Nov. 15, 1938. B. G. HARLEY 2,136,614

LEVELIZER

Filed March 10, 1938 2 Sheets-Sheet 1

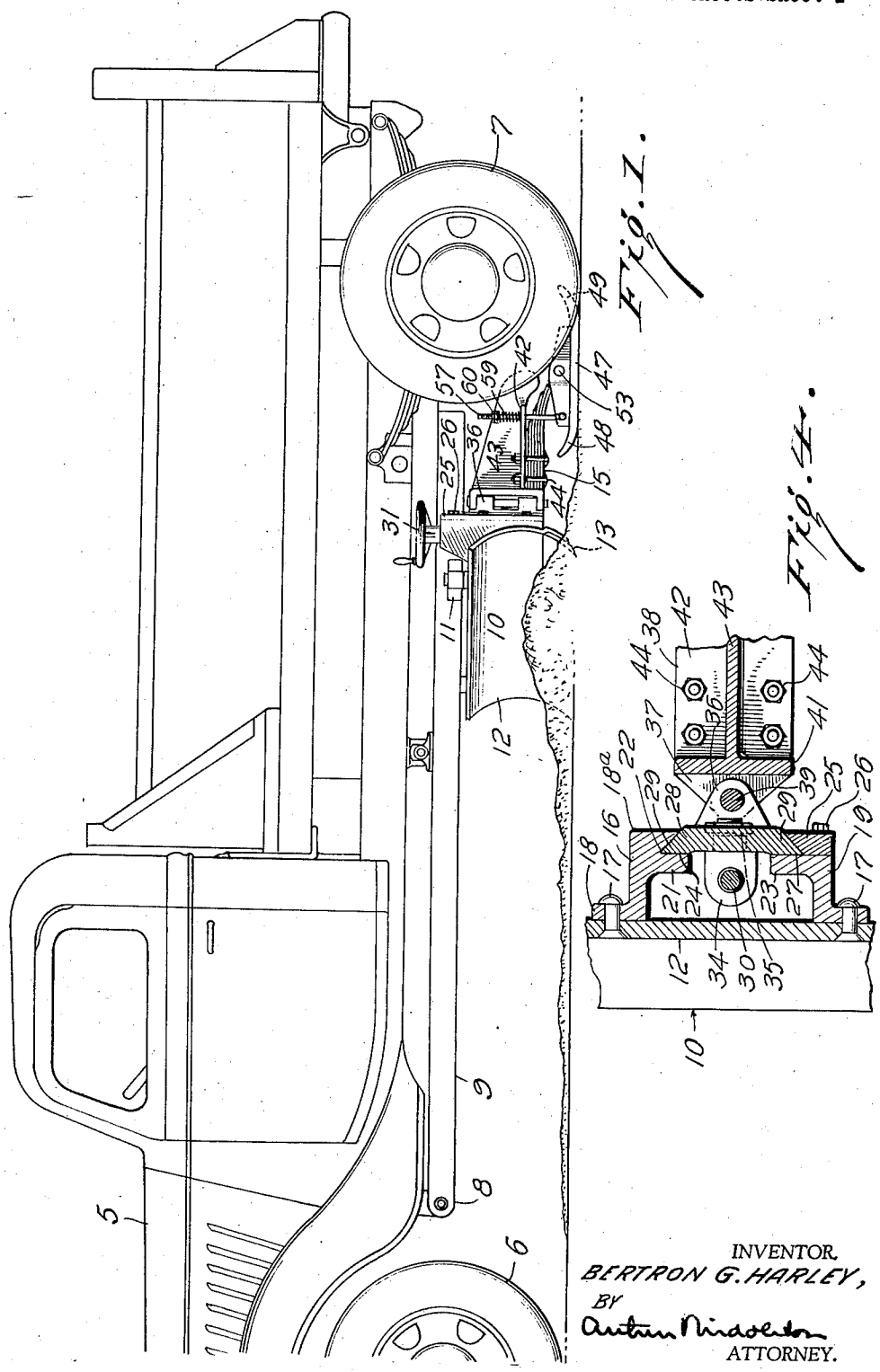

Fig. 1.

Fig. 4.

INVENTOR.
BERTRON G. HARLEY,
BY
Arthur Middleton
ATTORNEY.

Nov. 15, 1938. B. G. HARLEY 2,136,614

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Filed March 10, 1938 2 Sheets-Sheet 2

Fig. 2.

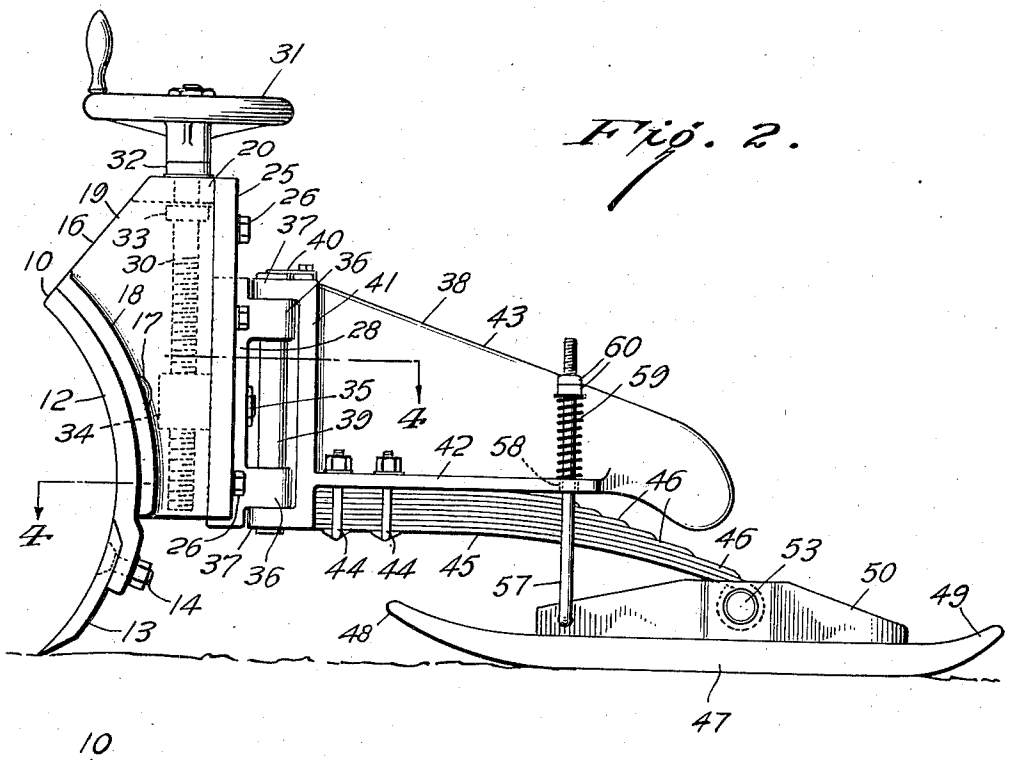
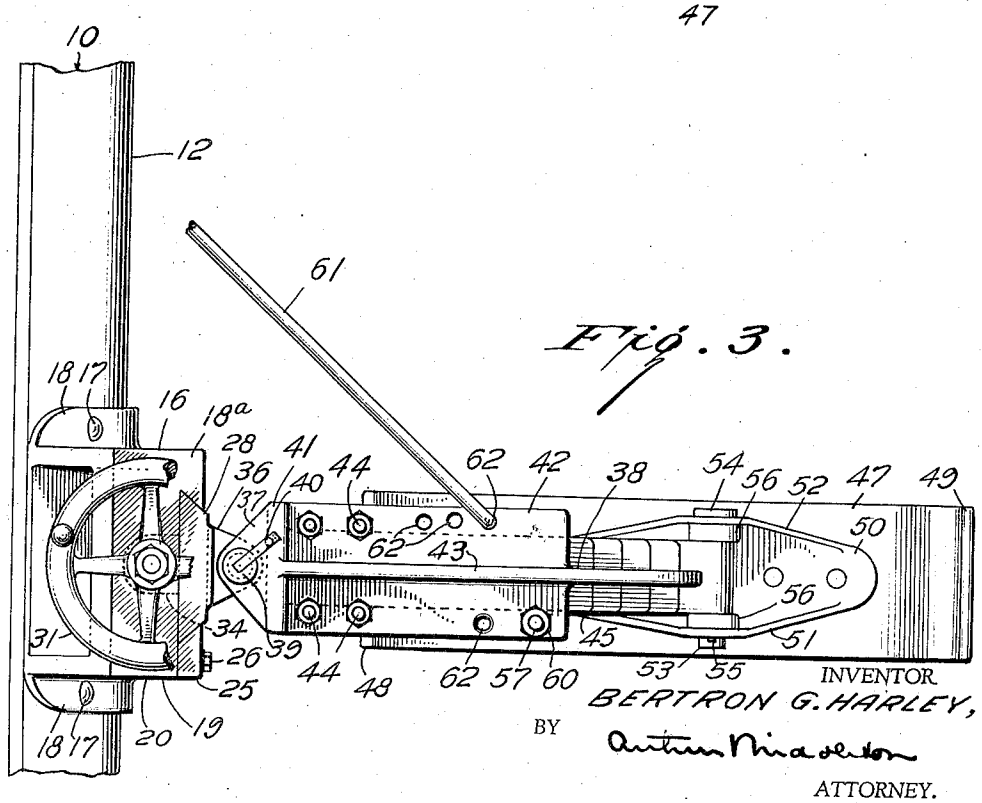


Fig. 3.



INVENTOR
BERTRON G. HARLEY,
BY
ATTORNEY.

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2,136,614

LEVELIZER

Bertron G. Harley, Saco, Maine, assignor to St. Paul Hydraulic Hoist Company, Minneapolis, Minn., a corporation of Minnesota

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13 Claims. (Cl. 37—143)

This invention relates to road maintenance or grading machines sometimes referred to as highway patrols.

More particularly the invention resides in a novel construction and arrangement of levelizer or chatter eliminator for use in cooperation with a scraper, scarifier or other road dressing implement commonly employed in association with such machines.

The invention finds particular application in conjunction with a road dressing implement adjustably supported beneath an internal combustion engine truck and actuated into and out of operative position by means of a hydraulic cylinder or the like. For the purpose of convenience it will be described and illustrated in this environment, and as applied to a scraper. It will be manifest, however, that the invention is equally applicable to any road dressing implement supported by a tractor, trailer or any other suitable type of road vehicle, whether or not the implement is adjustable and regardless of the operating means if it be adjustable.

In road maintenance equipment it is common for a scraper to be adjustably supported beneath a truck chassis. Generally the scraper may be withheld from operating position by appropriate means, preferably hydraulically operated, and releasable or operable by such means to enable the scraper to assume a position, at varying elevations, whereby its blade may scrape the surface of a road so as to smooth out the same and eliminate or lessen corduroy conditions and to cause the surface of the road to assume a generally smooth aspect. Naturally, because of corduroy or corrugated conditions on the road surface, rocks, holes and other irregularities in the road surface, there is considerable tendency for the scraper blade to receive strong shocks and vibrations and to have irregular cutting effect upon the surface of the road. Furthermore, the chattering effect caused by irregular surface conditions is objectionable in itself and by transmission through the scraper, may have a deleterious effect upon the other parts of the mechanism

Therefore, it is desirable to equip the scraper generally adjacent each end thereof, with a levelizing device, gauge shoe or other chatter eliminating device which will ride the surface of the road behind the scraper and hold the same in a rigid and virtually chatterless manner so that its cutting edge will be maintained always substantially at a regular cutting depth, and which will decrease to a marked degree the tendency of the scraper to vibrate and chatter.

It is a primary object of the present invention to provide such a gauge shoe or levelizing device that is strong, rigid, highly effective and simple in construction and operation.

It is a further object of the invention to provide a levelizer attachable to a road scraper or the like and which is readily adjustable both vertically and horizontally.

It is another object of the invention to provide a levelizer for scrapers or the like which is provided with means, preferably a spring, for receiving and absorbing road shocks.

A still further object of the invention is to provide a chatter eliminator wherein there is means to assure that the road contacting element will be able always to assume a position substantially parallel with the road surface.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings:

Fig. 1 is a side elevation of a truck having a road scraper implement suspended therebeneath and showing an embodiment of the levelizer or chatter eliminator of the present invention attached thereto;

Fig. 2 is an enlarged side elevation of the levelizer of the present invention, in one embodiment, showing the same attached to a scraper;

Fig. 3 is a top plan view of the device of Fig. 2; and

Fig. 4 is a horizontal sectional view taken substantially along the lines 4—4 of Figs. 1 and 2.

Referring to Fig. 1, there is shown in conventional style, a gasoline-propelled truck 5 having the usual front steering wheels 6 and rear driving wheels 7. On either side of the truck chassis adjacent the front part thereof are depending brackets 8 to which are pivoted side members or bars 9 constituting a pivoted sub-frame the rear portion of which may be raised or lowered with respect to the truck chassis by suitable actuating mechanism not shown. Adjacent the rear end of the sub-frame a road scraper 10 is attached to each of the side members 9 by means of the trunnion connection 11. The scraper generally comprises a mould board 12 and a scraping blade

13 attached to the lower edge of the mould board by means of nut and bolt connections 14, the scraping blade 13 generally being of relatively hard steel and having a sharpened lower edge which is adapted to contact the road surface and cut away irregularities.

An important point about a road scraping mechanism is for the blade to shape the irregularities of the road instead of allowing irregularities to force it up and down following the path of least resistance. In its preferred environment the scraper 10 is forced downwardly and held in contact with the road surface by means of a hydraulic cylinder of conventional type. The levelizer or gauge shoe of the present invention, shown generally at 15 in Fig. 1, is attached to the scraper, generally one levelizing device at either end thereof, and, in addition to minimizing chatter or teetering of the scraper, exerts pressure upwardly against the down pressure of the hydraulic cylinder to hold the blade in required cutting position without rigidity, yet with sufficient strength to insure proper cutting action.

In Figs. 2 and 3 there is shown, in enlarged detail, the present preferred embodiment of the invention. A yoke shaped bracket 16 is rigidly and securely attached to the mould board 12 by means of bolts or rivets 17 passing through openings in outstanding ears 18 which form a part of the bracket. The yoke 16 is somewhat irregular in shape and preferably is formed of two individual and separate legs 18a and 19, the two being joined by a web or plate 20 extending across and closing the top of the bracket.

The leg 18a has an inwardly projecting portion 21 which is grooved or cut away to form a substantially V-shaped or beveled groove 22. The opposite leg 19 also has a corresponding inwardly projecting portion 23 but which is approximately half the thickness of the inwardly projecting portion 21 and the outer face of the portion 23 has a plane surface lying in approximately the same vertical plane with one face 24 of the groove 22. A strip or bar 25 is adapted to be secured to the outer face of the inwardly projecting portion 23 by means of bolts 26 and the inner exposed face of this strip is beveled to form with the portion 23, a V-shaped groove 27 substantially corresponding to the groove 22, all for the purpose to be presently described.

A slide block 28 having its outer edges beveled, as at 29 to approximately correspond with and fit snugly within the respective grooves 22 and 27, is arranged within these grooves so as to be slidable in a vertical direction upwardly and downwardly. In assembling the mechanism one beveled edge 29 is inserted within the groove 22 and the beveled strip 25 is then applied and secured in place by the bolts 26. This arrangement, manifestly, permits ready assembly and disassembly of the mechanism. If desired, of course, each leg of the bracket may be identical and each provided with a groove 22 and the strip 25 dispensed with. This construction, however, would require more accurate construction and machining of the several contacting surfaces.

In order to provide for readily moving the slide block 28 upwardly and downwardly within the opposing grooves, there is provided a rotatable externally screw threaded shaft 30 which projects through an opening in the web 20 and is rotatable therein by means of the hand wheel 31 keyed to the upper end of the shaft, the shaft being held against vertical displacement in either direction by means of collars 32 and 33 surrounding the shaft adjacent the upper and lower faces respectively of the web 20. The inner face of the slide block 28 is provided with an outstanding lug 34 pierced in a vertical direction by an opening which is internally screw-threaded to cooperate with the externally screw-threaded shaft 30. As will be readily seen in the drawings, shaft 30, by means of the screw threaded cooperation, projects through the opening in the lug 34 and rotation of the shaft 30 by means of hand wheel 31 in one direction or the other, will cause the lug 34 to ride upwardly or downwardly upon the screw-threaded shaft and thus cause the slide block 28 to be raised or lowered within the grooves 22 and 27. The lug 34 may be integral with the slide block 28 or it may be attached thereto for ready removal by means of bolt 35.

The strip 25, when bolted firmly in place serves to lock the block 28 against vertical displacement. To raise or lower the block the bolts 26 are loosened whereupon the screw may be actuated to adjust the block vertically and the bolts thereafter tightened again. Any other suitable method of securing the block 28 against vertical displacement may be used, however, such as appropriate means for locking the screw 30 against rotation.

Projecting from the rear face of the slide block 28 and preferably integral therewith, are two or more lugs or ears 36 which are in vertical alignment and pierced by substantially vertical concentric openings. Cooperating with the members 36 are vertically aligned ears 37 which project forwardly from and form a part of the road contact shoe supporting structure indicated generally by the numeral 38. The ears 37 also are pierced by substantially concentric openings and a king bolt 39 passes through the openings in both sets of vertically aligned ears being held therein against vertical displacement either by means of a cotter pin through the lower end of the king bolt or by the restraining element indicated at 40. This construction, it will be seen, permits pivoting or swiveling of the shoe supporting structure 38 about a vertical axis so that the contact shoe may be allowed to assume any desired angle with respect to the mold board 12.

The shoe supporting structure consists essentially of two parts. There is a rugged and rigid framework supported from the bracket 16 in the manner just described, and spring means is interposed between the framework and the road contact shoe for imparting a certain amount of resilience to the same and for absorbing shocks. The rigid supporting framework comprises a vertical upstanding member or web 41 with which the ears 37 preferably are integral and from which they extend in order to be mounted on the king bolt as hereinbefore described. Extending rearwardly from the web 41, preferably at right angles thereto and somewhat above its lower extremity is a substantially horizontal and rigid plate member 42. The plate 42 may be integral with the web 41, welded thereto or secured to the web in any desired manner and, in order to give sufficient strength and rigidity to the framework, there is provided a central upstanding flange 43 which is of a shape resembling a right angle triangle. It is in rigid connection with the web 41 along the upstanding leg of the right angle and with the plate 42 along the horizontal leg of the right angle. The whole framework including the web 41, horizontal plate 42 and central flange 43 may be cast in one integral mass or all of these elements may be separate

and welded or otherwise rigidly joined at their point of contact with one another. This rigid framework thus may swivel as a unit about the king bolt 39.

Secured to the framework by means of U-bolts 44 passing through oppositely disposed openings in the plate 42 with one end nested in the angle formed by the underside of the plate 42 and the rear wall of the web 41 is a leaf spring assembly 45 composed of the usual individual leaves 46, each of a different length according to conventional construction. The free end of the lowermost of the leaves 46 is somewhat longer in proportion than the other leaves and is curled or rolled upon itself to form an eye or tubelike collar to serve as a tubular bearing for pivotally supporting the road contacting element or shoe presently to be described.

The road contacting shoe is provided by a runner 47, preferably of hardened steel to resist wear and has its toe and heel portions, 48 and 49 respectively, turned upward so as to enable the shoe to glide smoothly over the surface without catching into obstructions. Centrally of the runner 47 there is an attaching bracket 50 provided with upstanding walls 51 and 52. In each of these oppositely disposed walls there is an opening, the respective openings being in alignment and substantially concentric and adapted to receive a pivot pin 53. As will be readily understood, the pivot pin 53 extends through the aligned openings in the walls 51 and 52 and through the tubelike bearing provided by the curled end of the lower spring leaf 46, the pivot pin being provided with an enlarged head 54 and held against displacement by means of cotter pin 55 or by other suitable restraining means. Washers 56 may be interposed between the respective ends of the curled portion of the lower spring leaf and the inner surfaces of the upstanding walls 51 and 52. Thus, it will be seen that the contact shoe is attached to the spring assembly 45 in a simple and readily detachable manner and that it may easily pivot or rock about the pivot pin 53 so as to ride smoothly over road surface irregularities and so that it may always assume a position parallel with the road surface regardless of the angle of inclination of the mould board 12.

In order to restrain somewhat the pivotal movement of the contact shoe, to adjust it at any desired angular relationship with respect to the horizontal and to allow a limited amount of free pivotal movement, there is provided a rod 57 which slides vertically through an opening 58 in the plate 42. The rod 57 is pivoted, in the illustrated instance, to the forward part of the upstanding wall 51, extends upwardly therefrom through the opening 58 and is encircled above the plate 42 by the helical spring 59. The upper part of the rod 57, above the plate 42 is externally screw-threaded to receive the lock nuts 60 which may be used to adjust the angle of the runner 47 and hold the same at any desired angle with respect to the horizontal, while at the same time permitting limited pivotal movement. It will be seen that advancement of the lock nuts 60 in a downward direction will tend to raise the rod 57 and the contact shoe against the pressure of spring 59, whereas movement of the lock nuts toward the upper end of the rod 57 will tend to lower the rod and the forward portion of the contact shoe correspondingly. This pivotal movement restraining means is of particular importance when the entire mechanism is raised above the surface of the road in order that the vehicle may travel in a normal manner without scraping the road surface. In the raised position, of course, the runner 47 normally would tend to hang downward and drag along or catch in the road surface. This, of course, will not occur with the rod 47 in proper adjustment since the runner may then be maintained in a substantially horizontal position. In order to prevent free swiveling of the contact shoe and supporting structure about the king bolt 39 there is provided a tie rod 61 having one end bent substantially at a right angle so that it may be inserted in any of a number of openings 62 in the plate 42. The other end of the tie rod 61 also may be bent at a right angle and be inserted in an eye, hook or other receptacle on the back of the mould board 12 in a readily understood manner. The tie rod 61 in Fig. 3 is shown as extending between the plate 42 and a point on the mould board toward the center thereof. Obviously, however, the tie rod may extend from a point adjacent the opposite edge of the plate 42 to a point adjacent the outer end of the mould board or duplicate tie rods may be used at each side of the plate 42. By providing a number of aligned perforations 62 in the plate 42, or by providing a plurality of aligned hooks or eyes on the back of the mould board 12, the contact shoe and supporting structure may be adjusted and firmly held at any desired angle with relation to the bracket 16 and the mould board 12.

From the above description it will readily be seen that there is provided a levelizer, gauge shoe or chatter eliminator for scrapers or other road dressing implements which is strong and durable, simply constructed and capable of a variety of necessary and desirable adjustments. In most instances the mould board itself is adjustable at varying angular relationships with respect to the road surface so that the blade 13 may secure a good cutting action or may be merely more or less dragged over the surface. According to the angular adjustment of the mould board, the shoe and the supporting structure may be raised or lowered by the screw 30 and slide block 28 so that it can contact with the road surface in a firm and positive manner. In conjunction with this rectilinear vertical adjustment, the shoe may pivot about the pin 53 so as to always assume a position parallel with the road surface. Furthermore, it is obvious that the rectilinear vertical adjustment of the shoe and supporting structure by means of the slide block and screw elements, the cut of the blade 13 may be gauged so as to cause it to effect a deep or shallow cut as the case may be. It will be seen that the shoe, through its supporting structure, will exert pressure up against the normal downward pressure exerted by the hydraulic cylinder if such be used for actuating the scraping implement and that the combination of these opposing forces will firmly hold the blade in the required cutting position without rigidity and yet with sufficient strength to insure proper action. These opposing forces also will reduce to a minimum any tendency of the scraper to chatter or teeter and the spring assembly 45 further acts to absorb and eliminate shocks so that they are not transmitted from the contact shoe to the scraping implement.

The fact that the vertical adjustment of the shoe supporting structure is accomplished in a positive rectilinear manner is important in that it provides a strong and rigid construction without, however, sacrificing any flexibility of adjust-

ment. The best embodiment of the invention now known has been illustrated and described but it is to be understood that the invention in its broadest aspect is not to be limited to this specific construction and may embrace various other structures wherein there is a contact shoe supporting element vertically adjustable in a linear manner, pivotal about a vertical pivot point and carrying contact shoe pivotal about a horizontal pivot point.

I claim:

1. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, and a road contact shoe carried by said supporting structure.

2. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, spring means carried by said shoe supporting structure, and a road contact shoe pivoted to said spring means.

3. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, a lug projecting from said block and pierced with an internally screw-threaded opening, an externally screw-threaded shaft rotatably mounted in said bracket and extending through the opening in said lug and cooperating therewith for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, spring means carried by said shoe supporting structure, and a road contact shoe pivoted to said spring means.

4. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, spring means carried by said shoe supporting structure, a road contact shoe pivoted to said spring means, and means for limiting the pivotal movement of said shoe.

5. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, spring means carried by said shoe supporting structure, a road contact shoe pivoted to said spring means, and means for adjusting said shoe about its pivot point and holding it in adjusted postion while allowing a limited amount of pivotal movement.

6. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, a leaf spring carried by said shoe supporting structure and having a free rearwardly projecting end, and a road contact shoe pivoted to one of the leaves of said spring at its free end.

7. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical sliding movement to said block, a pair of rearwardly extending vertically pierced ears on said block, a road contact shoe supporting structure, a pair of forwardly extending vertically pierced ears on said structure, a king bolt extending through the openings in each pair of ears, and a road contacting shoe carried by said supporting structure.

8. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, said bracket having two sides provided with inwardly projecting oppositely disposed portions, each of said portions being provided with a groove, a block having its opposite edges received within the respective grooves and vertically slidable therein, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, and a road contact shoe carried by said supporting structure.

9. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, said bracket having two sides, one side having an inwardly projecting portion provided with a substantially V-shaped groove, the other side having an oppositely disposed inwardly projecting portion of a lesser width than said first mentioned inwardly projecting portion, a block having its opposite edges beveled with one of said edges received within said groove, a strip having a beveled edge substantially corresponding to that of the beveled edge of the block bolted to the outer face of the inwardly projecting portion of lesser width and holding the block in slidable engagement with the inwardly projecting portions of the sides of said bracket and adapted to hold said block against vertical displacement when bolted firmly, means for imparting vertical sliding movement to said block, a contact shoe supporting structure pivoted to said block, and a road contact shoe carried by said supporting structure.

10. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a road contact shoe supporting structure associated with said bracket in a pivotal manner, said supporting structure including a vertical web member, a horizontal plate, and a vertical central flange joining the web and plate members, a leaf spring bolted to the plate member, and a road contact shoe pivoted to said spring.

11. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical slidable movement to said block, a contact shoe supporting structure pivoted to said block, means to restrain pivotal movement of said supporting structure, and a road contact shoe carried by said supporting structure.

12. A levelizer for road dressing machines comprising a bracket adapted to be attached to a road dressing implement, a block slidably mounted in said bracket for vertical movement therein, means for imparting vertical slidable movement to said block, means operable for locking said block against vertical movement, a contact shoe supporting structure pivoted to said block, and a

road contact shoe carried by said supporting structure.

13. In a levelizer for road dressing implements, a bracket attachable to a road dressing implement, a road contact shoe supporting structure pivotally supported from said bracket, a leaf spring attached at one end of the same to said supporting structure and having a free rearwardly projecting end, the free end of one of the leaves of said spring being curled upon itself to form a tubular bearing member, a road contact shoe, an attaching bracket on the upper face of said shoe and having aligned oppositely disposed openings, and a pivot pin extending through said openings and through said tubular bearing member for pivotally supporting the contact shoe from said spring.

BERTRON G. HARLEY.