate member very robust. If required, intermediate elements of a specially substantial construction may be kept in stock. For rolling the railway car on and off, wedges are placed below the intermediate member or it is removed altogether and loading is carried out in the manner described further on.

In order to place the railway car as low as possible in view of the comparatively small headway of the under-frame and passages and in order to avoid, nevertheless, the drawbacks connected with a normal street vehicle which carries the load at a low level, is loaded with difficulty and apt to run against obstacles on the road, according to the invention the intermediate element may be placed high notwithstanding the low position of the tread or carrying web, especially between the adjacent street wheels, where the railway car wheels are supported. The respective lengths of the underslung portions must be sufficient to receive railway cars of different axle distances without altering the total length of the entire street vehicle.

The reduction of the street vehicle into individual underframes of course results in a more concentrated load and stress on the roadway. This is specially objectionable in regard to the forward or front bogie, because immediately in front thereof the high rear axle pressure of the tractor takes effect on the roadway, so that a local accumulation of high axle pressures is produced. This may be objected to especially when crossing bridges, the more so, as a tractor which is a tractor only should have a comparatively high frictional weight of the rear axle in order to produce the required tractional capacity on rising gradients. The invention shows, therefore, the mode of producing in such cases the frictional weights required for locomotion without the described drawbacks and without objectionable dead weight of the tractor rear axle, and neither a self-contained motor apt to
prevent locomotion altogether in the case of failure to work, nor a troublesome Curdan drive are
5 recommended for utilizing the underframe axle pressures by acting as frictional weights, but it is
rather recommended to construct the single front underframe as a saddle tractor trailer for the
5 tractor that becomes possible to use a tractor with a very low pressure of the rear axle merely sufficient for the locomotion of the tractor
10 itself.

The reduction of the street vehicle into single trucks and the resulting motive independence of the individual trucks one from the other will permit with advantage also of tilting the carried
15 railway car on end, and this, as a principle, in two respects, namely in order to actuate, on the
one hand, the tilting mechanism itself by pushing the trucks together, and on the other hand
5 angle by raising the tilting level by pushing the trucks together, or in order to start the tilting process by tilting up a self-contained compendious
5 tilting device that is in a lowered position during
25 For these operations of the single trucks or for the simultaneous actuation of the tilting mechanism the tractor can also be used directly or indirectly, in the latter case e.g., as a driving motor with flexible shaft connection and corresponding connecting clutches of the gears.
30 Also the steering devices, as a rule, by coupling them to the tractor, can be constructed so that the required mobility of the individual trucks is
35 maintained and nevertheless all raising is avoided for any of the wheels. Also the relative dis-
acement of the single trucks can be attained by means of longitudinally traversing driving and transmission shafts for steering and eventually also for the break, this longitudinal drive being adapted to be varied in its effective length, and appliances being provided, such as coupling and independent driving mechanisms which permit alternative operation of the single groups so that by suitably changing over either a curve true
40 running of all wheels or also a parallel or other springing of the wheels can be obtained. This
will meet the requirements of rolling on and off side ways in cramped localities in regard to the ramps.

In the drawings different modifications are illus-
45 trated by way of example.

Figs. 1–3 show elevation, ground plan and sec-
tional view of the general structure of the trans-
50 port appliance.

Figs. 4–6 show details to above.

Figs. 7 and 8 correspond to Figs. 1 and 2, ex-
cepting that loose intermediate elements are in-
55 stead between the single trucks.

Figs. 9–11 display loading and unloading proc-
60 esses.

Figs. 12–13 show a special disposition of the
tread web.

Figs. 14–17 represent the single trucks with the use of a saddle tractor.

Referring to the drawings in detail and more
65 particularly to the form of invention disclosed in
Figures 1 to 4, a1 and a2 indicate the wheels of a two-axle railway car b. Each wheel is sup-
ported by a separate rail piece c which latter is mounted on two short axles d carrying road
70 wheels e.

Each wheel piece is depressed at the medial portion as indicated at h so as to retain the wheels a1, a2, and consists, as shown in Fig. 4, of side
75 cheek c1 and the tread web c2.

Each rail piece c and its supporting wheels e constitute a truck and each truck illustrated in
Fig. 1 a, a pair of springs f1 connected at their outer ends with the rail piece c1 by toggle links i1. The
adjacent ends of the springs f1 are linked to a lever g which latter is pivotally mounted at g1
7 to the rail piece c1. The side members of the rail piece c1 are slotted to receive the axles d and
80 guide members i. Each guide piece i is provided in its upper portion with a recess receiving the
tread portion of the rail piece and is provided on its lower part with a second recess extending at right angles to the first recess and receiving the
85 medial portion of the axle d. A pin k disposed horizontally in the longitudinal axis of the
rail piece c1 pivotally connects the guide member i and the axle d received therein whereby the
road wheels e in traversing an uneven roadway may assume different elevations, the axle d turning
90 about the pin k.

The medial portion of each spring f1 is held in a spring clamp l1 provided with upright extensions m1 which are also pivotally held on the pivot
95 pin k.

Each truck in the modification shown in Figs.
1 a and 2 a is also constituted by a rail piece c and two pairs of road wheels e but in this case the two axles d are connected with the terminals of a single spring f2 which is held in a clamp l2 secured to the under side of the rail piece intermediate the ends thereof.

Preferably the trucks of each pair are connect-
90 ed together by a cross member f the ends of which
are connected with the adjacent vertical portions

of the rail pieces c1.

Also the road wheels d are suitably mounted
95 for steering movement for the purpose of guiding
the railway car during transport. According to the arrangement shown in Fig. 2, axles d are mounted in turn about vertical axes whereby the desired steering movement may be imparted to the road wheels e.

According to the arrangement shown in Fig. 2 a,
the mounting of the road wheels e on the termin-
45 nals of the axles d is the same as that ordinarily
employed in connection with the front wheels of motor vehicles, that is to say, the terminals of each axle are forked as indicated in Fig. 1 a and the road wheels e are mounted on stub axles pivotally mounted on vertical pins in said forked terminals.

In place of the rail piece sagging at h it is possible also to use a straight rail piece, the tread
50 web of which can be vertically raised and lowered at its middle portion. As is shown, the respective part of the web may either, as shown in
55 Fig. 5, be lowered in a parallel position into the situation shown in dashed lines, or in the manner of the shanks of an articulated parallelogram joint, as shown in Fig. 5 a, each of the movable
tread portions consists of two parts a2, b2 pivotally
connected at their adjacent ends and only supported at their outer ends on rollers v and permitting the lowering of the adjacent ends of the tread members.

The vertically movable tread member u shown
55 in Fig. 5 is adjustable by means of a screw a" hav-
60 ing the opposite end oppositely threaded and en-
gaged with nuts b2. Each tread member u is
connected by links c1, c2 with the nuts b1 and b2 whereby when the screw a is rotated in one direction the links c2 are brought to the vertical position shown in full lines to raise the tread member u but when rotated in the opposite direction the nuts b2 are moved outward thereby tilt-
65
ing the links c' causing the tread member a to lower. According to the arrangement shown in Fig. 5*, the same screw a, nuts b' and b' and links c' and c' are provided but in this case the links 5 act to lower the jointed ends of the tread member a' and a' when the nuts b' and b' are moved apart.

For no-load travelling the rail pieces positioned one behind the other may, as shown in Fig. 6, be coupled one to the other by any type of clamping or coupling c. In this case the shafts p and q are completely pushed one into the other. This type of coupling results in that the vehicle is of little length and that the single trucks are 15 prevented from running athwart in relation to each other.

According to the Figs. 7 and 8 the same spring mounting of the axes d' is employed as shown in Fig. 1. Intermediate elements x are interpositioned between the travelling rail pieces c', said elements being also of rail profile. The connection at points y is easily detached e.g. by providing socket connections as shown.

In the loading arrangement shown in Fig. 9 the railway car b runs from the head ramp c onto the trucks pushed closely together, in such manner, that first the forward railway car axle a' rolls over the trucks adjacent to the ramp and the depression portion h of which has been filled out by a suitably shaped section rail piece t, and is made to run onto the rear trucks in the depression therein. Now these trucks are detached from the others and are moved along with the railway vehicle, so that the wheels c' roll into the depression h of the forward truck after having first removed the intermediate element x. All trucks are now in proper travelling position, so that the intermediate elements x can be inserted and fixed.

As evident from Figs. 10 and 11 loading is carried out in such manner, that the trucks are placed in front and at the rear of the railway car. Now a rolling-on ramp s' is placed ahead of the truck as per Fig. 10 and the railway car is pushed in the direction of the arrow to position its axle wheels c' onto the truck. Now the ramp s' is placed between axle and wheels c' and the corresponding advanced truck as shown in Fig. 11. By moving the railway caravel in the direction of arrow in Fig. 11, the wheel s' is placed upon the truck. Now the truck can be complemented to form the transport appliance by inserting the intermediate elements x.

As seen in Fig. 12, the tread web c' which extends the whole length, may be formed so that it presents longitudinal depressions h' or h' respectively of a certain length and, in relation to the lower edges of the side cheeks c' is arranged in a lower position, whereas the tread web is made to rise in continuation thereto and runs up to a higher level corresponding to the greater height of the side cheek at the intermediate element x. In designing the definite and accurate construction reference should be made to the clearance limits when rolling on and off the railway car 60 to prevent low positioned parts of the car from meeting obstructions. Special insertations may be provided for filling up temporarily the depression of the tread webs c' when rolling the car on and off. Each rail beam consists, as evident from Fig. 13, of two vertical flanges or side cheeks c' connected by the tread web c', the dimensions of which correspond to the wheel and gauge profile of the railway wheels.

According to Fig. 14 the front truck c is provided with the rear axes d and the small front wheels e' which can be swung upward by means of the adjustable brackets d' and may be constructed as a saddle traction trailer so that the forward raised frame head c' may be placed upon the saddle of bogie B of tractor A, whereby the frictional weight of the rear axle B of the tractor is increased corresponding to the supporting and load-point distances of truck c.

Intermediate the frame of truck c and the railway car underframe, guides c are provided which are in the form of stakes or stake straps of truck c. The two stakes at the rear, may be arranged against the side sills of the railway car and the front strap, around the centre longitudinal sill of the railway car underframe, the arrangement being such that a horizontal swerving of the forward truck c against the railway car is prevented in the horizontal direction without restricting the vertical play. Stake and strap may be arranged reversible and may also be fitted to the rear truck.

As seen in Figs. 15 and 16 the forward truck 3 may be joined up to the saddle on the tractor in a loaded state or prior to rolling the railway car onto the truck. For the latter case a specially suitable method is shown in Fig. 16 consisting in that the trucks are first pushed together very closely and then against the head ramp p, so that a continuous railway is formed up to the forward truck c, and in doing so, the depression in the rear beam of the rear truck can be filled up by inserting a suitable filling piece t. By means of the winch D on the tractor and the rope E the railway car b can be drawn upon the truck. To this end the car is first drawn forward by means of the arrangement shown in Fig. 16 to a point, where the front axle of the railway car takes up its proper position on truck c. and now the tractor A advances together with truck c until the distance between the trucks corresponds to the axle distance of the railway car. During the latter movement the winch D remains arrested so that, at the same time, the railway car is brought into its proper position as shown in Fig. 14.

I claim:

1. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, each rail piece including a slider having a flat top web and side cheeks adapted to guide and support the railway car wheels, at least two short axes arranged one behind the other directly supporting each rail piece, individually, and road wheels carried by said axles and arranged on both sides of said rail piece.

2. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, each rail piece including linked sections adapted to lower the car wheel supported thereon, at least two short axles arranged one behind the other directly supporting each rail piece individually, and road wheels carried by said axles and arranged on both sides of said rail piece.

3. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, each rail piece including a depressed medial portion and an adjustable element adapted to fill out the depressed portion, at least two short axles arranged one behind the other directly supporting each rail piece individually, and road wheels carried by said axles and arranged on both sides of said rail piece.

4. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, at least two short axles arranged
one behind the other under each rail piece and movable vertically with respect to said rail piece; springs supporting said axles, compensating means connecting said springs, and road wheels carried by said axles and arranged on both sides of said rail piece.

5. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, at least two short axles arranged one behind the other directly supporting each rail piece individually, road wheels carried by said axles and arranged on both sides of said rail piece, and a detachable intermediate element connecting the rail pieces carrying the car wheels.

6. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, at least two short axles arranged one behind the other directly supporting each rail piece individually, road wheels carried by said axles and arranged on both sides of said rail piece, and a frame piece hung between said rail pieces.

7. An appliance for transporting railway cars on streets comprising rail pieces for each wheel of the railway car, at least two short axles arranged one behind the other directly supporting each rail piece individually, road wheels carried by said axles and arranged on both sides of said rail piece, and cross trusses intermediate the rail pieces.

8. An appliance for transporting railway cars on streets comprising a rail piece for each wheel of the railway car, at least two short axles arranged one behind the other directly supporting each rail piece individually, road wheels carried by said axles and arranged on both sides of said rail piece, a trough-shaped element connecting the ends of the rail pieces, the medial portions of the rail pieces being depressed.

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