Sept. 3, 1929. J. S. OECHSLE 1,727,114

PORTABLE RAIL CAR UNIT

Filed March 28, 1928 2 Sheets-Sheet 1

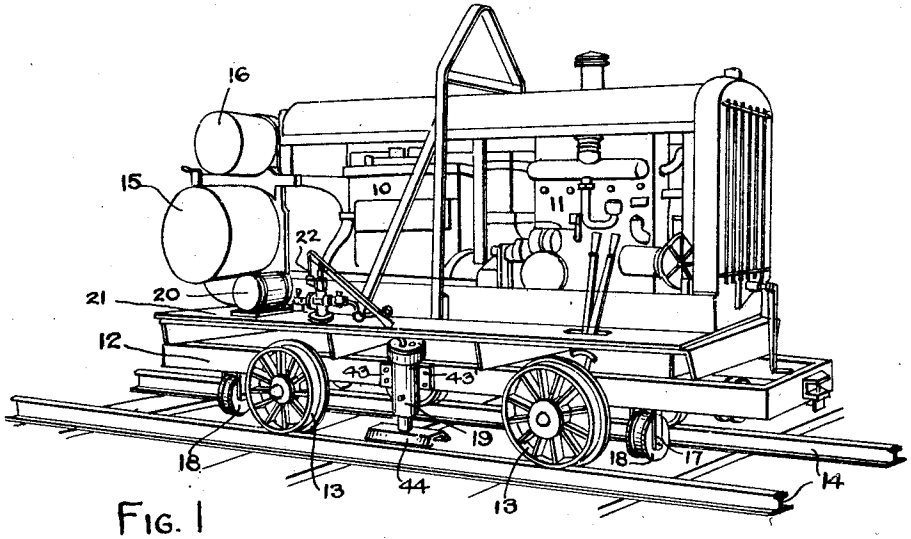


FIG. 1

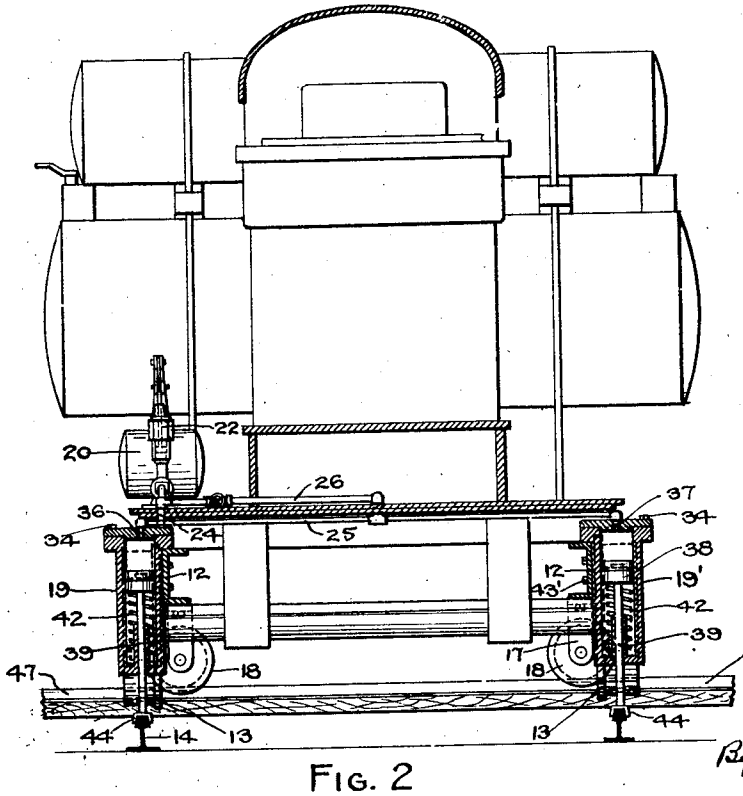


FIG. 2

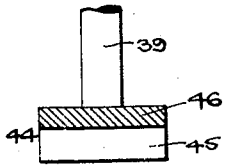


FIG. 3

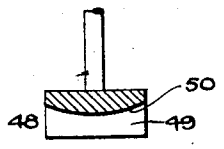


FIG. 4

INVENTOR:
JOSEPH S. OECHSLE
By Lem Edelen
ATTORNEY

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PORTABLE RAIL CAR UNIT

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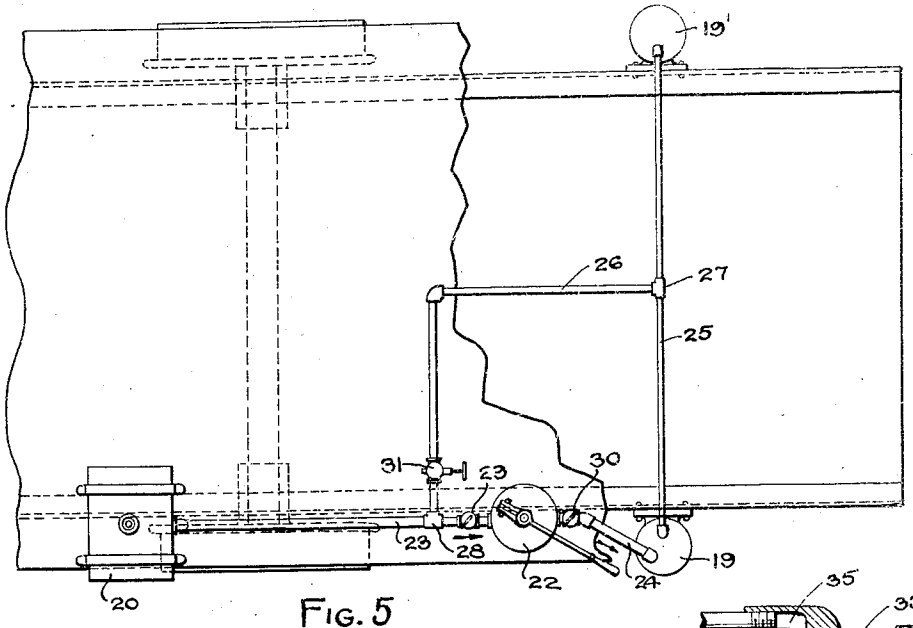


FIG. 5

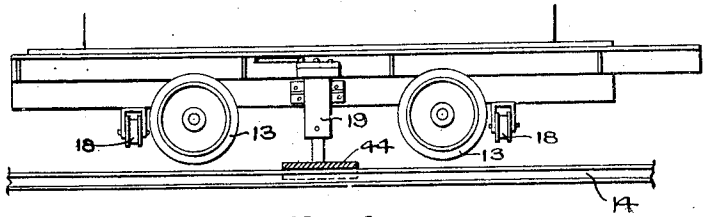


FIG. 6

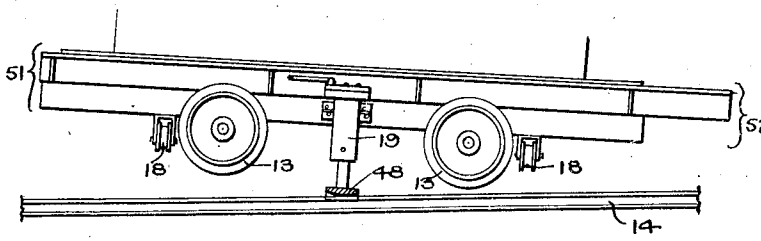


FIG. 7

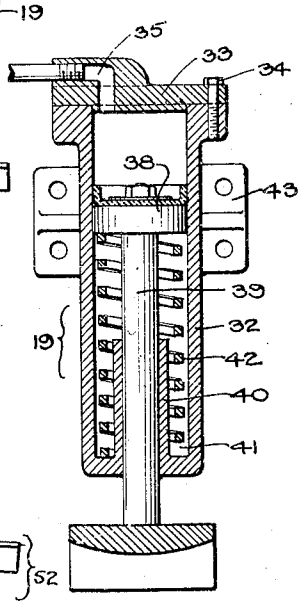


FIG. 8.

INVENTOR:

JOSEPH S. OECHSLE

By Fran Edelsa

ATTORNEY

Patented Sept. 3, 1929. 1,727,114

UNITED STATES PATENT OFFICE.

JOSEPH S. OECHSLE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO METALWELD, INCORPORATED, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PORTABLE RAIL-CAR UNIT.

Application filed March 28, 1928. Serial No. 265,299.

This invention relates to improvements in railway portable air compressors and more particularly to a hydraulic lifting jack arrangement for lifting the compressor bodily above its tracks to facilitate the insertion of derailing ties when it is desired to move the compressor laterally of its main tracks.

Heretofore and prior to this invention considerable difficulty has been encountered in raising portable air compressors and similar apparatus to a distance above its main tracks sufficient to permit the insertion of derailing ties under transverse wheels mounted upon the frame. Ordinarily, pairs of these transverse wheels are mounted in suitable manner at either end of the compressor, the wheels of each pair being arranged in tandem so that when laterally extending derailing ties are inserted beneath them the apparatus may be freely moved laterally of its main tracks. In order to insert the transverse derailing ties beneath the sets of transverse wheels the common practice has been to separately and manually jack up each end of the compressor to a height sufficient to clear the main wheels thereof from the main tracks at the same time that the transverse wheels are raised sufficiently to permit the insertion therebeneath of the derailing ties, it being understood, of course, that these latter rest upon and extend transversely of the main tracks. Not only did this practice of individually jacking-up of each end of the compressor necessitate the use of special lifting jacks and the exercise of considerable effort in manually operating the jack, but there was always present the possibility of the jack being missing or otherwise not available when it was most needed. Added to this was the fact that at least two distinct jacking-up operations were necessary before it was possible to respectively insert the derailing ties under the fore and aft sets of transverse wheels. Still other more or less serious objections against the use of these separate lifting jacks were that it was always essential that the base of the jack be founded upon a flat and secure foundation and that the clearance between the frame of the compressor and said foundation was sufficiently great to permit the placement of the jack in proper position.

This invention aims to overcome the aforementioned objections and difficulties and it is accordingly among the objects thereof to provide the compressor or similar apparatus with means suitably and permanently mounted upon the frame of the compressor for lifting the same vertically above its main tracks thereby obviating the use of separate lifting jacks for raising first one and then the other end of the compressor.

A further object of the invention is the provision of hydraulic lifting means operable to lift the compressor bodily above its main tracks, these means being so arranged that the main tracks themselves act as the lower abutments therefor, thus insuring at all times the provision of a firm, secure and flat foundation to take the downward thrust of the lifting means.

A still further object of the invention is the provision of a pair of hydraulically operated lifting jacks arranged at opposite sides of the compressor frame, the medium for operating both jacks being supplied from a common reservoir under pressure obtained by the actuation of a single pump.

Still another object of the invention is the provision of a pair of hydraulic lifting jacks, each of which is rigidly mounted upon the sides of the compressor and includes a plunger the lower end of which is provided with a shoe for engaging opposite faces of each main rail whereby to effectually preclude the possibilty of the lower ends of said plungers from shifting laterally with respect to said main rails.

Still another object of the invention is the provision of a pair of hydraulic lifting jacks mounted upon opposite sides of the compressor and operative in such manner that upon actuation thereof to raise the compressor the lower ends thereof constitute laterally arranged fulcrums or supports upon which the compressor may be bodily supported in substantially balanced condition.

A still further and important object of this invention is the utilization of these fluid pressure operated devices not only for raising the compressor above its main tracks in order to permit the insertion of the transverse derailing ties beneath their respective sets of transverse wheels but also for braking the compressor when certain unforeseen emergencies arise, as when the usual braking mechanisms fail.

Still another object of this invention is the idea of so mounting the lifting devices upon

the frame of the compressor that, under certain conditions, said devices may function as a pair of fixed vertical supports for rigidly supporting the sides of the frame against undue vertical vibration while the compressor is operating, the lower ends of the devices being founded for this purpose upon the main tracks at points located respectively between the fore and aft wheels on either side of the compressor.

Other objects of the invention are the provision of means easily and simply operated not only for the purpose of facilitating the derailment or lateral shifting of the compressor with respect to its main tracks but also for supporting the compressor against vibration, the rigid and secure mounting of said means upon the compressor so that it constitutes a permanent part thereof, the provision of means for lowering the compressor quickly, yet easily and without shock, upon either the main tracks or the derailing ties, and the provision of a hydrulic lifting mechanism which is simple in construction, relatively inexpensive to manufacture, and efficient and durable in use.

Other objects and objects relating to details of construction and operation will appear more fully hereinafter.

The invention consists substantially in the combination, construction, location and relative arrangement of parts, all as will be described more fully hereinafter, as shown in the drawings and finally pointed out in the appended claims. While I have chosen to illustrate and describe this invention in operative association with a rail car portable air compressor, it will be understood, of course, that the invention is capable of use in connection with apparatus other than air compressors and accordingly I do not wish to limit myself to its use solely in connection with air compressors.

In the accompanying drawings:

Figure 1 is a perspective view of a rail car air compressor in which my invention has been embodied, the lifting jacks being in inoperative position;

Figure 2 is a transverse vertical section through both jacks, the latter being shown, in this instance, in operative position for lifting the compressor clear of the main tracks;

Figure 3 is a longitudinal section of the form of shoe shown in Figures 1 and 2;

Figure 4 is a longitudinal section of a modified form of shoe;

Figure 5 is a plan view of a portion of the rail car frame showing the system employed for delivering fluid under pressure to the hydraulic lifting jacks;

Figure 6 is a side view of the lower structure of the rail car showing both ends of the car raised, shoes of the form shown in Figure 3 being employed in this instance;

Figure 7 is a side view of the lower structure of the rail car showing one end of the car raised, shoes of the form shown in Figure 4 being employed in this instance; and

Figure 8 is a vertical section through the lifting jack per se. the shoe shown herein being of the form shown in Fig. 4.

Referring now to the drawings and more particularly to Figures 1 and 2 thereof it will be observed that the invention is shown as being embodied in a portable rail car air compressor, the compressor unit 10 thereof being arranged to be driven by an internal combustion engine 11 and the air compressor as a whole being suitably mounted upon a main frame 12 having the wheels 13 for guiding the compressor as the latter is propelled along the main tracks 14. The air receiver 15 and the gasolene tank 16 are mounted upon the frame 12 in any suitable manner. Secured to the under surface of the main frame 12 by means of the supporting brackets or hangers 17 are a plurality of transverse wheels 18, these latter being considerably smaller than the main wheels 13 and mounted in such manner that they hang freely above and out of contact with the main tracks 14. These transverse wheels are arranged in pairs at opposite ends of the compressor so that when the latter is raised sufficiently to permit transverse derailing rails or ties to be laid across the main tracks and under the said transverse wheels the compressor may be moved laterally of said main tracks and along said derailing ties. Inasmuch as the foregoing parts are more or less well known, further explanation thereof is deemed unnecessary herein, said parts having been but briefly described in order that a more comprehensive idea may be had of my invention, now to be described in detail, of the means for lifting the compressor vertically above the main tracks 14.

In order to raise the compressor bodily above the main tracks 14 for the purpose of inserting the transversely extending derailing ties in position beneath the transverse wheels, I employ a pair of hydraulic lifting jacks, designated generally as 19 and 19′, to which a suitable fluid, such as oil, is pumped from the oil reservoir 20 suitably mounted upon the running board 21. A pump 22, in this instance a hand operated plunger pump, although any other type may be employed as desired, for supplying oil under pressure to the lifting jacks 19—19′ is also mounted upon the running board of the compressor. As appears most clearly in Figure 5, the oil from the reservoir or tank 20 is delivered to the pump 22 through the pipe 23 and from the latter is equally distributed to the lifting jacks 19—19′ through the pipes 24 and 25, the pipe 25 serving commonly as a supply line leading from the jack 19 to the jack 19′ and as a return line leading from both jacks

and communicating with the return pipe 26. One end of this return pipe 26 is preferably connected, as at 27, to the midpoint of the pipe 25 while the other end is connected to the pipe 23 at a point 28 located between the tank 20 and the pump 22. Check valves 29 and 30 are provided between the said point 28 and the intake side of the pump and between the output side of the pump and the jack 19 for effectually preventing the oil from returning to the tank 20 by way of the pump 22. A valve 31 is provided in the line 26 for controlling and regulating the return flow of the oil from the jacks 19—19′ through the pipes 25 and 26, it being understood that when the valve 31 is closed the oil pumped into the jacks will not be able to return to the oil tank 20. By opening the valve 31 to greater or less extent the oil in the jacks will be permitted to return more or less quickly to the tank.

Referring to Figures 2 and 8, it will be seen that jacks 19—19′ each comprise a main cylinder 32 having a cover or head 33 removably secured in position by the bolts 34. The head 33 of the jack 19 differs from that of jack 19′ in that it is provided with an inlet 35 extending laterally and thence downwardly to the interior of the cylinder 32, this head being further provided with an axially extending opening 36 constituting the outlet from the cylinder. The head 33 of the jack 19′ is provided with a single opening 37 which serves commonly as the inlet and outlet ports for the cylinder, the said openings 36 and 37 in the heads of the jacks 19 and 19′, respectively, being connected together by the pipe 25 and the said inlet 35 in the head of the jack 19 being connected by the pipe 24 to the output side of the pump 22.

Arranged within the bore of each of the cylinders 32 is a plunger or piston 38 having the usual piston rod 39, the lower end of which projects through the bottom of the cylinder. Extending upwardly into the interior of the cylinder 32 from the bottom end thereof is an annular flange 40, this flange being so arranged with respect to the inner wall of the cylinder as to form an annular channel or seat 41 for receiving the lower end of a relatively heavy spring 42, the upper end of which abuts against the piston 38. This spring 42 tends normally to resist the downward movement of the piston 38, this resistance being overcome, however, when the oil pressure becomes sufficiently great, the result being that when the oil pressure against the piston is released by opening the valve 29 in the line 26 the piston will be operative to force the return of oil back into the oil tank 20.

Preferably, the cylinders 32 are respectively secured to opposite sides of the main frame 12 of the compressor, the points of securement thereto being substantially midway between the fore and aft ends of the frame. In order to effect a rigid and substantial securement of the cylinders to said frame each of the cylinders is provided with a pair of integrally formed laterally extending mounting flanges 43, the latter being secured to the sides of the frame by bolting, or welding, bolts 43′ being shown in this instance. As appears most clearly in Figures 1 and 2, the lifting devices 19 and 19′ are respectively arranged between and in longitudinal alinement with the wheels 13 located on either side of the compressor, the arrangement being such that when the pistons 38 are urged downwardly by the oil pressure acting against the upper ends thereof the lower ends of the piston rods 39 will be respectively founded upon the main tracks 14.

In order to prevent lateral displacement of said lower ends of the rods 39 with respect to the tracks 14, said lower ends are each provided with shoes 44 having depending flanges 45 for engaging the opposed side faces of each track. Figure 3 is a longitudinal section through that form of shoe employed in Figures 1, 2 and 6, it being noted that the main body 46 of said shoe is of a substantial length and that the track engaging surface thereof is substantially flat from end to end. When the pump 22 is operated to supply oil to the cylinders 32 of the lifting jacks, the piston rods 39 will be forced downwardly and into engagement with the tracks 14 whereupon further downward movement of the pistons relative to their cylinders will cause the compressor to be lifted bodily above its main tracks, the said rods operating as a pair of lateral fulcrums or supports for supporting the compressor in raised and substantially balanced condition. Even though the compressor be somewhat unbalanced (this condition often arising because of constantly varying weights of the water in the radiator located at the front end of the compressor and of the gasolene carried at the rear end thereof) both ends of the compressor will be simultaneously lifted when that form of shoe shown in Figure 3 is employed. With the compressor in raised position the derailing ties 47 may be readily inserted under the transverse wheels 18, the compressor being then lowered upon said derailing ties by opening the valve 31. It has been found that only a few strokes of the plunger pump are necessary to raise the compressor bodily a sufficient distance above the tracks 14 to not only clear the same but also to permit the ready insertion of the transverse derailing ties beneath the transverse wheels 18.

In certain instances it has been found unnecessary to effect a simultaneous lifting of both ends of the compressor, and where this is the case it may be preferable to employ that form of shoe 48 best shown in Figures

4, 7 and 8. This shoe 48 is also provided with depending flanges 49 adapted to embrace opposite sides of the main tracks 14 with which it is engageable, but the track engaging bottom surface thereof is crowned, as at 50, instead of being flat as in the former instance. It will be apparent that the use of these crowned or curved shoes 48 will permit the compressor to rock upon its main tracks 14 when the pistons 38 and their rods 39 are urged downwardly under the pressure of oil, in consequence of which the end 51 of the compressor (which happens to be the lighter end) will be raised considerably above the tracks while the heavier end 52 will remain in lowered position. (See Figure 7.) One of the derailing ties may be then inserted under the transverse wheels carried upon the lighter end after which the heavier end may be raised to permit the insertion thereunder of a second derailing tie. It will be understood, of course, that this unbalanced condition may be the result of only a very slight difference in weight of the opposite ends of the compressor and accordingly very little effort, if any, is required to lift said lowered end 52 to a height sufficient to permit the insertion thereunder of the second transversely extending derailing tie.

By "cracking" the valve 31 in the line 26, the oil pressure in the two cylinders may be equally and gradually released and the oil returned to the oil tank 20, this return of the oil being effected not only by the springs 42 acting against the pistons 38 but also by reason of the downward movement of the compressor unit and the cylinders 32 carried thereby relative to the pistons 38. The springs 42 are of sufficient strength to normally maintain the piston rods 39 in raised, inoperative position when no oil pressure is applied to the upper ends of the pistons 38 so as to eliminate the possibility of the rods dropping down while the compressor is being propelled along its main tracks 14.

It will be apparent that the invention herein described is adaptable for use not only as a lifting means for the compressor unit, but also as an emergency braking means under certain emergency conditions, as when the usual braking devices fail to function. For instance, suppose the unit to be traveling down grade and the usual brakes fail to hold it against further downward movement. In such an event only a few strokes of the plunger pump 22 are necessary to cause the piston rods 39 to be depressed into engagement with the main tracks 14, the shoes with which the lower ends of said rods are equipped affording sufficient frictional engagement with the tracks to quickly and safely stop the compressor and hold it against further downward movement. This emergency braking action is obtained irrespective of the type of shoe used, since both types herein shown and described are provided with more or less broad track engaging surfaces and laterally spaced depending flanges. (See Figures 3 and 4.)

Still another advantage of this invention resulting from the fact that the hydraulic jacks 19—19′ are located on opposite sides of the frame intermediate the fore and aft ends thereof is that said jacks may be employed, when conditions warrant, as rigid vertical supports extending between the main tracks 14 and the sides of the frame respectively arranged above said tracks. Inasmuch as the wheels for supporting the compressor are usually arranged adjacent opposite ends of the compressor frame the central portions of the latter are unsupported and free to vibrate when the compressor is operated, these vibrations being of course objectionable. This objectionable condition may be obviated in compressors and similar units embodying the present invention by operating the plunger pump 22 to an extent sufficient to force the piston rods 39 downwardly and into engagement with the main tracks 14, the extent of such downward movement being insufficient, however, to lift the compressor unit bodily above said tracks. By so operating the jacks 19—19′ the latter function as fixed vertical supports extending between the sides of the compressor frame and the main tracks 14, said supports being interposed respectively between the fore and aft wheels 13 on either side of the compressor for supporting the central and normally unsupported portions of the compressor frame.

Although this invention has been illustrated and described in connection with rail car compressor units, it will be understood that it is equally applicable for use in connection with other types of apparatus and accordingly the term "compressor" as used herein is to be regarded as comprehensive. It is to be further understood that various changes may be made from time to time without departing from the general spirit or principles of this invention, and it is accordingly intended to claim the same broadly, as well as specifically, as indicated in the appended claims.

What is claimed as new and useful is:

1. In a portable rail car unit, in combination, a main body frame having wheels arranged to travel along main tracks extending longitudinally with respect to said unit, transverse wheels carried by said frame and arranged to travel along tracks extending transversely of said main tracks, and means carried by said body frame and operative to bodily lift the unit above the main tracks to a height sufficient to permit said transverse tracks to be inserted beneath said transverse wheels, said means being disposed intermediate the fore and aft ends of said unit whereby to facilitate the insertion and removal of said transverse tracks into and out of position by bodily shifting the same laterally of their lengths.

2. In a portable rail car unit, in combination, a main body frame having wheels respectively rotatable about longitudinally and transversely extending axes, certain of said wheels being arranged to travel along main tracks while others constitute transverse derailing wheels for the unit, and means respectively secured to opposite sides of said frame intermediate said transversely extending axes and operable to bodily lift the unit to a height sufficient to clear said main wheels from the main tracks and to permit derailing ties to be laterally shifted into position between said tracks and the transverse derailing wheels from points located outwardly of the opposite ends of said frame.

3. A portable rail car unit including a main body frame, wheels journalled upon said frame for permitting said unit to be moved along a set of main tracks, said wheels being arranged adjacent the fore and aft ends of said frame, and a pair of hydraulically operated lifting devices mounted upon opposite sides of said frame and intermediate the fore and aft ends of said frame or bodily lifting said unit above said main tracks.

4. A portable rail car unit including a main body frame, wheels journalled upon said frame for permitting said unit to be moved along a set of main tracks, said wheels being arranged adjacent the fore and aft ends of said frame, and a pair of hydraulically operated lifting devices mounted upon opposite sides of said frame and intermediate the fore and aft ends of said frame for bodily lifting said unit above said main tracks, said devices constituting a pair of laterally opposed fulcrums upon which said unit may be supported in substantially balanced condition.

5. In a portable air compressor unit arranged to travel along a track way extending longitudinally with respect to said unit, a pair of fluid pressure operated lifting devices for said unit mounted on opposite sides and intermediate the fore and aft ends thereof, each of said devices comprising a cylinder and a plunger operable within said cylinder and adapted to be forced downwardly against one of the tracks whereby to lift the unit bodily above said trackway.

6. In a portable rail car unit, in combination, a frame having wheels for engaging a pair of main longitudinally extending tracks, transverse wheels also mounted upon said frame and spaced above said tracks, a pair of cylinders respectively mounted upon opposite sides of said frame intermediate the fore and aft ends thereof, a pair of plungers operable within said cylinders and projecting downwardly and in line with said tracks for engagement therewith at points located intermediate said wheels, and means for supplying fluid under pressure to said cylinders equally whereby to force said plungers into engagement with said tracks and thereby cause said unit to be lifted bodily above said tracks in substantially balanced condition.

7. In a portable rail car unit, a main body frame, a pair of fluid pressure operated lifting devices mounted upon opposite sides of said frame intermediate the fore and aft ends thereof, each of said devices including an axially movable plunger arranged to be forced downwardly and into engagement with opposite tracks, means for supplying fluid under substantially equal pressure to both of said devices simultaneously, whereby to effect said downward movement of said plungers, means tending normally to resist said downward movement, and means for gradually releasing said fluid pressure whereby to permit said resisting means to effect the return of said plungers to their normal inoperative position.

8. In a portable rail car unit, a main body frame having a pair of opposed wheels at either end thereof for engaging a pair of longitudinally extending tracks, a pair of fluid pressure operated lifting devices mounted upon opposite sides of said frame intermediate the ends thereof, each of said devices including an axially movable plunger arranged to be forced downwardly and into respective engagement with said tracks at points located between each pair of fore and aft wheels, means for supplying fluid under substantially equal pressure to both of said devices simultaneously whereby to effect said downward movement of said plungers, and means for gradually releasing said fluid pressure.

9. In a portable rail car unit, in combination, a pair of opposed wheels at either end thereof for engaging a pair of longitudinally extending tracks, a pair of fluid pressure operated lifting jacks mounted upon opposite sides of said frame intermediate the ends thereof, each of said jacks including an axially movable plunger arranged to be forced downwardly and into respective engagement with said tracks at points located between each pair of fore and aft wheels, means secured to the track-engaging ends of said plungers for preventing lateral displacement thereof with respect to said tracks, and means for commonly supplying fluid under pressure to both of said jacks whereby to force said plungers downwardly and into respective engagement with said tracks.

10. In a portable rail car unit, in combination, a pair of longitudinally alined wheels at either side of said unit for respectively engaging a pair of main tracks, a second pair of transversely alined wheels at either end of said unit for respectively engaging a pair of derailing tracks arranged to be laid across said main tracks, said transversely alined wheels being so mounted with respect to said longitudinally alined wheels that the track-engaging points of the former are spaced ver-

tically above the track-engaging points of the latter, a pair of fluid pressure operated plungers secured to opposite sides of said unit intermediate the ends thereof, said plungers being each operable along a vertical line extending between and lying in the plane of one of said pairs of longitudinally alined wheels, and means for commonly supplying fluid under pressure to both of said plungers whereby to cause at least one end of said unit to be lifted to a height sufficient to clear said main tracks and permit a derailing track to be inserted beneath the transverse wheels associated with said lifted end.

11. In a portable rail car unit, in combination, a frame having a pair of fore and aft wheels on opposite sides thereof for operative engagement with a pair of tracks, a pressure cylinder mounted upon each side of said frame intermediate and in substantial alinement with the corresponding pair of fore and aft wheels, a plunger operable within each of said cylinders, the lower end of said plunger being provided with a crowned track engaging portion, means tending constantly to maintain said plungers in normally retracted position within said cylinders, and means for supplying fluid under pressure to the upper ends of said plungers to force the latter downwardly and against the action of said retracting means into engagement with said tracks whereby to permit said unit to be bodily lifted above said tracks for rocking movement about said crowned track engaging portions as fulcrums.

12. In a portable rail car unit, in combination, a frame having a pair of fore and aft wheels on opposite sides thereof for engaging a pair of tracks, a pair of oil pressure operated devices respectively mounted upon opposite sides of the frame, each of said devices including an axially movable plunger, an oil tank mounted upon the frame, and a pump interposed between said tank and said devices for supplying oil under pressure to both of the latter simultaneously whereby to force said plungers downwardly until the lower ends thereof project below the lowermost points of said wheels.

In testimony whereof, I have hereunto affixed my signature.

JOSEPH S. OECHSLE.