

Jan. 24, 1950

R. Q. ARMINGTON
COMPACTION GRADER

2,495,310

Filed Oct. 22, 1945

2 Sheets-Sheet 1

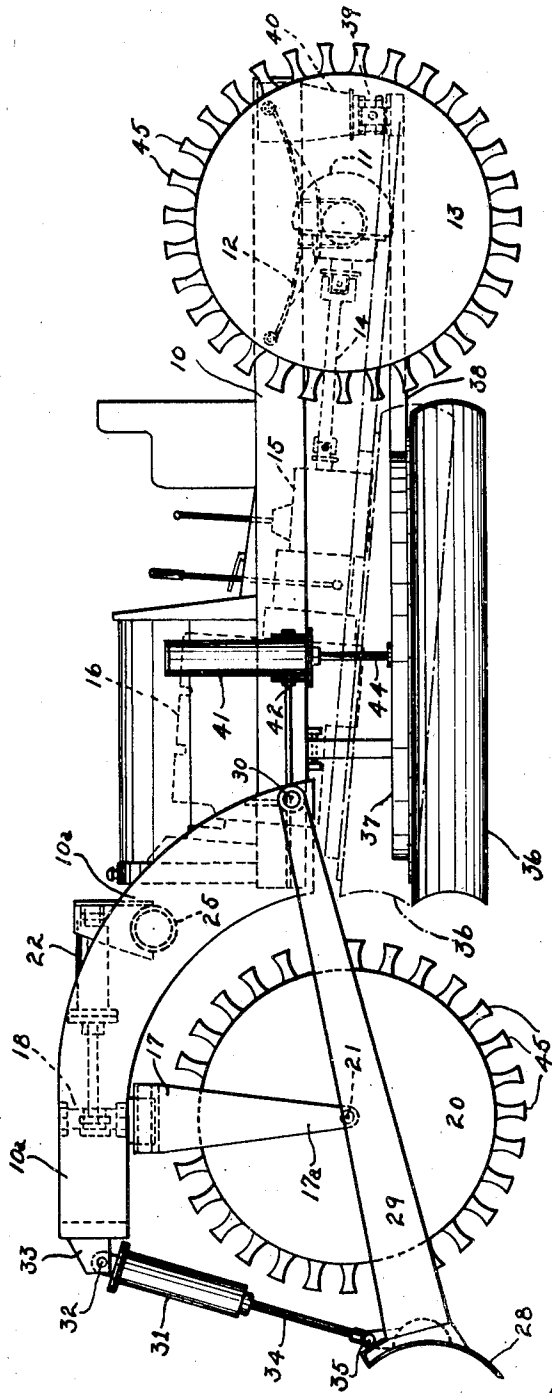


FIG. 1.

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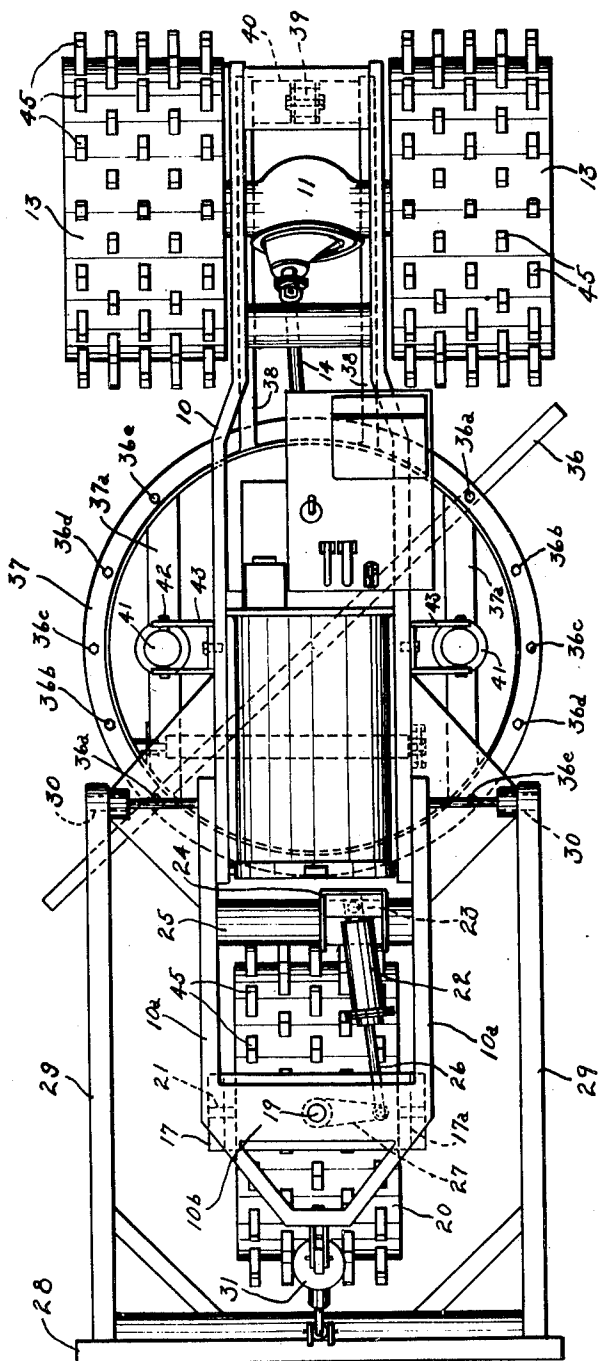


FIG. 2.

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2,495,310

COMPACTION GRADER

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Application October 22, 1945, Serial No. 623,681

2 Claims. (Cl. 37-146)

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This invention relates to improvements in a spreading and tamping device and more specifically to a machine adapted to grade loose material, while at the same time compacting the same.

An object of the present invention is to provide a vehicle provided with tamping rollers which perform the double duty of driving the vehicle and compacting the earth beneath it.

Another object of the invention is to provide in the same machine a blade for spreading or grading loose earth material, while the very act of running the machine over the material aids in compacting it in a special manner.

Objects and advantages of my invention will be apparent from the accompanying drawings and the essential features thereof are set forth in the appended claims.

In the drawings,

Fig. 1 is a side elevational view of a machine embodying my device in one form, while

Fig. 2 is a top plan view thereof.

In the handling of loose earth material, as in making a fill or the like, the dirt is generally dumped in long windrows, then a bulldozer is used for a rough spreading of the loose material after which a roller compacts it and a grader alternates with the roller to level up the surface. In my improved machine, I have comprised all of these operations in a single device.

The device here shown, is for use around material having binding qualities, such as are inherent in clay material as distinguished from sandy soil which will be mentioned briefly hereafter. In the handling of clay soils or the like, it is important to thoroughly compact each layer of loose material before the next layer is placed on top thereof. My improved device is particularly valuable in such an operation.

The machine shown, comprises a main frame 10 from which is suspended an axle housing 11 by any usual means, such as the spring suspension indicated at 12. On opposite ends of the housing are mounted the rollers 13 and connected with the driving axle by any usual means, the details forming no part of the present invention. The drive for these rollers is through shaft 14, change gear mechanism 15 and engine 16. The drive mechanism forms no part of the present invention and may be of any standard type. The forward end of the vehicle is supported from the overhanging frame member 10a having a cross member 10b from which the yoke 17 is supported on a trunnion mounting 18 permitting the yoke to swivel at the mid point about shaft 19.

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The yoke 17 has two parallel downwardly extending arms 17a passing on opposite sides of forward roller 20 which is rotatably supported by shaft 21 in the arms 17a.

Means is provided for steering the vehicle by the swiveling of roller 20 about shaft 19. Power means is provided for this purpose including hydraulic jack 22 pivotally mounted at 23 in a bracket 24 which is rigidly supported by the tube 25 from the frame members 10a. The jack has a piston which operates piston rod 26, which is pivotally connected to the crank arm 27, which is connected with the trunnion of yoke 17, so that as power is supplied to the jack 22, by means not shown, the yoke 17 and therefore roller 20 is caused to swivel about the shaft 19.

A bulldozer blade 28 is mounted in front of roller 20 for raising and lowering movement. This mounting means comprises a pair of parallel arms 29 connected at their forward ends to the blade 28 and having a pivotal mounting at their rearward ends on shafts 30 which in turn are supported in the frame portions 10a.

Power means is provided for raising and lowering this blade. To this end a jack 31 is pivotally mounted at 32 on a bracket 33 rigid with the frame 10a. This jack has a piston which operates piston rod 34, the lower end of which is pivotally connected at 35 to the blade. It results from this construction that when power is supplied to the jack 31, by means not shown, the bulldozer blade may be raised and lowered under the control of the driver of the vehicle.

Preferably, a grading blade 36 is provided intermediate the rollers 13 and 20. Preferably also, this blade is arranged to be raised and lowered or to be tilted in a lateral direction as desired. As shown in the drawings, a large ring 37 may be formed of structural angles, and is mounted on two parallel arms 38 which extend rearwardly to a pivotal mounting 39 on bracket 40, which is fixed to frame 10 at its rear end. Means for raising and lowering the ring 37 is provided by means of two hydraulic jacks 41 which are provided with trunnion mountings 42 in brackets 43, which are connected with frame 10. Each of these jacks has a piston which operates a piston rod 44, each of which is connected to one of the cross members 37a, provided on ring 37 at opposite sides of the frame. It results from this construction that when power is supplied, by means not shown, to both of the jacks 41, the ring 37 and the blade 36, is raised as a whole, pivoting about the rear pivot 39.

The blade 36 is also arranged for lateral tilt-

ing motion which is accomplished by a differential operation of the two jacks 41. In other words, one is held stationary while the other is operated, or they are operated in opposite directions so as to raise the blade 36 higher at one side of the vehicle than at the other. To permit this operation, the pivot at 39 is in the form of a universal joint. This raised and tilted position of 36 is indicated in dot-dash lines, in Fig. 1.

It will be noted, that the angle of blade 36, with reference to the longitudinal center line of the vehicle, may be varied by changing the position of the bolts 36a in the ring 37. Various positions of these bolts are indicated at 36b, 36c, 36d and 36e.

I have shown the rollers 13 and 20 as provided with sheep's-foot tampers 45, and these are spaced over the entire area of the wide rollers to provide the tamping action for compacting clay soils which is efficiently done by equipment arranged in this fashion. It results from this construction, that the vehicle compacts the soil as it passes over it, while at the same time, the sheep's-foot construction 45 aids the traction of the driving rollers 13.

It is thus possible, with the use of my improved vehicle, to spread the windrows of loose earth by means of the bulldozer blade 28, while at the same time, compacting the soil over which the vehicle moves. Then, by use of the grader blade 36, the soil may be leveled off in any desired manner. By the provision of raising and lowering equipment for blades 28 and 36, one or the other may be used alone, both can be used together, or neither of them may be used under certain circumstances, when they are not necessary.

I have described my above invention as applied to the compacting of soils which carry a binder, such as the clay soils mentioned. By substituting smooth rollers at 13 and 20, either solid or pneumatic, my device may be readily adapted for use on sandy soils where the best results are obtained by applying smooth rollers to the top of the soil, disturbing the same as little as possible. The bulldozer and grading blades are equally useful during such use of my machine.

What I claim is:

1. A spreading, compacting and grading device comprising a vehicle having a frame, one roller at the front end and two rollers at the rear end of said vehicle supporting the same for travel over a surface, said rear rollers being spaced apart laterally and said front roller being in staggered lateral relation with said two rear

rollers, whereby the rollers at the rear end of said vehicle compact the surface missed by said roller at the front end of said vehicle, means for driving said rear rollers, means for steering said front roller, all of said rollers having soil compacting projections on their outer surfaces, a bulldozer blade carried by said vehicle and adapted to engage the ground ahead of said front roller, a grading blade carried by said vehicle and adapted to engage the ground between said front and rear rollers, means for varying the height of said bulldozer blade relative to the ground, and means for varying the height of said grading blade relative to the ground and for tilting the same relative to the horizontal.

2. A spreading, compacting and grading device comprising a vehicle having a frame, roller means at the front end adapted to act as a single steerable unit and two rollers at the rear end of said vehicle supporting the same for travel over a surface, said rear rollers being spaced apart laterally and said front roller means being in staggered lateral relation with said two rear rollers, whereby the rollers at the rear end of said vehicle compact the surface missed by said roller means at the front end of said vehicle, means for driving said rear rollers, means for steering said front roller means, all of said rollers and roller means having soil compacting projections on their outer surfaces, a bulldozer blade carried by said vehicle and adapted to engage the ground ahead of said front roller means, a grading blade carried by said vehicle and adapted to engage the ground between said front roller means and said rear rollers, means for varying the height of said bulldozer blade relative to the ground, and means for varying the height of said grading blade relative to the ground and for tilting the same relative to the horizontal.

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