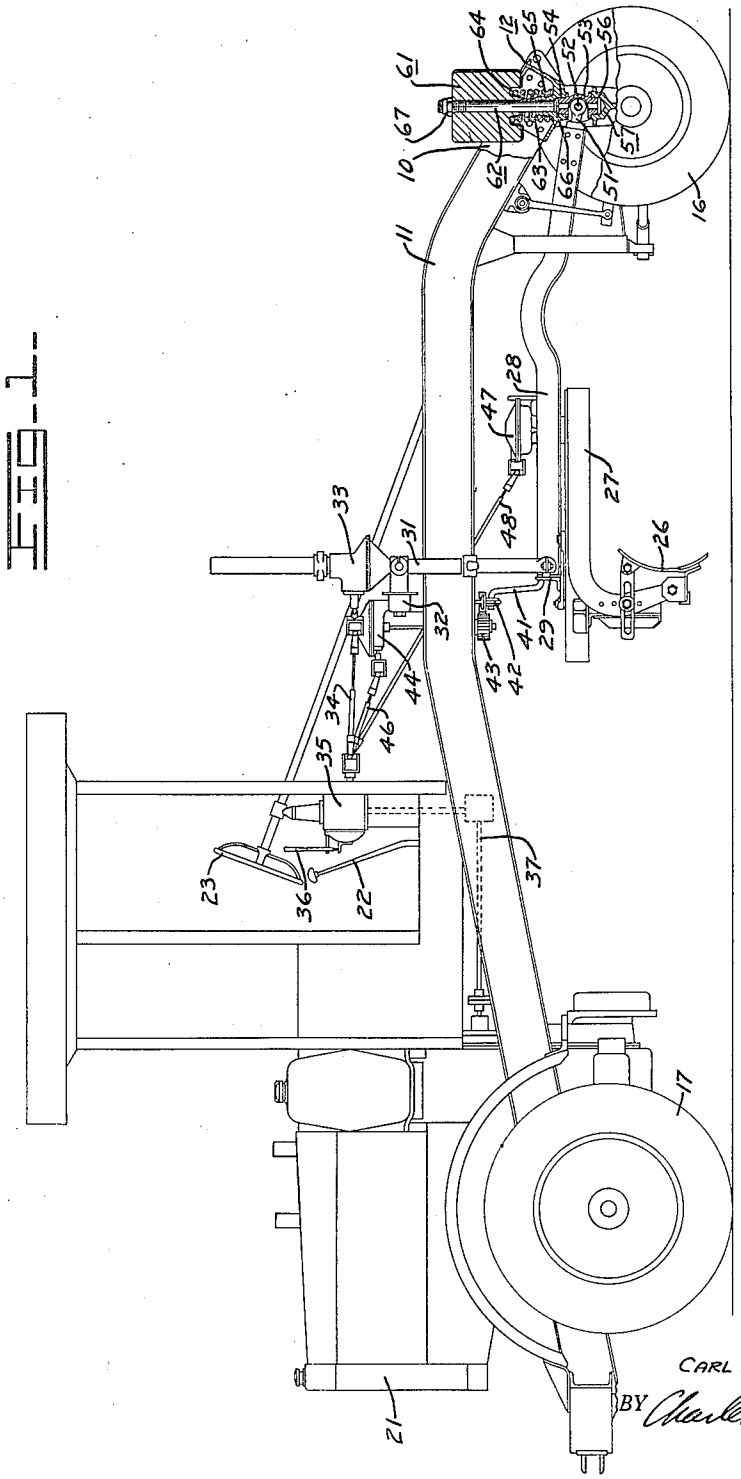
May 25, 1937. C. A. GUSTAFSON 2,081,536

ROAD MACHINE

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Fig. 1.



INVENTOR.
CARL A. GUSTAFSON
BY Charles M Fryer
ATTORNEY.

May 25, 1937. C. A. GUSTAFSON 2,081,536

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Fig. 2.

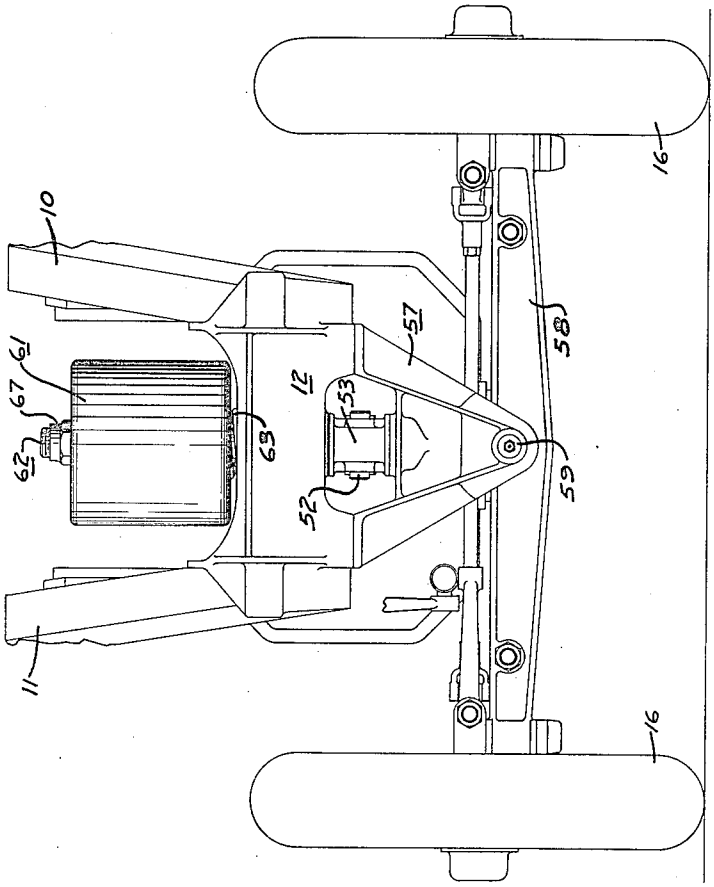
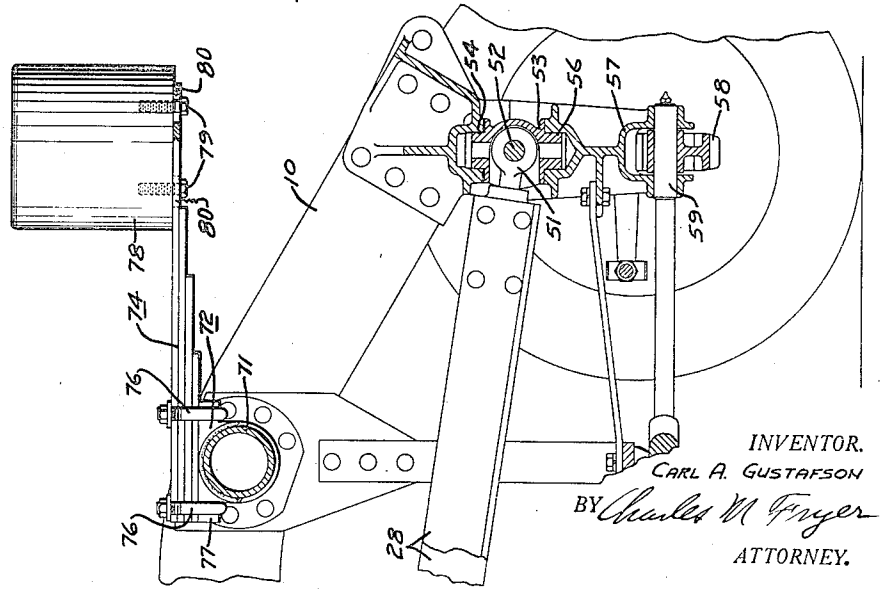


Fig. 3.



INVENTOR.
CARL A. GUSTAFSON
BY Charles M Fryer
ATTORNEY.

Patented May 25, 1937

2,081,536

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ROAD MACHINE

Carl A. Gustafson, Peoria, Ill., assignor to Caterpillar Tractor Co., San Leandro, Calif., a corporation of California

Application February 5, 1934, Serial No. 709,832

6 Claims. (Cl. 37—156)

My invention relates to road machines of the type adapted for road maintenance work, and more particularly to means for preventing the transmission of bouncing movement of the ground supports or engaging members of the machine to the earth-engaging means when the machine is travelling over an uneven or corrugated road surface.

When vehicles with resilient tires travel over a road, especially a dirt or gravel road, corrugations or waves are formed on the road-bed, which become more pronounced during further travel of vehicles over the road due to the bouncing action of the tires in passing over the corrugations. When a road maintenance machine is refinishing such a road, the front wheels thereof travel over the corrugations of washboard surface ahead of the blade, and the bouncing action of the front wheels is transmitted through the frame to the earth-engaging means or tool, which, as a result, forms another set of corrugations.

The transmission of the bouncing action of the wheels of the road machine to the frame is particularly troublesome in present day high speed road machines equipped with resilient wheels, such as wheels having pneumatic tires. I have found that the transmission of such bouncing action to the frame of the machine can be prevented by opposing the bouncing action of the wheels. Preferably, in road machines where a solid or non-resilient connection is provided from the frame to the front axle whereby movement of the axle in a vertical direction is imparted to the frame, such opposing action is provided by means including a weight which is resiliently supported on the frame. It is desirable that the means oppose upward movement when the wheels encounter a road corrugation, and oppose downward movement when the wheels are leaving a road corrugation, so that bouncing action is counteracted, and the frame remains substantially unaffected.

It is an object of my invention, therefore, to provide a road machine of improved construction which is adapted to refinish a road surface having corrugations therein to a smooth road surface free from such corrugations.

It is a further object of my invention to provide a road machine of improved construction in which the bouncing action of the front ground supports in passing over road-bed corrugations is overcome and therefore is not transmitted to the earth-working means.

Another object of my invention is to provide in a road machine a method of preventing the bouncing action of the front ground supports, thereby preventing vibration from being transmitted to the earth-working means.

Another object of my invention is to provide an improved road machine having a solid connection between the frame thereof and the front axle which carries ground-engaging wheels and vibration damping means for absorbing the bouncing action of the wheels in travelling over road-bed corrugations.

Other objects will appear as the description progresses.

Description of figures

Fig. 1 is a side elevation of an automotive road machine illustrating a preferred embodiment of the invention.

Fig. 2 is a front elevational view of the road machine illustrated in Fig. 1.

Fig. 3 illustrates a second modification of the preferred embodiment in my invention.

Description of machine

An automotive road machine disclosed herein, with which the invention is preferably employed, comprises a main frame including symmetrically disposed side members **10**, **11** (Figs. 1 and 2) which are connected by suitable cross members including front bolster **12**. The frame is provided with steerable front supports or wheels **16**, which are described more specifically hereinafter, and driving rear supports or wheels **17**. Motor **21**, located at the rear of the machine, above rear wheels **17**, provides a suitable drive for said wheels, controlled from the operator's station by suitable means including gear shift lever **22**. Steering wheel **23** at the operator's station controls front wheels **16**.

The road machine is equipped with suitable earth-engaging or earth-working means in the form of a conventional maintenance blade which is adjustably supported underneath the frame of the machine for vertical and transverse adjustments with respect thereto, and for angular adjustment about a vertical axis to vary the angle thereof with respect to the line of draft. The adjustment of the tool is controlled from the operator's station by suitable means. Blade **26** (Fig. 1) is adjustably mounted on circle **27** which is supported for rotation in a suitable circle-carrying frame, including drawbars **28**, and rear cross bar **29**. The circle-carrying frame has a universal draft connection with the main frame of the machine as described herein-

after to accommodate movement thereof during adjustment of the tool.

The means for accomplishing vertical adjustment of the earth-engaging tool includes similar opposite telescopic lift links 31 (Fig. 1). Only one of links 31 is illustrated. Each link 31 is universally connected at its lower end to an end of cross bar 29, and is universally supported at 32 on one of respective side members 10, 11. Telescopic adjustment of each lift link 31 is accomplished by means of a suitable nut and screw mounted in housing 33 and operated through shaft 34 from gear box 35 controlled by hand lever 36. A suitable drive connection 37 is provided from motor 21 to gear box 35. By vertical adjustment of respective lift links 31, the tool can be adjusted vertically or it can be adjusted angularly about a longitudinal axis.

The means for adjusting the tool laterally with respect to the machine includes center shift link 41 (Fig. 1) connected to rear cross bar 29 at its lower end and at its upper end to laterally shiftable rack 42 engaged with pinion 43. Pinion 43 is operated by suitable gearing in housing 44 and by shaft 46 from gear box 35. Center shift link 41 not only serves to adjust the tool laterally with respect to the machine, but also serves to prevent lateral movement thereof after the tool has been moved to an adjusted position. It is to be noted that center shift link 41 together with respective lift links 31 provide a rigid connection between blade 26 and the frame.

To adjust the angle of blade 26 with respect to the line of draft, circle 27 (Fig. 1) is rotated in the circle-carrying frame by suitable means including gearing in gear box 47, operated through shaft 48 from gear box 35.

Thus it is seen that the earth-engaging tool is capable of vertical, angular and lateral adjustment with respect to the frame of the machine, as well as for angular adjustment with respect to the line of draft.

To provide for the universal adjustment of the tool with respect to the frame of the machine, drawbars 28 (Figs. 1 and 3) converge at their front ends to a suitable connection providing a pivotal mounting for eyebolt 51 which is pivotally secured to drawbars 28 in the usual manner and is universally connected to the frame of the machine. Eyebolt 51 is pivoted on pin 52 mounted in connection 53 having its upper end pivotally journaled in recess 54 in bolster 12, and its lower end pivotally journaled in complementary recess 56 in V-bracket 57 detachably secured to bolster 12. Bracket 57 embraces front axle 58 at the bottom, being pivotally connected thereto by pin 59. Thus, the main frame of the road machine has a vertical non-yielding or solid connection with the front axle, so that vertical movement of the front axle caused by bouncing action of wheels 16, which are here shown equipped with pneumatic tires, is transmitted directly to the frame.

Vibration damping means is provided for yieldingly opposing the bouncing action of the wheels so that when the wheels pass over corrugations in the road surface, the frame of the machine tends to float evenly while the resilient wheels absorb the bouncing action caused by the corrugations. Said vibration damping means comprises a comparatively heavy weight 61 (Figs. 1 and 2) which has a vertical central aperture for receiving guide post 62 mounted in bolster 12. Weight 61 is resiliently supported on spring 63 seating at its upper end in annular recess 64 formed in the weight, and on bolster 12 at its lower end. Post 62 (Fig. 1) extends through apertured boss 65 of bolster 12, and has enlarged end 66 resting on the top of connecting member 53. Nut 67 threaded on the upper end of post 62 acts as a stop to maintain weight 61 and spring 63 on the post, and also serves to adjust the compression placed on spring 63.

From the preceding description, it will be apparent that a resiliently supported weight is provided on the main frame of the machine immediately over the point of connection of the frame with the front axle. The inertia of weight 61 by virtue of its elastic connection with the frame, opposes upward movement of the frame when either or both of front wheels 16 bounce; and, when wheels 16 pass over the corrugations, spring 63 in expanding presses weight 61 upwardly and through post 62 serves to resist downward movement of the frame with the wheels. The action of the weight and the supporting spring therefor is, therefore, to oppose movement of the frame in response to bouncing action of the wheels, so that movement of the frame which would otherwise result is substantially prevented. Thus, the vibration damping means compels the resilient front wheels to absorb substantially all vibratory movement caused by travel over corrugations, while the frame and the earth-engaging tool are stabilized and have a smooth travel, remaining substantially level.

In the modification illustrated in Fig. 3, the frame is provided adjacent the front end with tubular cross member 71 (Fig. 3) suitably secured between side members 10, 11, and having bracket 72 welded thereon centrally thereof. Bracket 72 has a flat top surface against which an end of leaf spring 74 is clamped by means of U-bolts 76, embracing the end of leaf spring 74 at spaced points and also extensions 77 of bracket 72. Weight 78 is secured on the outer end of leaf spring 74 by means of cap screws 79, passing through longitudinally disposed slots 80 in the top leaf of spring 74 and having threaded engagement with weights 78. Slots 80 provide for adjustment of weight 78 longitudinally of spring 74 to a desired position to obtain proper functioning of the vibration damping means. Weight 78 is positioned substantially over front axle 58 at the center thereof, and acts similarly to weight 61 of Fig. 2 to prevent the transmission of the vertical vibrations to the frame.

The sizes of the weight and the springs to be used are varied according to the machine with which they are to be employed. For the usual type of road maintenance machine now in use, a weight of from 200 to 400 pounds is satisfactory.

I, therefore, claim as my invention:

1. In a road machine adapted for road maintenance work, a frame having earth-working means supported therefrom for movement therewith, ground-engaging means supporting the front end of said frame and having a solid connection with said frame, a weight, and yieldable means mounting said weight on said frame adjacent said ground-engaging means.

2. In a road machine adapted for road maintenance work, a frame having earth-working means supported therefrom for movement therewith, ground-engaging means supporting said frame and having a solid connection with said frame, a weight, and connecting means between said weight and said frame providing for elasti-

cally controlled movement of said weight with respect to said frame.

3. In a road machine adapted for road maintenance work, a frame having earth-working means supported therefrom for movement therewith, resilient ground-engaging means supporting an end of said frame and having a solid connection therewith, a weight, and resilient means supporting said weight above said resilient ground-engaging means.

4. In a road machine adapted for road maintenance work, a frame having earth-working means supported therefrom for movement therewith, wheels supporting the front end of said frame and located in front of said earth-working means, said wheels having resilient tires thereon, a solid connection between said wheels and said frame, a weight, and resilient means supporting said weight above said wheels.

5. A road machine adapted for road maintenance work comprising a frame having earth-working means supported thereby, ground-engaging supporting means for said frame and having a solid connection with said frame whereby any bodily movement of said supporting means in an upright direction is transmitted directly to said frame, and means for opposing tendency of the machine to bounce caused by travel of said supporting means over uneven road surface comprising a weight resiliently supported on said machine adjacent said supporting means.

6. In a road machine adapted for road maintenance work, a frame having earth-working means supported therefrom for movement therewith and a station for an operator; resilient ground-engaging means supporting said frame and having a solid connection with said frame; and means independent of said earth-working means said operator and said station for damping vibrations of said frame caused by travel of the machine over uneven road surface, comprising a weight, and resilient means interposed between said weight and said frame.

CARL A. GUSTAFSON.