Feb. 15, 1938. LE GRAND H. LULL 2,108,541

LEVELIZER FOR ROAD MAINTAINING APPARATUS

Filed Feb. 13, 1937 3 Sheets-Sheet 1

Fig. 1

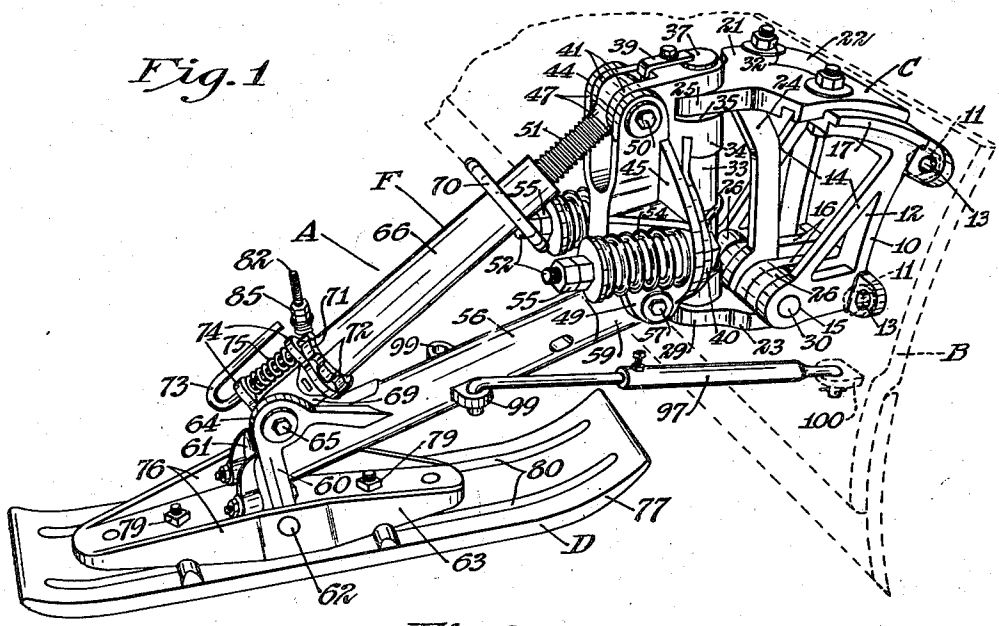


Fig. 2

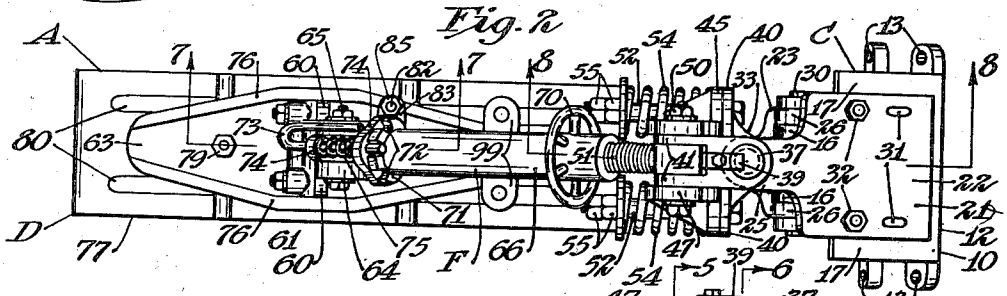
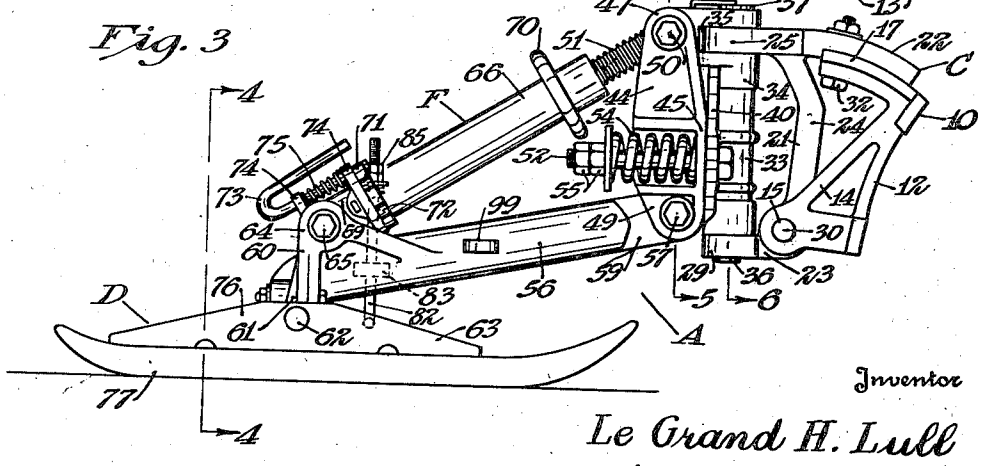


Fig. 3



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Fig. 4

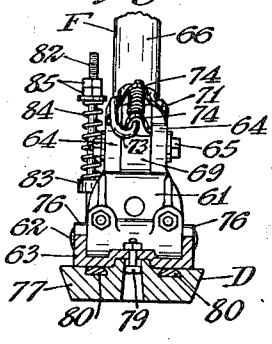


Fig. 5

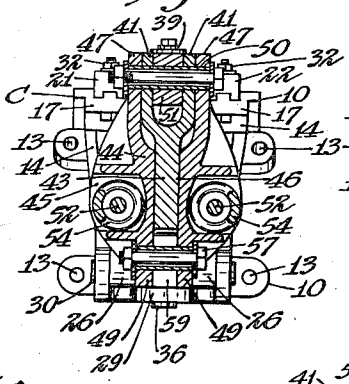


Fig. 6

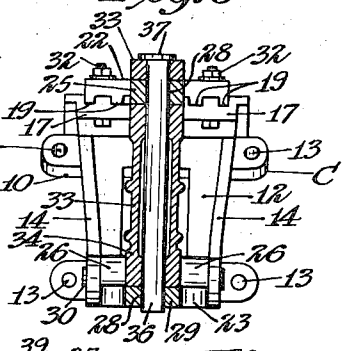


Fig. 7

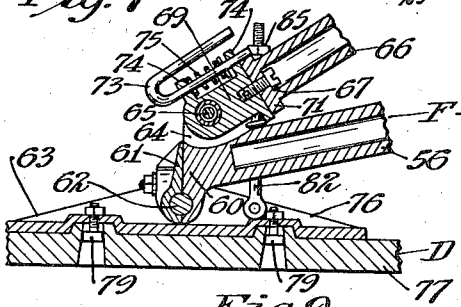


Fig. 8

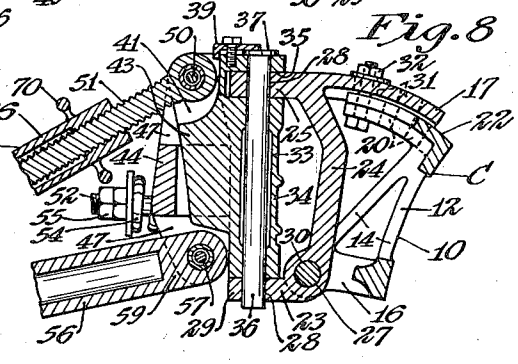


Fig. 9

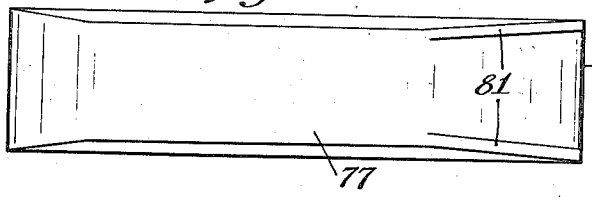


Fig. 10

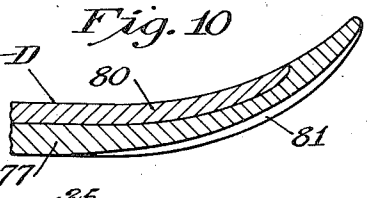


Fig. 11

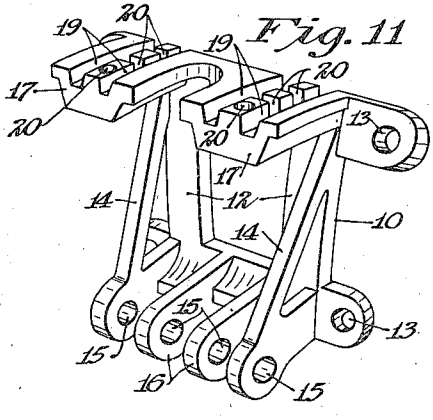
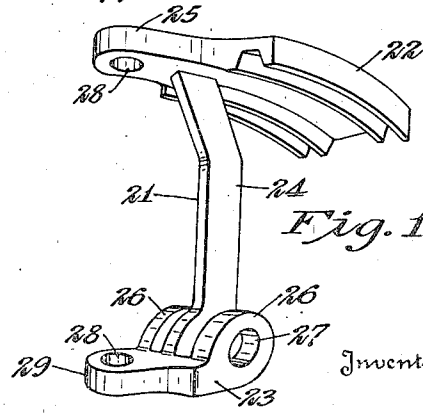


Fig. 12



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LEVELIZER FOR ROAD MAINTAINING APPARATUS

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Fig. 14

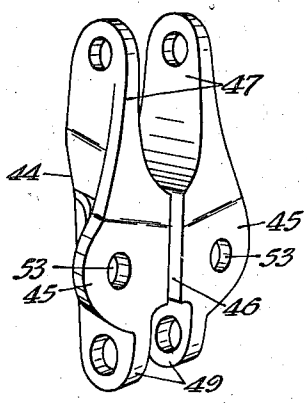


Fig. 13

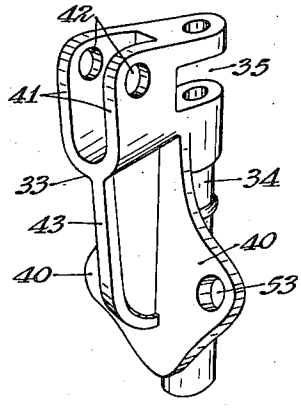


Fig. 16

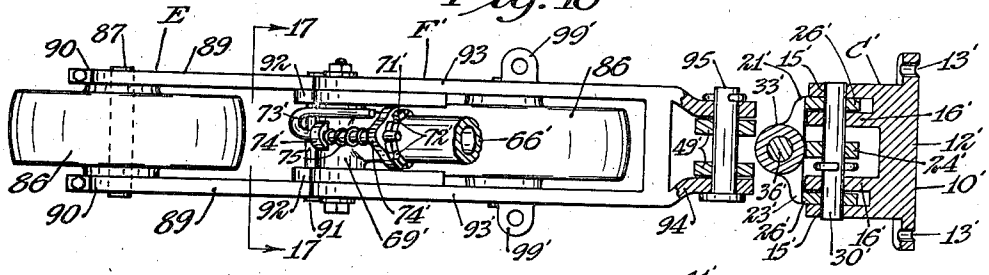


Fig. 15

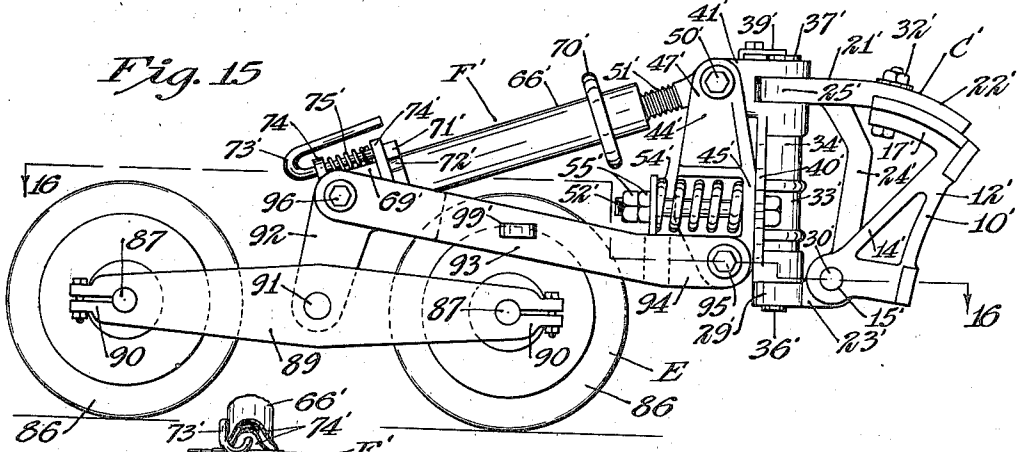
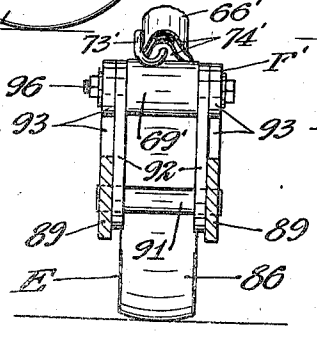


Fig. 17



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Patented Feb. 15, 1938 2,108,541

UNITED STATES PATENT OFFICE

2,108,541

LEVELIZER FOR ROAD MAINTAINING APPARATUS

Le Grand H. Lull, Minneapolis, Minn.

Application February 13, 1937, Serial No. 125,570

9 Claims. (Cl. 37—143)

My invention relates to an improvement in vibration eliminators for road maintaining apparatus, and is designed for attachment to the mold board or other road engaging device of a maintenance machine to hold the same on an even plane when in operation. The present construction is an improvement of my former construction, disclosed in Patent 1,968,412, issued on July 31, 1934.

In my former patent, I outlined the advantages of providing a chatter eliminating device for attachment to scraper blades and the like. The device in general comprises a means such as a shoe or rolling device adapted to ride over the surface of the ground in the rear of the blade. This means is adjustably connected to the blade, and acts in a manner similar to the heel of a plane, holding the blade at a desired height with respect to the surface of the ground to the rear of the blade. With this arrangement, the blade cannot ride over the surface of an uneven road, but will cut through the higher spots of the ground, and pass over the lower spots of the ground, permitting earth to drop beneath the blade to fill up these lower spots. As the ground to the rear of the blade is substantially leveled by the blade, the chatter eliminating device is maintained on a substantially even plane at all times.

While my device as outlined in my previous patent has been very satisfactory in accomplishing the desired purpose, it has been found desirable to change the construction somewhat, to make the device more readily adaptable for numerous uses, and to make the same readily adjustable to meet various conditions. It has also been desirable to provide a spring mounting arrangement to provide a means of providing a constant pressure of the shoe or rolling device upon the surface of the ground, and to provide a means of relieving excess pressure.

It is a purpose of my present invention to provide a means of adjusting the connection between the mold board or other road working device, and the vertical pivot permitting the vibration eliminating device to travel in the direction of movement of the vehicle supporting the mold board regardless of the angularity of the mold board. This adjustment permits the operator to keep the aforementioned pivot extending vertically regardless of the position of the mold board or other device to which it is attached.

It is a further object of my invention to provide an adjustable spring mounting, whereby the shoe or rolling device may be urged with a constant tension into engagement with the surface of the ground. This same means provides a means of relieving excessive upward pressure upon the shoe, permitting the shoe or rolling device to pivot over an obstruction in the road or ground which, for some reason, has not been leveled off by the road working device.

It is a further purpose of my invention to provide a means of locking the vibration eliminating device in adjusted position, so that the device will not change adjustment during its travel over the surface of the ground. It is also a purpose of my invention to provide a resilient means of supporting the shoe in adjusted angular relation with the supporting bracket therefor, so that the shoe will not tilt excessively when lifted from contact with the ground, and accordingly engage the surface of the ground first with one end thereof when lowered. It may be seen that injury to the shoe or bracket, or at least to the surface of the earth over which the device travels, might well occur if the shoe tilted forwardly when lifted and dug into the surface of the ground when lowered.

It is also my object to provide a shoe formed of extremely hard material to withstand a maximum amount of wear. This shoe is provided with strengthening ribs of a tougher material, which prevent breakage of the more brittle body portion thereof.

These and other features of my improved device will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a perspective view of my vibration eliminating device attached to the mold board of a road maintaining device, disclosing the general construction thereof.

Figure 2 is a top plan view of my device, illustrating the relationship of the various parts thereof.

Figure 3 is a side elevation view of my vibration eliminating device.

Figure 4 is a cross-sectional view through the road engaging shoe, on the line 4—4 of Figure 3, showing a partial end view of my vibration eliminating device.

Figure 5 is a cross-sectional view through a portion of my device, taken on the line 5—5 of Figure 3.

Figure 6 is a sectional view through the vertical pivot between the mounting bracket and the shoe supporting arms, on the line 6—6 of Figure 3.

Figure 7 is a cross-sectional view through the

connection between the ground engaging shoe and the mounting arms, on the line 7—7 of Figure 2.

Figure 8 is a cross-sectional view taken longitudinally through the mounting bracket and the attachment of the arms therewith, taken on the line 8—8 of Figure 2.

Figure 9 is a bottom plan view of the road engaging shoe, illustrating the guiding ribs thereon.

Figure 10 is a longitudinal cross-sectional view through a portion of the road engaging shoe.

Figure 11 is a perspective view of the portion of the bracket mounted upon the mold board or other road working device.

Figure 12 discloses a cooperating portion of the bracket, in perspective, this portion being pivotally and adjustably connected to the bracket portion illustrated in Figure 11.

Figure 13 discloses in perspective a portion of a pivoted bracket for supporting the arms connected to the shoe or rolling device, this portion being pivoted to the bracket of Figure 12.

Figure 14 is a perspective view of the other portion of the pivoted bracket shown in Figure 13, which is normally pivotally and resiliently connected to the bracket of Figure 13.

Figure 15 is a side elevation view of my device provided with a road engaging rolling device in place of a shoe.

Figure 16 is a plan view of my device, partially in section, and taken on the line 16—16 of Figure 15.

Figure 17 is a cross-sectional view through the road engaging rolling device, taken on the line 17—17 of Figure 16.

My vibration eliminating device A is designed for attachment to a ground working device, such as the mold board or scraper B. My device A comprises, in general, a mounting bracket C, a road engaging shoe D or rolling device E, and a connecting apparatus between the shoe D or device E and the mounting bracket C, which may be indicated generally by the letter F, or F′ when used in connection with the rolling device E.

The mounting bracket C includes a bracket portion 10 which is designed to be attached to the ground working device such as the mold board B by any suitable means such as bolts 11. This bracket may perhaps be best seen in Figure 11 of the drawings. The bracket 10 comprises a base plate 12, arcuated to fit the mold board B, and having bolt openings 13 therein to accommodate the bolts 11. Substantially triangular flanges 14 project from the base plate 12; and at the apex of the flanges, at the bottom of the bracket 10, these flanges are drilled at 15 to provide aligned openings. A pair of spaced projections 16 are provided on the base plate 12 intermediate the flanges 14; and these projections are likewise drilled at 15 in alignment with the openings in the flanges 14.

A pair of arcuated guides 17 project from the top edge of the base plate 12, these guides 17 having as the center or curvature, the axis of the drilled openings 15. The arcuated guides 17 are each provided with a pair of longitudinal grooves 19, and are provided with a series of angularly spaced adjustment openings 20 radially extending through the guides 17 between the grooves 19.

The bracket portion 21 cooperates with the portion 10. The bracket 21 comprises an upper guide portion 22, and a lower pivot portion 23, connected by an integral connecting bar 24. The upper guide portion 22 is arcuated to conform with the arcuation of the arcuated guides 19 of the portion 10, and is provided with a forwardly extending projection 25. The lower pivot portion 23 is provided with journals 26 spaced on either side of the bar 24. Pivot openings 27 extend through the journals 26 and the bar 24. A forwardly extending projecting portion 29 connects the journals 26 to the bar 24; and aligned openings 28 are provided through the projecting portion 29 and the forwardly extending projection 25 on the upper guide portion 22.

A pivot 30 extends through the openings 15 in the bracket 10 and the aligned openings 27 in the bracket portion 21 when these portions are placed in interlocking relationship, the bar 24 extending between the forwardly extending projections 16; and the journals 26 extending between these projections 16 and the adjacent flange 14. Openings 31 are provided in the upper guide portion 22, cooperable with the openings 20 in the guides 17, and bolts 32 extend through desired openings 20 and 31 to hold the bracket portions 10 and 21 in desired adjusted relationship.

A bracket portion 33 is pivotally connected to the bracket portion 21. The bracket 33 comprises a vertical journal or bearing 34 which is adapted to rest upon the projecting portion 29 of the bracket 21, and is notched at 35 to accommodate the forwardly projecting portion 25 on the bracket 21. A vertical pivot 36, or king pin, extends through the vertical journal 34 and through the aligned openings 28 in the projections 25 and 29. This pivot 36 is provided with a head 37 and is held in place by a clamp 39 bolted to the bracket 33.

The bracket portion 33 is shown in perspective in Figure 13 of the drawings, and is provided with transversely extending flanges 40. A yoke 41 is provided at the top of the portion 33, having transversely aligned openings 42 therein. A reinforcing rib 43 is provided centrally with respect to the flanges 40 and the yoke 41.

The bracket portion 44 is designed to pivotally connect with the portion 33, and is seen in Figure 14 of the drawings. The bracket 44 is provided with a pair of transversely extending flanges 45 cooperable with the flanges 40, and is centrally slotted at 46 to accommodate the central reinforcing rib 43 on the portion 33. The bracket 44 is provided with a bifurcated upper end 47 and a bifurcated lower end 49. A pivot 50 extends through the bifurcated upper end 47, through the aligned openings 42 in the yoke 41, and through the upper extremity of a threaded rod 51 forming a part of the connecting mechanism F. Bolts 52 extend through cooperating openings 53 in the brackets 33 and 44, and coil springs 54 are positioned on the bolts 52 between adjusting nuts 55 on the bolts 52 and the flanges 45. The flanges 45 and 40 are by this means resiliently held together by adjustable spring tension, thus holding the bracket portions 33 and 44 pivoted together.

The connecting apparatus F including a tubular member 56 which is pivotally connected to the bracket 44 by a pivot 57 extending through the lower bifurcated end 49 of this bracket and through the upper flattened extremity 59 of the tubular member 56. An attaching flange 60 substantially normal to the axis of the tubular member 56 is formed on the lower end of the tubular member 56, cooperable with a clamping plate 61 bolted thereto, to provide a bearing for a pivot 62 on the mounting portion 63 of the road engaging shoe D. Spaced ears 64 extending upwardly from this lower extremity of the tubular member

56 having aligned openings therethrough to accommodate a pivot 65.

A sleeve 66 is threadably connected to the threaded rod 51 pivoted at the top of the brackets 44 and 33. This sleeve 66 is secured by a swivel connection 67 to an end member 69 pivoted between the ears 64 on the pivot 65. A hand wheel 70 is provided on the sleeve 66 by means of which the sleeve may be rotated, to increase or decrease the distance between the pivots 50 and 65. The lower extremity of the sleeve 66 is provided with an integral collar 71 having angularly spaced notches 72 therein. A U-shaped rod 73 is journalled in ears 74 on the end member 69, and is normally held in one of the notches 72 by the spring 75. The rod 73 may be slid out of engagement with the notches 72, compressing the spring 75, when it is desired to rotate the sleeve 66. The sleeve 66 is otherwise locked by this rod 73, against rotation.

The road engaging shoe D includes a mounting portion or plate 63, having transversely spaced upwardly extending flanges 76 thereon, through which the pivot 62 extends to hold the shoe D pivotally engaged with respect to the lower extremity of the tubular member 56. The road contacting runner 77 is secured to the mounting plate 63 by means of bolts 79. The member 77 is formed preferably of extremely hard material, with a Brinell test of 385 or harder. The runner 77 is cast, as illustrated in Figures 4 and 10, with longitudinally arranged inserts 80 of steel or the like, to provide greater strength. These inserts are placed in spaced relation and extend the greater portion of the length of the runner 77. The lower surface of the runner 77 is equipped with oppositely disposed flanges 81 tapering inwardly from the extreme end of the runner along the opposite edges thereof. These flanges 81 have a tendency to draw material inwardly from both sides of the runner, holding the runner in alignment with the direction of travel.

A threaded rod 82 is pivoted to the flange 76 on one side of the mounting plate 63, and extends through an ear 83 on one side of the end member 69. A coil spring 84 is interposed between the ear 83 and the nut 85 on the end of the rod 82 holding the road engaging member D normally in substantially horizontal position. Thus when the road engaging member D is raised out of contact with the ground, the runner 77 will be held from tilting to any extent. Any danger of the forward end of the runner 77 engaging and digging into the ground as the runner 77 is lowered is in this manner obviated.

Figures 15, 16 and 17 disclose a different type of ground engaging member E which is in the form of a pair of wheels, arranged in tandem within a suitable frame. The brackets 10', 21', 33' and 44' are entirely identical to the brackets 10, 21, 33, and 44 previously described. In order to avoid confusion, the parts of the modification A' which are identical to elements of the vibration eliminator A will be identified by similar numerals with a prime mark added to the numeral. Elements which are different in construction will be given an entirely different number.

The connecting apparatus F' used to connect the road engaging element E with the brackets 33' and 44' is somewhat different from that employed in the eliminator A.

The road engaging element E comprises a pair of wheels 86 freely rotatable on shafts 87 between a pair of longitudinally extending frame members 89. The shafts 87 are held clamped by clamping means 90 at each end of the frame members 89. Centrally pivoted to a shaft 91 between the ends of the frame members 89, I provide a bifurcated end 92 of a bracket 93 in the form of a bell crank. The other end 94 of this bracket 93 is pivotally connected by a pivot 95 on either side of the lower bifurcated end 49' of the bracket 44'. The bifurcation of the bracket 93 is necessary in order to permit this bracket to straddle the forward wheel 86.

At the point of bend of the bracket 93, or at the intermediate pivot point of this bell crank lever, I provide a pivot 96 extending transversely between the bifurcated parts of the bracket, upon which pivot 96 is mounted an end member 69'. The end member 69' is swivelly connected to a tubular sleeve 66' which is threadably engaged in a threaded rod or arm 51', which is connected by a pivot 50' in a yoke 41' of the bracket 44'. A locking means 71', 72', 73', 74', 75' similar to that previously described normally locks the sleeve 66' from rotation.

The operation of the device is believed understood from the foregoing description. The hand wheel 70 or 70' on the sleeve 66 or 66' may be operated, when the sleeve locking rod 73 is retracted, to urge the road engaging member D or E into contact with the ground with more or less tension. The ground engaging member is drawn along the comparatively smooth surface of the ground behind the scraper blade, holding the blade from raising or lowering to ride over the surface of the ground. If necessary, the springs 54 or 54' will compress to permit the ground engaging member to pass over some obstruction; but the springs 54 or 54' are sufficiently heavy to normally hold the mold board B in a desired position with relation to the ground engaging member D or E.

It is, in some instances, desirable to hold the vibration eliminator A or A' in a definite angularity with respect to the mold board B or other ground working apparatus. This may be accomplished, as shown in Figure 1, by means of a telescopic rod 97 engaging an ear 99, on the tubular member 56 or the bracket 93, at one end and engaging an ear 100 on the mold board B at the other end. The rod 97 is variable in length, and holds the device A in desired angular relation with respect to the mold board B.

In accordance with the patent statutes, I have described the principles of operation of my vibration eliminator; and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that this is only illustrative of a means of carrying out my invention; and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A vibration eliminator for earth working apparatus including a bracket portion attached to the earth working apparatus, a second bracket portion pivotally connected to said first bracket portion along a substantially horizontal axis and angularly adjustable with respect to said first bracket portion, an arm, means pivotally connecting said arm to said second bracket portion, a runner pivotally connected to said arm, and means for pivoting said arm to force said shoe into engagement with the surface of the ground.

2. A vibration eliminator for road maintenance machines including bracket means attached to the machine, a second bracket pivoted

to said bracket means along a substantially vertical axis, a third bracket pivoted to said second bracket along a substantially horizontal axis, resilient means holding said second and third brackets from relative pivoting, an arm pivotally connected to said third bracket at a point spaced from said pivotal connection with said second bracket, a road engaging member pivotally connected to said arm, and means for pivoting said arm to urge said road engaging member into engagement with the surface of the ground.

3. A vibration eliminator for scraper blades and the like including a bracket means attached to the blade, a second bracket pivoted along a substantially horizontal axis to the top of said bracket means, resilient means holding said bracket and bracket means from relative pivotal movement, an arm pivotally connected to the bottom of said second bracket, a ground engaging member pivotally connected to said arm, and means for pivoting said arm to force the ground engaging member into contact with the ground.

4. A vibration eliminator for road maintenance machinery including a mounting bracket adapted to be connected to a scraper blade or the like, a ground engaging element, a pair of rigid connecting means pivotally connected to said ground engaging element and to said bracket, and resilient means normally holding said connecting means from pivotal movement with respect to said bracket.

5. A vibration eliminator for road maintenance machinery including a bracket adapted to be attached to a scraper blade or the like, a second bracket pivotally connected to said first bracket along a substantially horizontal axis means connecting said first and second brackets to hold the same in desired angular adjustment, a third bracket pivotally connected to said second bracket along a substantially vertical axis, a road engaging element, and connecting means connecting said road engaging element in adjusted relation to said third bracket.

6. A vibration eliminator for a road working device movable along the surface of the ground including a mounting bracket adapted to be attached to said device, a road engaging element, an arm pivotally connected to said road engaging element and to said mounting bracket, a threaded member connected pivotally to said bracket at a point spaced from the point of attachment of said arm, a sleeve threadably engageable with said threaded member, an end member pivotally connected to said arm near its point of attachment with said ground engaging member, and a swivel connection between said end member and said sleeve, whereby said sleeve may be rotated to vary the distance between the connection of said threaded member to said mounting bracket and the connection of said end member to said arm.

7. A vibration eliminator for road working apparatus movable along the ground including a mounting bracket adapted for attachment with said apparatus, a road engaging element, an arm pivotally connected to said road engaging element and to said mounting bracket, and means for pivoting said arm on said bracket including a threaded member pivoted to said bracket at a point spaced from the pivotal connection with said arm, a sleeve threadably connected to said threaded member, an end member pivotally connected to said arm at a point spaced from the pivotal connection of said arm to said mounting bracket, a swivel connection between said end member and said sleeve, and locking means interposed between said end member and said sleeve for normally holding said elements from relative rotation.

8. A vibration eliminator for a road working device movable along the ground including a bracket adapted for attachment with said device, a second bracket pivoted to said first bracket along a substantially vertical axis, a road engaging member, means connecting said road engaging member to said second bracket, and means connecting said connecting means to said device at a point spaced from the attachment of said bracket thereto to hold said road engaging member in definite angular relationship with respect to said device.

9. A road engaging element adapted to be drawn along the surface of the ground including an elongated body, an upturned end on said body, and a pair of longitudinally extending ribs on the ground engaging surface of said body, said ribs extending inwardly from said upturned end toward the other end of said body and toward the longitudinal center of said body.

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