Jan. 15, 1935. J. J. BASH 1,987,729

SHOULDER GRADING MACHINE

Filed July 27, 1932 3 Sheets-Sheet 1

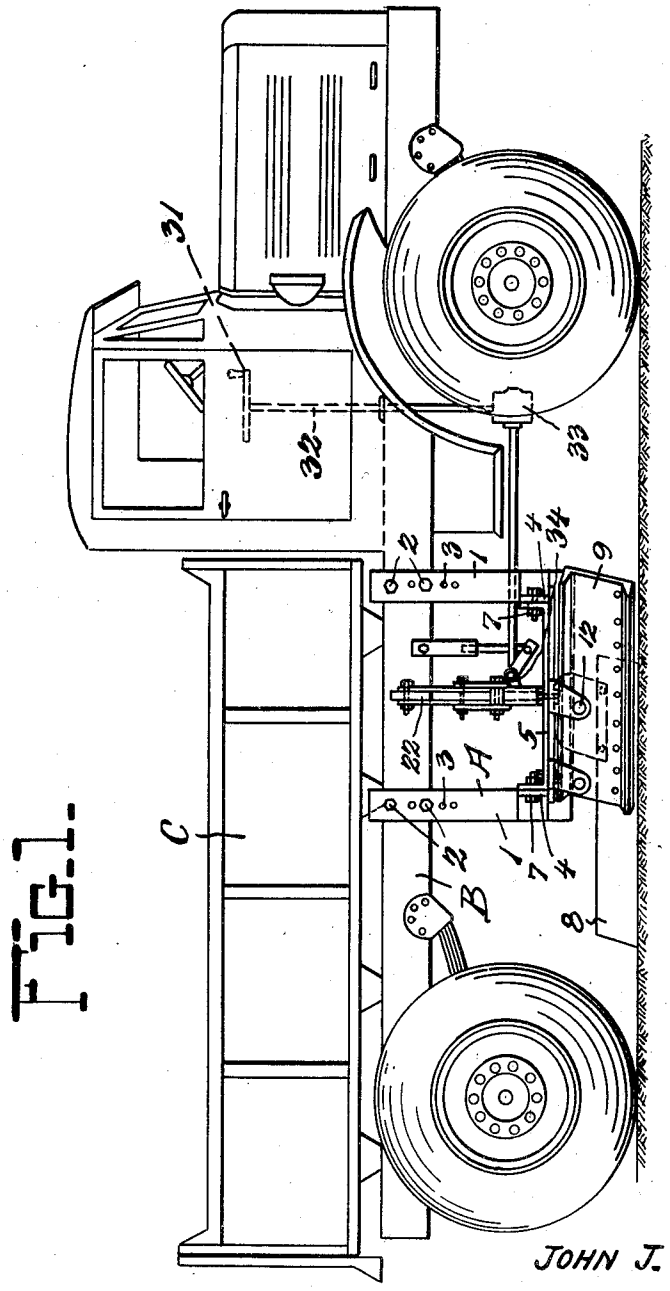


FIG. 1.

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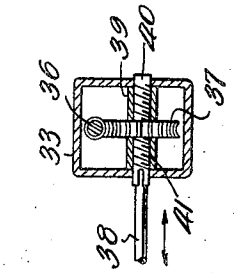


Fig. 6

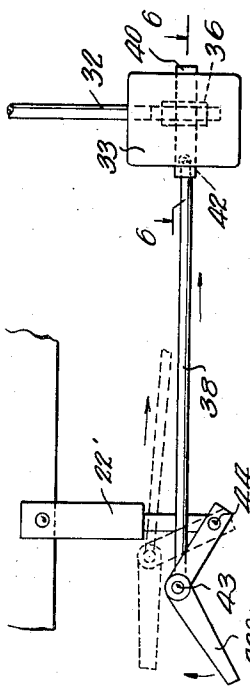


Fig. 5

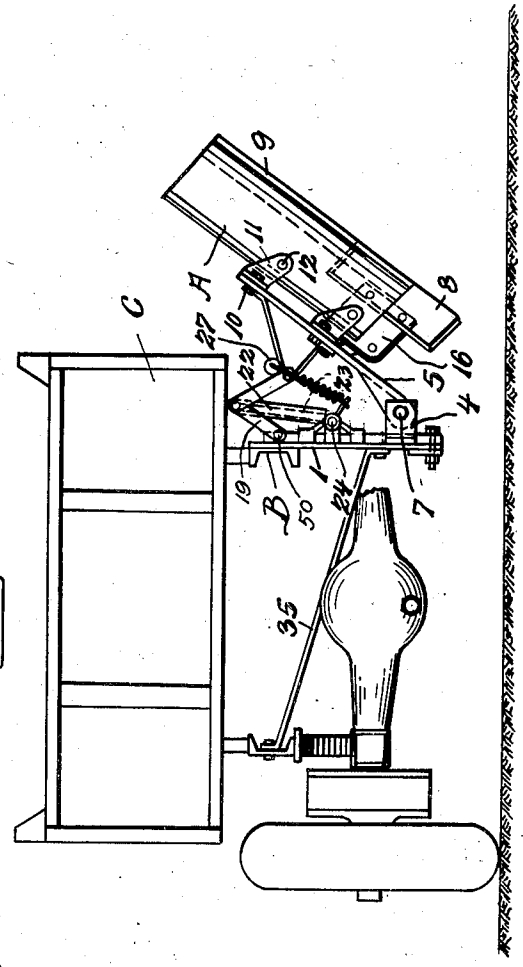


Fig. 2

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SHOULDER GRADING MACHINE

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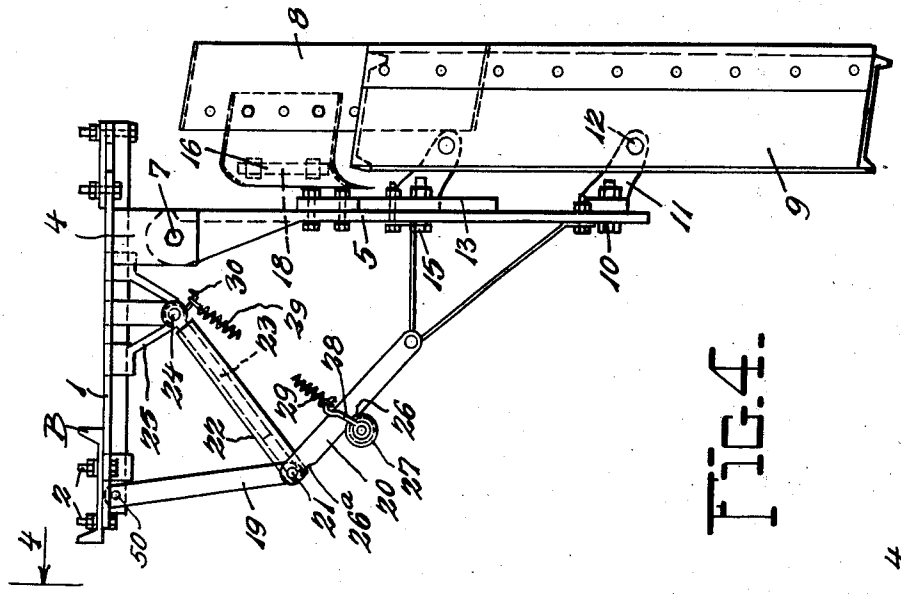


Fig. 4.

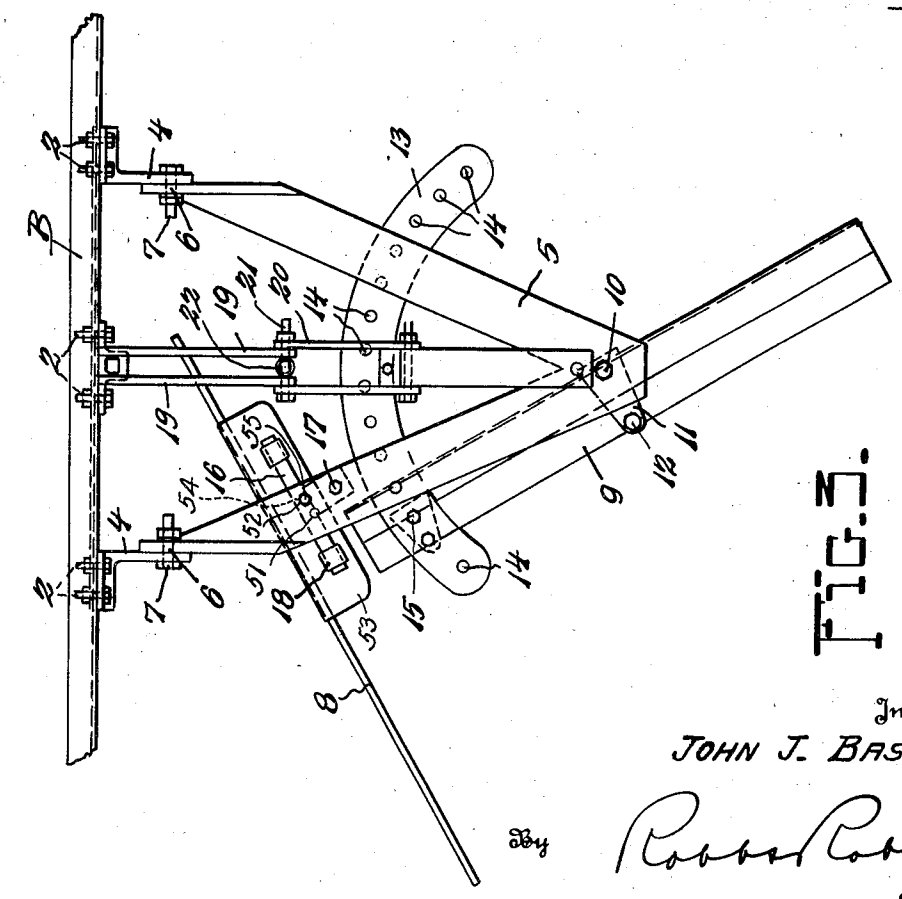


Fig. 1.

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UNITED STATES PATENT OFFICE

1,987,729

SHOULDER GRADING MACHINE

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Application July 27, 1932, Serial No. 625,132

9 Claims. (Cl. 37—155)

It is of course well known and frequently observed that the berms or shoulders along paved roads are subject to the likelihood of becoming rutted and out of shape, and since highway specifications usually require that the shoulders along the highways conform to rather rigid requirements it is necessary to maintain these shoulders or berms in condition to fulfill all the requirements of a particular location. The likelihood of the shoulders becoming rutted and uneven increases very materially the driving hazards along the highway and the unevenness of the shoulders frequently may lead to the formation of ruts and other irregularities along the edges of the paved surface itself.

The maintenance of such shoulders in proper condition along a paved highway, as well as the shaping and grading of newly formed shoulders requires usually special types of appliances for grading and smoothing such shoulders, which appliances often are relatively complicated and heavy in construction and are more or less difficult to operate.

The present invention deals with an improved form of a shoulder grading machine or appliance which may be readily secured to the frame of a truck in such a manner that the appliance may be readily manipulated to get it out of the way when it is not in use.

To this end, the invention embraces novel mounting instrumentalities for the blades of the appliance, whereby the blades may be readily adjusted to any desired horizontal angle, and which may be also vertically adjusted in an expeditionus manner when desired to bring the blades out of engagement with the ground or shoulder being operated on.

The invention further embraces, as incidental means to the instrumentalities above set forth, means whereby a suitable pressure upon the blades is always assured when the blades are in operative position, and also means for cushioning the blades in the event that obstructions are encountered during the course of the work, so that any such obstructions will merely lift the blades to enable them to ride over the obstruction with a minimum of likelihood of breakage of the blades.

A further advantage lies in the fact that the present construction may be mounted upon a light truck, and will operate satisfactorily at quite a substantial rate of speed, thereby reducing the cost of shoulder maintenance to a very low level, and a single operator is able to cover considerably more territory than has been heretofore practicable.

Other advantages of the present improved construction will become apparent as the description proceeds, it being especially borne in mind that the present machine may be employed to shape newly built or badly deformed shoulders, to smooth out rough and uneven shoulders, and to entirely eliminate the ordinary rut that appears along the edge of the pavement; and because of the fact that the construction is light, and readily manipulatable by the truck driver from his cab, its attachment to the truck in no way limits or interferes with the operation of the truck in any respect.

In general, the invention embraces an appliance of the above outlined type, which comprises a pair of blades mounted on a generally semi-circular segment attached to a suitable frame, which is in turn hinged to support arms clamped or otherwise suitably secured beside the truck frame. These blades are readily adjustable to the desired angle horizontally and to the desired pitch vertically for proper maintenance under variable conditions, and the whole appliance is hinged to the sides of the truck in such a manner that it will follow the contour of the shoulder while being used and will fold up alongside the truck when not in use.

The blades are mounted so that one blade is disposed in front of the other, the front blade serving as a cutting blade, and the back blade serving as the cleaning blade. Both of these blades are readily adjustable to any desired position, both vertically and horizontally.

The front blade can be set so as to cut the shoulder and either push material outwardly or drag it inwardly, the back blade being lifted to non-operating position. This gives a good arrangement for shaping shoulders that are badly warped.

In regular shoulder maintenance work, the front blade is adjusted so that it drags material to the edge of the pavement, and the rear blade is set so that it spreads any excess material thus collected over the shoulder.

Instrumentalities are provided for delivering pressure to the blades to accomplish a ready regulation of the depth of the cut of the shoulder and to allow a sufficient degree of freedom in case the blades strike some obstruction during operation.

Suitable bracing is supplied for assuring rigidity of the mounting of the truck frame while eliminating possible distortion thereof. The con-

struction is adjustably mounted so that the appliance may be attached for the proper height for different makes of trucks.

Although the particular details of the invention may specifically take many forms, a satisfactory arrangement is typified in the accompanying drawings, in which—

Figure 1 represents a side view of a truck having the present improved appliance mounted on the frame.

Figure 2 is a partial fragmentary rear view of the truck of Figure 1, showing details of the mounting of the present shoulder forming device.

Figure 3 is a detail top view of the device showing details of the supporting structure.

Figure 4 is a side view of the construction of Figure 3 looking in the direction of the arrows.

Figure 5 is a detail view illustrating the mechanism employed for vertically moving the blades.

Figure 6 is a section of the actuating means of Figure 5, taken on the line 6—6 of Figure 5.

It will be seen that the above generally outlined features of construction are illustrated in detail in these drawings, which show the shoulder forming and grading attachment A securely hung from the frame B of the truck C.

The attachment A comprises in general the supports 1, of suitable rigid construction to withstand warping and other distortion under conditions of service, which are secured in suitable manner to the frame of the truck through bolts or similar securing members 2 which are positionable in the adjusting openings 3 in the supports 1 for adjusting the entire attachment A to required height for operating on a road shoulder, dependent upon the height of the truck frame B from the ground.

The supports 1 carry the brackets 4 to which the arms of a substantially V-shaped frame 5 are secured, each of which arms is hingedly mounted at 6 to its respective bracket, being turnably mounted on the bolt 7.

Mounted upon the frame 5 are a pair of cooperating blades for working upon the shoulder undergoing construction or repair.

In the illustrated arrangement the blade 8 acts as the cleaning blade, and the blade 9 serves as a grading blade.

Both of these blades are mounted for independent angular adjustment in both horizontal and vertical directions. To accomplish the horizontal angular adjustment of the blade 9 it is pivotally mounted at 10 to the frame 5, the blade 9 being directly mounted on the supporting member 11, to which it is adjustably connected at 12.

In order to maintain the blade 9 in desired angular position, there is carried by the frame 5 the arcuate or generally semi-circular supporting member 13 provided with aligned holes 14 into which the end of the blade 9 may be adjustably secured as indicated at 15. It will therefore be seen that the combination of the hinged mounting 10 with the blade 9 and the arcuate adjusting member 13 allows free adjustment of the blade 9 to any desired position. This blade 9 acts as the grading blade, as mentioned, so as to grade the shoulder to conform with highway regulation, when new highways are completed.

It is well known that under conditions of weather, the shoulder may become higher than the highway surface, due to freezing, thawing, etc., and to enable this excess of material in the shoulder to be cleaned back off the highway to its original shoulder position, there is provided the aforementioned cleaning blade 8. This blade is secured to the frame 5 by a hanger 16, the blade being hinged at 17 and for horizontal angular adjustment of the same the hole 51 or 52 of the member 5 may be brought into alignment with a hole 54 in the bracket 53 by turning the blade about its pivot point 17. The blade is then locked to the member 5 by means of a screw 55, and at 18 for vertical movement to lift the blade 8 out of operation without disturbing the position of the grading blade 9 when it is desired to do so.

It will further be seen that the frame 5 is supported at its apex by a toggle strut having arms 19 and 20 hinged together at 21, at which point there is provided a reinforcing strut formed of a sleeve 22 into which the arm 23 telescopes, the arm 23 being hingedly mounted at 24 to the bracket 25, which is bolted or otherwise secured about the standard to slide thereon, which will be apparent from the figures.

The arm 20 is notched at 26*a* for receiving a roller 27 carrying a hook 28 to which a spring 29 is attached, the spring having its other end suitably secured to the hook 30 mounted on the bracket 25.

By this construction there is transmitted to the blades a constant operating pressure, by means of which the depth of cut on the shoulder may be controlled. This mounting arrangement also allows the blades sufficient fredom to ride over any obstructions which may be encountered, minimizing likelihood of breakage of any of the supporting structure.

The hinge mountings allow the entire attachment to be lifted out of operative position, as shown in Figure 2, so that the attachment can be swung vertically out of the way of the truck used in any way desired without limits.

The operating mechanism is illustrated in Figure 1, wherein there is illustrated a hand wheel 31 positioned in the operator's cab conveniently to the operator, which actuates a shaft 32, a suitable worm gear in the housing 33 to the casting 25.

For shaping shoulders that have become warped, the front blade 9 is adjusted to cut the shoulder and either push material out or drag it in, the blade 8 being lifted to non-operating position by swinging about hinges 18. For regular maintenance of the shoulders where excessive regrading is not necessary, the blade 9 is set so that it drags material to the edge of the pavement and the blade 8 adjusted so that it spreads any excess material thus collected out over the shoulder. The pressure delivered to the blades through means of the spring 29 regulates the depth of the cut and allows, as has been previously mentioned, the blades to yield when passing over any obstruction. Such yielding of the blades will cause an upward motion of arm 19 about its pivot point 50 and the use of a telescoping arm 22 is therefore necessary. The spring 29, when the attachment is raised to inoperative position for transportation, is rendered inoperative by slipping the roller 27 out from its notch 26*a* and allowing it to slide down to the end of the lever arm 20, so that the spring member will be out of use and will not hinder the raising of the attachment.

Struts 35 may be provided to prevent the warping of the truck frame under stresses set up during operation of the attachment; the struts may be secured to the supports 1 and to the opposite side of the truck frame, as clearly illustrated in Fig. 2.

It has been said that the blades are vertically operable to raise them from operative to inoperative position, and contrarily, as is well illustrated in Figure 2. This mechanism is illustrated in detail in Figures 5 and 6.

It will be seen that adjacent the driver's seat in the cab, there is positioned a hand-wheel 31 which actuates a shaft 32, and it has been said that there is positioned in the housing 33 a suitable worm gear for transmitting actuation from the shaft 32 to the casting 25, which is slidably positioned between the supports 1.

The worm is illustrated at 36, which is positioned on the end of shaft 32 and which operates a worm gear 37 for reciprocating the rod 38 through instrumentalities of an internally threaded sleeve 39 in which operates the end portion 40 of the rod 38. This end portion 40 is provided with threads 41 corresponding to the internal threads of the sleeve 39, so that as the sleeve 39 is rotated the portion 40 is correspondingly moved relatively to the sleeve. The rod 38 has one end pivotally joined to the portion 40, as indicated at 42, the other end of the rod 38 being connected to the bell crank 22*a*, as shown at 43. The bell crank 22*a* is pivotally secured at 44 to the strut 22'. The other end of the bell crank 22*a* is interconnected with the casting 25, so that when the hand-wheel 31 is turned, the rod 38 and bell crank 22*a* will assume the dotted line position in Figure 5, thereby raising the blade assembly to the position of Figure 2.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a shoulder grading machine comprising a unit adapted to be mounted on a truck or the like, and comprising cooperating standards adapted to be secured to the usual frame of the truck, a frame hingedly mounted on the standards, cooperating blades carried by the frame, means for effecting adjustment of the blades in both horizontal and vertical adjustments, and supporting instrumentalities for the frame and blades, the said instrumentalities including resilient means for yieldingly pressing upon the blades during operation of the machine, the supporting instrumentalities comprising a pair of hingedly interconnected lever arms forming a toggle connection between the said standard and supporting frame for the blades, and a telescoping strut supporting the links at the hinged connection therebetween.

2. A shoulder grading machine comprising a unit adapted to be secured to the usual truck frame and comprising standards adapted to be rigidly mounted on the truck, a frame hingedly mounted on the standards for vertical movement relatively thereto, a pair of cooperating scraper blades carried on the frame, one of the said blades being adapted to operate in advance of the other, and means for adjusting at will the said blades in both horizontal and vertical directions and comprising a pair of hingedly interconnected links hingedly connected to a standard and to the frame respectively, a telescoping arm hingedly carried by the last mentioned standard and by the links at the hinged points of interconnection of the links, and means comprising an adjustable spring for imparting pressure to the blades for yieldingly pressing the blades upon the ground to control the cutting action of the blades.

3. In a road shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, the said unit comprising a substantially V-shaped frame, supporting instrumentalities for mounting the frame on the truck, cooperating shoulder grading and shaping blades carried by the frame, one blade operating in advance of the other, instrumentalities for effecting adjustment of each blade, including an arcuately shaped supporting member extending across the V-shaped frame and provided with means for securing one of the blades in predetermined angular adjustment, mechanism for vertically operating the frame and blades, including a pair of hingedly connected lever arms forming a suspension carriage for the frame, the arms being connected to the frame and truck, respectively, and means for effecting a yielding pressure upon the blades during operation of the machine, the means including a spring interconnecting one of the lever arms and the frame mounting instrumentalities on the truck and a roller operating on the said lever arm and directly carrying the spring to allow continuous tension on the spring as the said arm is vertically adjusted.

4. In a road shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, the said unit comprising a frame, supporting instrumentalities for pivotally mounting the frame on the truck for folding movement, a pair of cooperating shoulder grading and shaping blades carried by the frame, one of the blades being disposed to operate in advance of the other, and means for pivotally adjusting the frame and blades vertically as a unit and horizontally adjusting the blades to certain positions.

5. In a road shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, the said unit comprising a substantially V-shaped frame, supporting instrumentalities for mounting the frame on the truck, cooperating shoulder grading and shaping blades carried by the frame, one blade operating in advance of the other, instrumentalities for effecting adjustment of each blade, including an arcuately shaped supporting member extending across the V-shaped frame and provided with means for securing one of the blades in predetermined angular adjustment, mechanism for vertically operating the frame and blades, including a pair of hingedly connected lever arms forming a suspension carriage for the frame, the arms being connected to the frame and truck, respectively, and means for effecting a yielding pressure upon the blades during operation of the machine, the means including a spring interconnecting one of the lever arms and the frame mounting instrumentalities on the truck and a roller operating on the said lever arm and directly carrying the spring to allow continuous tension on the spring as the said arm is vertically adjusted, the lever arm being suitably notched to receive the roller when the blades are in operative positions.

6. In a shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, and including a frame hingedly mounted on the truck and foldable from a position closely adjacent the side of the truck to a position laterally extended from the truck, and vice versa, coacting blades mounted on the frame, and instrumentalities for horizontally adjusting the blades independently of each other.

7. In a shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, and including a frame hingedly mounted on the truck and foldable from a position closely adjacent the side of the truck to a position laterally extended from the truck, and vice versa,

coacting blades mounted on the frame, and instrumentalities for vertically adjusting the blades.

8. In a shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, including a frame hingedly mounted on the truck and foldable from a position closely adjacent the side of the truck to a position laterally extended from the truck, and vice versa, coacting blades mounted on the frame, instrumentalities for adjusting the blades independently of each other in horizontal directions, and mechanism for adjusting the blades in vertical direction.

9. In a shoulder grading machine, a grading unit adapted to be mounted on a truck or the like, including a frame hingedly mounted on the truck and foldable from a position closely adjacent the side of the truck to a position laterally extended from the truck, and vice versa, coacting blades mounted on the frame, instrumentalities for adjusting the blades independently of each other in horizontal directions, and mechanism for independently adjusting one of the blades in vertical direction.

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