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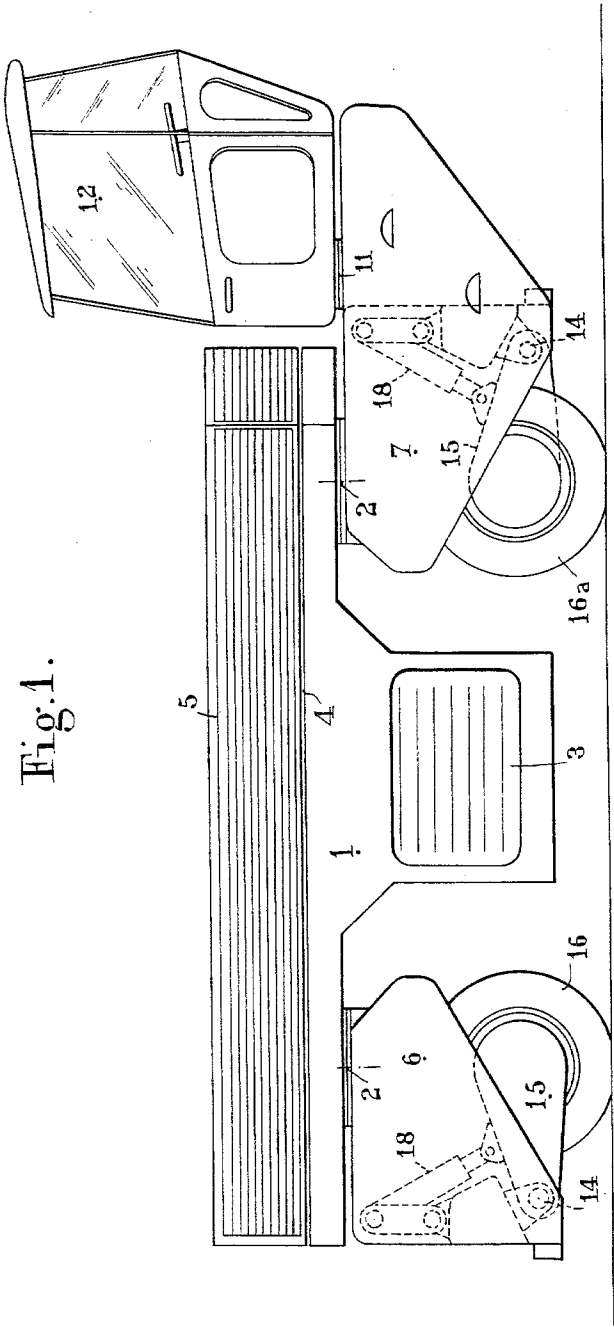
C. VIVIER

3,229,602

SELF-POWERED COMPACTING ROLLER

Filed May 25, 1962

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Fig. 2.

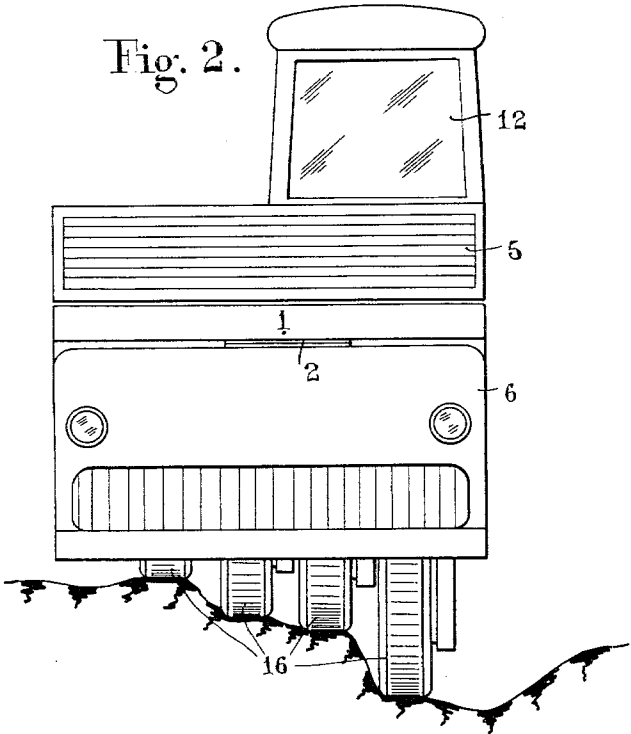
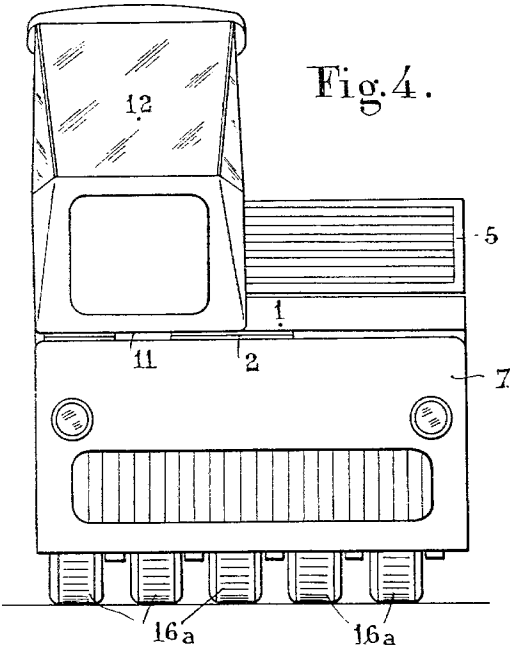


Fig. 4.



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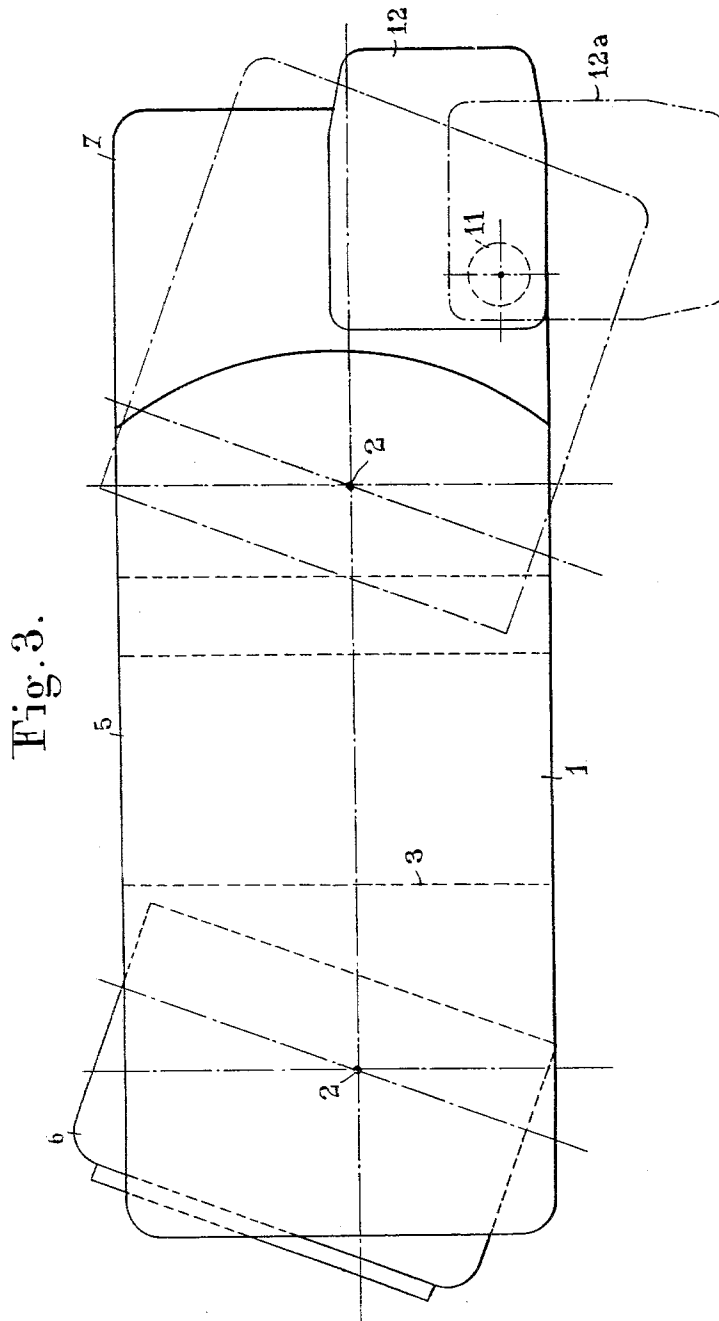
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Fig. 5.

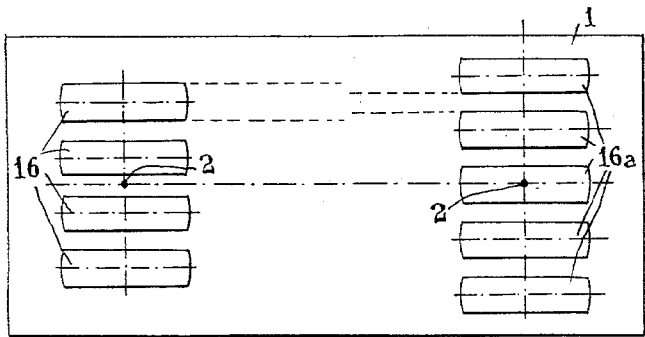


Fig. 6.

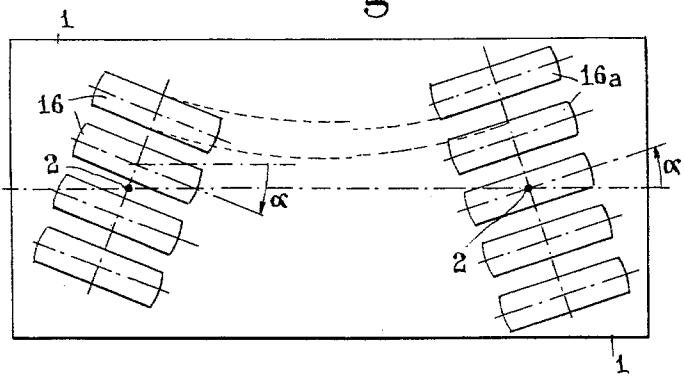
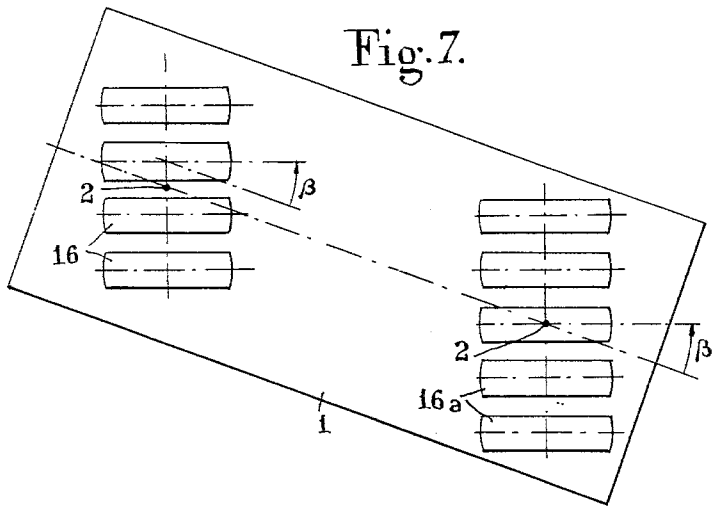


Fig. 7.



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Fig.8.

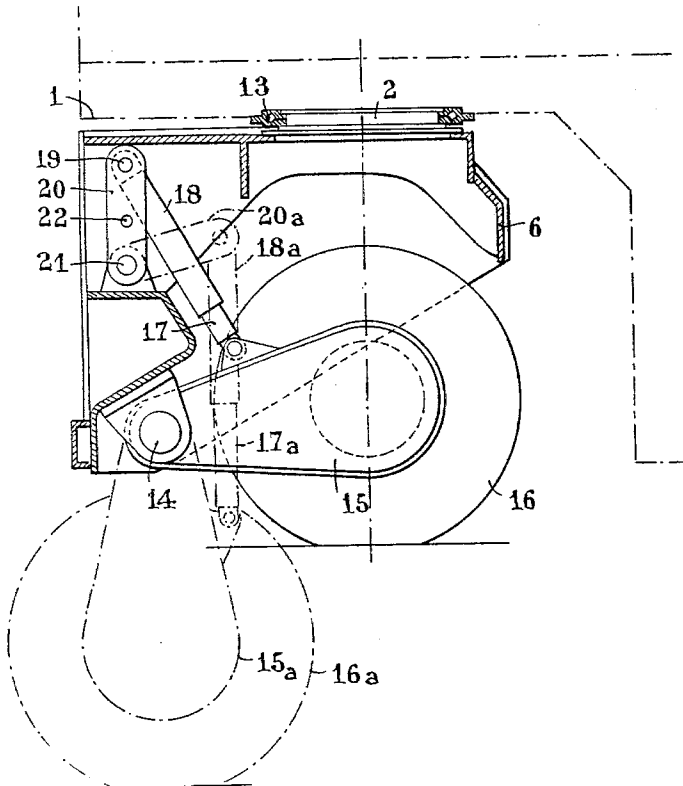
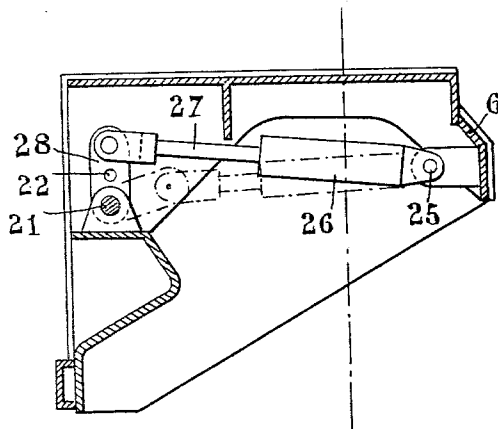


Fig. 9.



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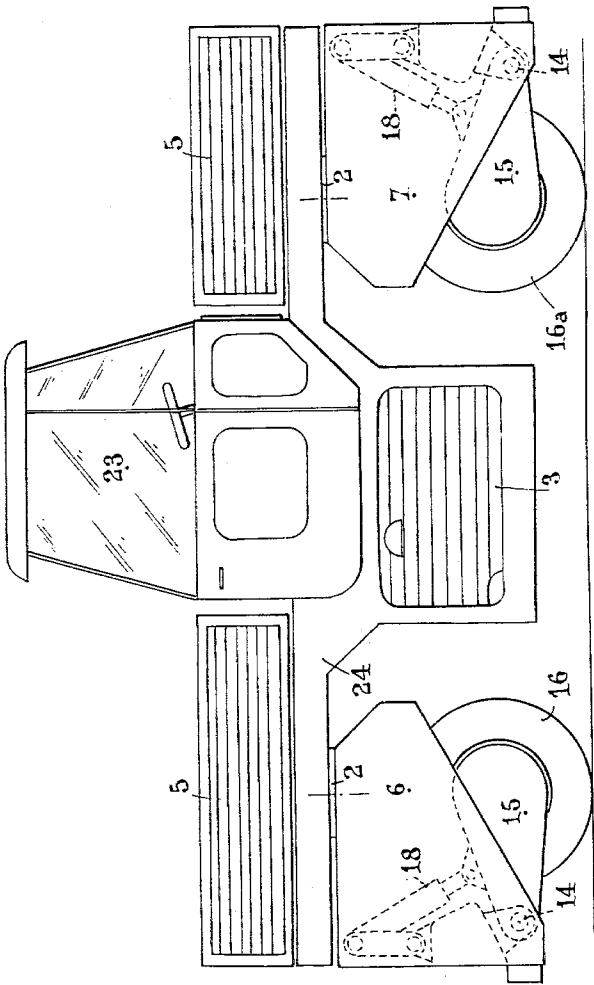
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Fig. 10



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SELF-POWERED COMPACTING ROLLER

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862,799, Patent 1,297,854

2 Claims. (Cl. 94—50)

This invention relates to ground-levelling and compacting rollers or like machines and has specific reference to a self-powered compacting roller having a hydraulic transmission and two wheel axles or trains ensuring a perfect relative overlapping of the wheel-tracks of both axles in any curvilinear or straight runs while permitting, in certain coarse levelling works, the widening—beyond the width of the widest set of wheels—of the strip of ground levelled by the machine in one pass.

In this compacting roller the wheels of each axle or train are carried by arms pivoted about a common axis and the angular movements of these arms are controlled by hydraulic cylinders fed preferably from the isostatic and stabilizing system described in the French Certificate of Addition Ser. No. 860,223 filed on April 28, 1961 and entitled "Isostatic Compacting Roller."

This self-powered compacting roller equipped with a hydraulic transmission is characterized in that it comprises a platform supported at its ends by a pair of slewing roller- or ball-bearings mounted on two frames or casings in which the two trains of wheels or wheel axles are mounted respectively, these wheel axles being steered separately by means of hydraulic cylinders.

The features and advantages of this invention will appear more completely from the following description of typical embodiments of the invention which is given hereafter with reference to the accompanying drawings, in which:

FIGURES 1 to 4 inclusive show a typical embodiment of the vehicle in side view as seen from the right-hand side, end view (from back), top view and end view (from front);

FIGURES 5 to 7 are diagrammatic views illustrating in plan view from above the angular settings of the two frames or casings in relation to the platform, these views corresponding respectively to the operation of the vehicle in straight line, along a curve, and sideways or crabwise, this last steering position permitting, for coarse levelling works, the widening of the ground surface worked during each pass of the compacting vehicle.

FIGURE 8 illustrates on a larger scale and in section taken across the rear frame or casing of the vehicle, in a plane parallel to the wheels planes, the mounting of the hydraulic device controlling the angular movements of the wheel supporting arm.

FIGURE 9 shows in a section parallel to the preceding one and in a plane disposed in the casing just behind the train of wheels one portion of the mounting of this train of wheels which is not shown in FIGURE 8 in order to simplify the drawing.

FIGURE 10 similar to FIG. 1 illustrates a modified embodiment of the compacting vehicle of this invention.

As shown in FIGS. 1 to 4 inclusive, the self-powered compacting vehicle or roller of this invention comprises a platform 1 carrying at either end a thick and sturdy bearing member or slewing track 13 adapted to receive balls, rollers or the like, as shown in FIG. 8, for the

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swivelling mounting on another structure to be described presently. In its central portion the platform 1 carries a lower extension constituting a housing 3 for a combustion engine, a compressed-liquid distributing system and, if desired, a compressed-air distributing system. The upper portion 4 of the platform is adapted to receive sideboards and tailboards 5 permitting the loading of ballast or other materials such as gravel, sand, concrete blocks or slabs, as well as a large-capacity water tank.

Through the aforesaid bearing members 13 the platform ends are pivotally supported about the axes 2 by a front frame or casing 7 and a rear frame or casing 6. As illustrated in FIG. 8, each frame, for example the rear frame 6, carries perpendicularly to pivot axis 2 a beam 14 having swingably mounted thereon a plurality of arms 15, each arm 15 carrying one of the wheels 16 of the set or train mounted on this frame for supporting the latter on the ground. Each arm 15 is maintained in a certain angular position in relation to the frame 6 by a hydraulic cylinder having its rod 17 pivotally connected to the relevant arm 15, the body 18 of each hydraulic cylinder being pivotally mounted on a transverse pivot pin 19 the position of which is adjustable in relation to the frame 6. This pivot pin 19 is carried by a link 20 radially rigid (for example by welding) with a shaft 21 mounted in the casing parallel to the first shaft 14. The aforesaid shaft 21 may be locked against axial rotation by means of a pair of rams mounted in the frame 6 on either side of the train of wheels. Each ram aforesaid, as shown for one of them in FIGURE 9, is pivoted on a point 25 of frame 6 by means of its cylinder 26 and its rod 27 is pivoted on a crank arm 28 rigidly secured on shaft 21. A spindle 22 co-acts with the frame 6 and one of the crank arms 28 for locking these arms 20 in the angular position illustrated in thick lines in the drawings. This position corresponds to the normal operation of the vehicle, notably its operation as a compactor. By operating the hydraulic cylinders controlling the shaft 21 and causing this shaft to rotate in the clockwise direction as seen in FIG. 8, for instance through an angle of about 75°, the wheel control systems assume the position 20a, 18a, 17a, 15a and 16a wherein the arms 15a, being substantially vertical, set the wheels 16a in their remotest position beneath the frame 6. In this position permitting a convenient inspection of the wheels, any defective wheel can be replaced without difficulty by raising it moderately above the ground by means of its control cylinder 17, 18a.

Each frame 6 or 7 is equipped with a separate hydraulic-controlled steering system with, if desired, means for locking the steering systems jointly or separately. Besides, all the wheels, or at least the major part of them, are equipped with separate hydraulic motors. The front wheel steering system is preferably of the non-reversible type with hydraulic servo-action. It is also advantageous to control the steering of the rear wheels by means of a simple hydraulic system provided with means for locking this system when the compactor is being transferred like an ordinary vehicle from one site to another.

The front portion of casing or frame 7 has mounted thereon a driver's cab 12 pivotally mounted about an axis 11 whereby the cab may be set either in a road position as shown in thick lines in FIG. 3, with the cab located on the right-hand side of the vehicle, parallel to the longitudinal axis thereof, or in a working position 12a shown

in broken lines in the same figure and wherein the cab is disposed at right angles to the longitudinal axis of the vehicle to enable the driver to have an unobstructed sight of the wheels carried by the two frames or casings 6 and 7.

All the means for controlling the different generators contained in the housing 3 as well as the handwheel or like element for controlling the angular settings of frames 6 and 7 are disposed on an instrument panel in front of the driver in the cab 12.

The number of wheels constituting the two trains of wheels differ by one from one train to another, and in the embodiment illustrated, as shown more particularly in FIGS. 5 and 6, there are four rear wheels 16 and five front wheels 16a. In the straight ahead position, as shown in FIG. 5, the rear wheels 16 roll in the intervals between the tracks formed by the front wheels 16a. The same applies when the vehicle is cornering or following a curvilinear track in which, as shown in FIG. 6, the two frames and therefore the two wheel planes of the two trains are inclined in opposite direction, in relation to the longitudinal center line of the vehicle, by a same angle α . If a relatively coarse compacting work is to be effected, or if it is desired to compact a lateral strip of relatively reduced width (for example when widening a lane limited by a ditch), the ground width that can be compacted with the machine may be increased by operating the compactor sideways or crabwise, as shown diagrammatically in FIG. 7, so that the two wheel planes of both trains of wheels are also inclined by a same angle β in relation to the longitudinal center line of the vehicle, but in the same direction.

The above-described construction of a self-powered ground compactor is characterized over known constructions by many advantages, the essential ones being listed hereafter:

- (a) The general stability is increased considerably;
- (b) The steering possibilities are widely extended;
- (c) The vehicle can be operated crabwise;
- (d) The wheel tracks can overlap each other both in straight ahead and curved steering conditions;
- (e) The center of gravity of the vehicle is advantageously lowered;
- (f) The wheelbase is reduced;
- (g) The complete hydraulic unit is so disposed that its weight is properly distributed; besides, this unit is accessible from all sides, and can be removed and reinstalled without difficulty and without resorting to special handling apparatus or means;
- (h) In crabwise operation the width of the compacted ground can be extended considerably in certain works, notably for compacting fills;
- (i) The switching valves of the hydraulic motors and the hydraulic wheel suspension cylinders are easy to get at;
- (j) There is a large-area platform for loading and unloading ballast;
- (k) The ballast may consist of loose material such as gravel or sand, by using sideboards and tailboards mounted on the platform;
- (l) The ballast may consist of blocks of any arbitrary configuration;
- (m) The platform is supported by relatively flat slewing tracks on the frames or casings 6, 7, thus reducing vertical dimensions;
- (n) The compactor has neither chassis nor half-chassis and the platform may be constructed from structural iron at a lower cost than sheet-metal construction;
- (o) Different compactor types may be constructed from a standard platform to meet various requirements;
- (p) A large-capacity tank can be mounted on the platform for either using water as a ballast or moistening the ground (for example when repairing tracks in Africa where up to now no satisfactory solution has been proposed);
- (q) The control cab is independent of any functional structures of the compactor and can be swivelled to the

desired angular position during the operation of the machine.

Moreover, it may be noted that the self-powered compactor roller of this invention can be constructed with a width inferior to 2.50 meters (8'2"). This specific feature made the construction of the compactor of this invention particularly difficult due to various technical requirements in connection notably with the hydraulic systems, the wheel tyres, etc. It is advantageous in that the vehicle can be driven without infringing the Highway Code Regulations, whereby the usual application for driving large vehicles from one site to another on public roads can be dispensed with.

The ballast platform is completely free and can be loaded and discharged easily and rapidly with gravel or sand.

In case of tire puncture, the repair can be done very rapidly due to the possibility of releasing the wheel completely, a feature inasmuch appreciable as with most hitherto known compactors this operation is particularly difficult.

With the arrangement according to this invention it is also possible to have a very easy access to all hydraulic systems for driving or braking the wheels.

Of course, many modifications and alterations could be brought to the specific forms of embodiment shown and described herein, without however departing from the spirit and scope of the invention as set forth in the appended claims. Thus, for instance, as shown in FIG. 10, the cab, instead of being mounted at one end of the vehicle, as at 12, FIG. 1, may be mounted on the central portion of the vehicle, and in this case the platform 24 comprises two ballast compartments disposed on either side of the cab 23. This cab may also be mounted on means permitting its longitudinal sliding movement on the platform, if desired. Furthermore, the number of wheels of each train or axle may also be altered, one train having preferably one wheel more than the other train in order to preserve the track overlapping feature. More particularly, the widest train, instead of having an odd number of wheels as shown, may comprise an even number of wheels.

What I claim is:

1. A self-powered compacting roller comprising a platform, a casing pivotally mounted beneath said platform about a spindle extending at right angles to said platform, a beam rigidly mounted in said casing so as to extend in a direction at right angles to the pivot axis of said casing, a series of swinging arms rotatably mounted on said beam, a series of wheels mounted on the arms of said series, a shaft rotatably mounted in said casing and parallel to said beam, another series of arms rigid with said shaft, a series of hydraulic rams having each a bearing end pivoted on one of said arms of said other series and an operative end pivoted on one of the arms of said first series, another pair of arms rigidly carried by said shaft on either side of said other series of arms and another pair of hydraulic rams each having a bearing end pivoted on said casing and an operative end pivoted on one of said other arms, means for simultaneously controlling said other pair of rams whereby the arms of said other series can be locked either in a raised position in said casing whereby said rams of the series permit of adapting the wheels of the series, in said casing, to the unevennesses of the ground, or in a lower position in which the rams of said series permit, when the roller is still, to cause said wheels of said series to engage the ground underneath said casing, any one of said last-named wheels being adapted to be raised above ground level by actuating its corresponding ram, while remaining well clear under said casing, for easier repair and removal, while the other wheels support the weight of the roller.

2. Self-powered compacting roller as set forth in claim 1, which further includes lock means co-acting with any selected one of said other arms and with said casing to

lock said shaft against rotation in a direction to lock the corresponding one of the arms of said first series in its raised position while other arms of said first series are lowered by the respective hydraulic rams, whereby said wheel and ram corresponding to said selected locked arm 5 are positioned for servicing.

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