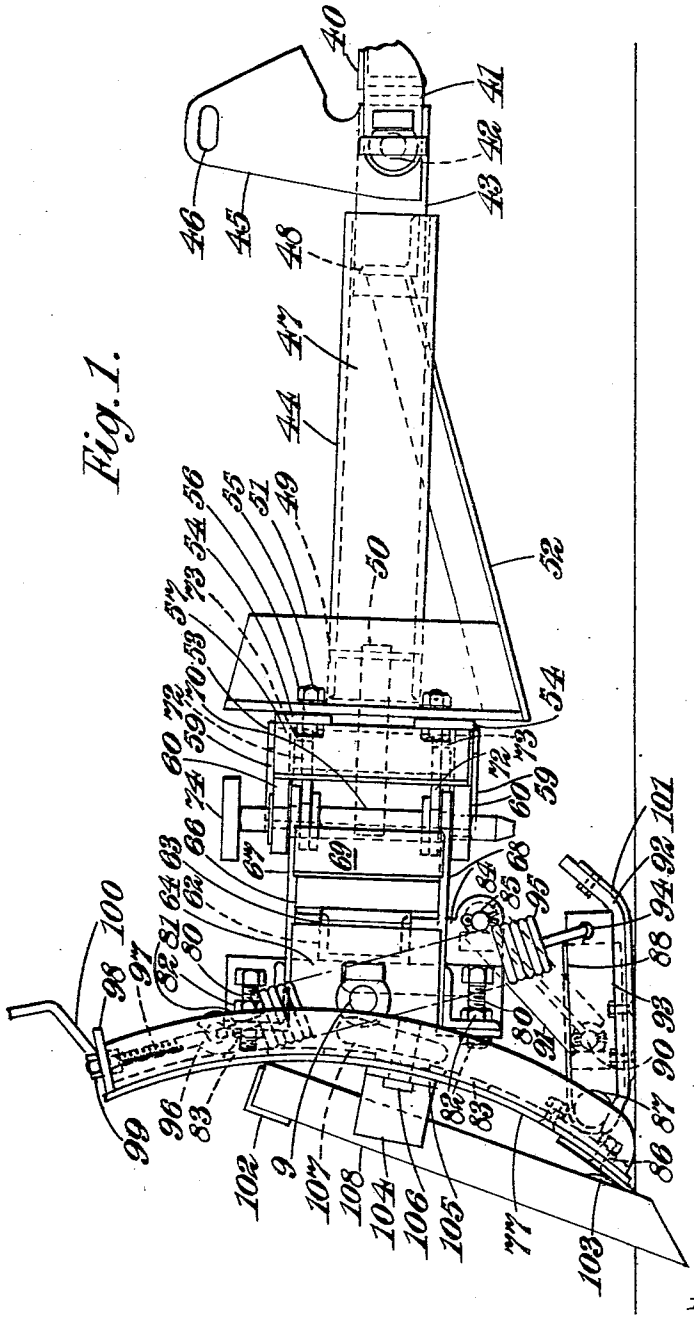
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ATTACHMENTS FOR VEHICLES FOR TRAVERSING HEAPED UP MATERIAL ALONG THE GROUND

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Fig. 1.



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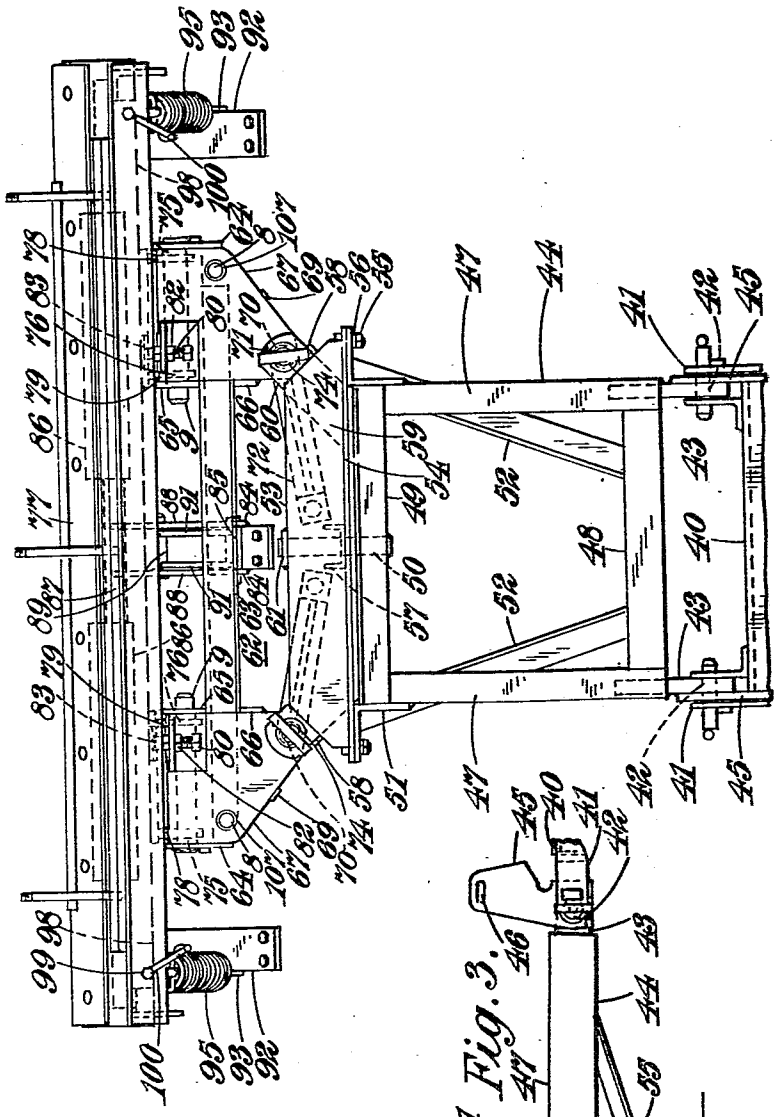


Fig. 2.

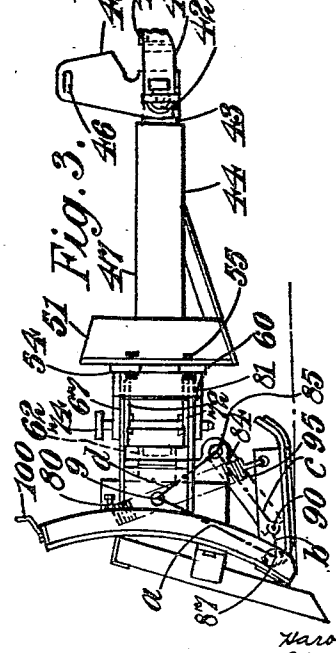


Fig. 3.

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# ATTACHMENTS FOR VEHICLES FOR TRAVERSING HEAPED UP MATERIAL ALONG THE GROUND

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2 Claims. (Cl. 37—144)

This invention relates to attachments to vehicles for traversing heaped up material along the ground and of the kind comprising an upright transverse wall or blade (hereinafter referred to as a blade) mounted so that its lower end may contact with and dig into the ground to a predetermined extent and which mounting permits the blade to be elevated. It has already been proposed to provide hand control means whereby the blade may be elevated a short distance so that should there be excessive resistance movement over the ground, for example due to the lower edge of the blade encountering either an obstruction or heavy ground, or digging too deeply into the ground due to pitching of the vehicle, it may be withdrawn upwardly at the will of the operator.

An object of the present invention, is to provide a mounting which will automatically raise the blade when the resistance movement reaches a predetermined amount. The invention is particularly applicable to comparatively low horse power vehicles.

According to this invention, an attachment of the type referred to above for a vehicle for traversing heaped up material along the ground, is characterised in that said blade is carried by a closed collapsible pivoted linkage carrying said blade, propelling means attached to said linkage, stop means for restraining the linkage against collapse in one direction and spring means permitting collapse in the other direction, which linkage comprises four links, a first link forming a part of the blade, a second forming a part of a skid pivoted to and extending rearwardly of the first, a third forming part of said propelling means and connected to one end of the first link and a fourth connected between the second and third links whereby upon collapse of the linkage against the action of the spring the skid is lowered and the blade is raised.

In one form of linkage, the internal angle between said second and fourth links is arranged to less than 180 degrees and the spring means are arranged to act on said linkage so as to tend to straighten out said second and fourth links and swing said skid upwardly and the aforesaid stop means are provided for limiting said upward swing.

The spring means may comprise a tension spring extending upwardly and connected between said skid and the upper part of said blade. The line of action of said spring is preferably arranged to pass through or close to the axis of pivoting between the first and third links.

An adjusting device may be provided for varying the strength of the resiliently yielding means, for example, for varying the tension in a spring, whereby the linkage may be arranged to collapse at a predetermined resistance to movement of the blade and then to lower the skid.

In one construction a number of skids are fixed to a shaft mounted in bearings near the lower end of said blade, so as to extend across the width thereof, and a centraly disposed skid is connected by the aforesaid



fourth link to that link which forms a part of the propelling means. In such a construction, a tension spring is connected between each of the outermost skids, and the upper part of said blade.

The assemblage of said blade, skids and linkage, may be so connected to the propelling means as to permit adjustment of the assemblage about a fore and aft axis and/or about an upright axis.

Means may be provided for detachably connecting a number of scarifiers to the front of the blade so as to project below the lower edge thereof.

The following is a description of one form of construction for an earth moving or bulldozer attachment to a power driven vehicle, reference being made to the accompanying drawings in which:

Figure 1 is a side elevation of one form of construction;

Figure 2 is a plan view of the arrangement shown in Figure 1; and

Figure 3 is a diagrammatic view indicating the nature of the linkage.

The sub-frame 40 of the vehicle is provided across its width with two forwardly extending lugs 41 which are pivotally attached at 42 to elements 43 extending rearwardly from a main blade carrying frame indicated generally at 44. Fixed to and extending upwardly from each of the elements 42, is a plate 45 which is provided at its upper end with a slot 46 extending in a fore-and-aft direction. A hydraulically actuated rod is connected to each of these plates by a pin which may move along the slot.

The aforesaid main scraper blade carrying frame is provided with two channel section side members 47, and welded between these two are a rear angle section frame member 48 and a channel section forward member 49. Spindle 50 is fixed to the channel section member 49 so as to extend in a fore-and-aft direction at the centre thereof. Welded to each end of the forward channel section frame member 49, is an upright angle plate 51 which extends both above and below the frame member. The lower end of each angle section plate 51 is braced to the rear frame member 48 by an angle section side member 52. The forwardly directed flange of each angle section plate 51 is provided with a series of holes disposed in an arc shaped manner in the centre of the arc on the axis of the spindle 50. Secured across the upright angle section plate 51 is a tilting gate 53 which is built up from two strips 54 spaced apart one above the other, and extending across the forwardly directed flanges of the upright angle section plate 51 to which they are attached by screws and nuts 55 and 56, the former extending through a selected hole in the arcuate set of holes.

Welded between the two strips 54 at their centre is an upright channel member 57. Welded across the top and bottom of this channel member 57 and along the strips 54 are plates 59, between the ends of which are welded inclined plates 58 and welded to these plates and to the plates 59 are forwardly extending lugs 60, provided with holes near their extremities. Also welded between the two plates 59 in the centre thereof is an upright tie member 61 and this tie member and the channel member 57 are formed with holes for accommodating the forward end of the spindle 50. Thus by selecting the appropriate holes through which the screws 55 extend, the tilting gate may be disposed at the required angle in relation to the main blade frame 44.

Connected to the tilting gate is an angle gate frame. It comprises a transversely extending channel section member 62 across the flanges of which is welded a plate 63 to close it. Welded at each end of the closed channel member is an upright plate 64 as seen in Figure 2, which extend both above and below the channel member, and welded to the closed channel member at the front and

rear thereof are two plates **65** and **66** which extend above and below it. These parts **62** to **66** constitute a propelling member for the blade. Welded to each set of plates **64**, **65** and **66** at the upper and lower ends thereof are two gusset plates **67** and **68** respectively. The two gusset plates **67** and **68** are braced together near their extremities by a further plate **69**. The plates **67** and **68** of each pair of plates are provided with two holes **71** and **8** spaced apart in a fore and aft direction and secured between the two plates and registering respectively with two holes are tubular elements **70** and **107**. Pivotally mounted on the tubular element **70** are two links **72**, each of which links is provided at its extremity with a thickening piece **73** so as to bring it roughly in alignment with plates **67** and **68**. The rearward extremity and the thickening piece are drilled to correspond with the bore of the tubular element **70**. In the position shown in Figure 2 each tubular element **70** has been brought into register with holes in one of the pairs of lugs **60** and a pin **74** is shown extending through these holes and tubular elements whereby the closed channel member **62** is arranged parallel with the forward frame member **49** and tilting gate. By removing one of the pins **74**, one of the pair of plates **67** and **68** may be drawn forwardly of the lug **60** until the holes in the extremities of the links **72** register with the holes in the lugs **60** and the pin re-introduced, whereby the closed channel member **62** is now arranged at an angle to the tilting gate and the forward member **49** of the main supporting frame. A further adjustment may be made from this position by removing the other pin **74** and bringing the hole **8** and tubular element **107** in the other pair of plates **67** and **68** into register with the holes in the former pair of lugs **60** thus shifting the inclined channel member laterally.

The forward edges of the two plates **67** and **68** of each pair are spaced apart and the two strips **64** and **65** are provided with holes **75** and **76** respectively.

The earth moving scraper blade which is indicated at **77** is provided on the back plate near each extremity thereof with two lugs **78** and **79** spaced apart, and which project between the upper and lower plates **67** and **68**, and are provided with holes at their extremities which register with the holes **75** and **76** respectively in the plates **64** and **65** which registering holes are engaged by pins **9**, whereby the blade may be tilted about a transverse horizontal axis. This tilting movement, however, may be limited by adjustable stops **80** which are carried by angle members **81** secured to the plates **67** and **68**, which adjustable stops comprise screws which are held in position on a flange of the angle plate by lock nuts **82**. The ends of the screws are engageable with abutment plate **83** on the back face of the blade.

Welded to and projecting downwardly from the centre portion of the closed channel shape member **62** are two plates **84** each of which is provided with a hole at its lower extremity, through which extends a pivot pin **85**. Mounted in bearings **86** secured to the back face of the lower edge of the blade is a cross shaft **87**. Welded to the centre portion of the cross shaft are two side plates **88** of a skid and which side plates are welded to the sole plate **89** of the skid. Pivoted between the two downwardly extending plates **84** and between the side plates **88** of the skid is a link or links **91**. A skid **92** is also fixed at each end of the shaft **87**, and each of these skids is provided with a single side plate **93** having a hole **94** near its rear extremity which is engaged by one end of a tension spring **95**. The other end of the tension spring engages an adjustable anchorage **96** in the form of an eye bolt, the threaded shank **97** of which passes through a hole in a flanged-plate **98** secured to the upper extremity of the blade. The end of the screw shank is engaged by a nut **99** provided with a hand lever **100**.

The skids may be provided with suitable lining plates **101**.



It will be seen that the side plates **88**, which carry, or are included in, the skid structure, cooperate with the link **91** to therewith define a toggle linkage having its knee coincident with the pivot **90**, and the spring means **95** tensioned between this toggle linkage and the upper portion of the scraper blade above the horizontal axis **9** of the latter urges both said links of the toggle linkage toward relative alignment. Obviously such urging and normal maintenance of the toggle linkage in the position in which its links most nearly approach alignment as shown in the drawings will exert a thrust against the lower edge or edge portion of the blade tending to maintain same in a forwardly swung operative scraping position.

There may be attached to the front face of the blade a number of scarifiers. The upper ends of which are welded to an angle member **102** while towards the lower ends and across the back faces thereof is welded a cross bar **103**. Each of the outermost scarifiers has welded to a side face thereof an angle member **104**, one flange **105** of which rests against the scraper blade and is secured thereto by a headed cotter pin **106** which extends through a hole in the flange and through the scraper blade and is slotted so as to be engaged by a flat wedge shaped element **107** which is wedged in position. Referring to Figure 3, the above mounting of the skid may be considered as a closed linkage embodying four links, *a*, *b*, *c*, and *d*. The link *a* is constituted by the blade between the pivot axis **9** and cross shaft **87**, the centre link *b* is constituted by the skid between the cross shaft **87** and the pivotal connection **90**. The link *c* is constituted by the linkage **91** between the pivotal connection **90** and the pivot pin **85** carried by the plate **84** while the link *d* is constituted by the plate **84** between the pivot pin **85** and pivot axis **9**. The plate **84** can be considered to be fixed. It will be seen that the effect of the spring **95** which passes through the axis **9**, tends to straighten out the links *b* and *c* and since the link *d* is fixed, this tends to swing the link *a* clockwise, and its movement is limited in this direction by the adjustable stop **80**. The main effect of the spring is to hold the skids in their uppermost position clear of the ground. Should, however, the lower edge of the scraper blade encounter an obstruction, the angularity of the links *b* and *c* will be increased and the skid will be pressed downwardly lifting the blade. This will have the effect of swinging the main blade supporting frame **44** upwardly about the pivot axis **42** and bringing the forward end of the slot **46** against the pin in that slot.

The above construction also permits adjustment of the blade about a fore and aft axis by introducing the screws **55** in their appropriate holes in the plates **54** and also permits adjustment about a vertical axis by the appropriate adjustments of the aforesaid links **72**.

We claim:

1. A ground traversing bulldozer comprising a propelling member projecting longitudinally forwardly in the direction of the ground traversing movement of the bulldozer, a generally vertical scraper blade pivoted to said propelling member for movement about a horizontal axis transverse to said propelling member and having a horizontal lower edge spaced below said axis, a toggle linkage comprising a first rigid link pivoted to said blade adjacent the lower edge thereof for vertical swinging movement, a normally horizontally disposed ground engaging skid carried by said first link, and a second rigid link pivotally connected at one end to said propelling member, the free ends of said links being pivotally interconnected to define the knee of said toggle linkage, spring means tensioned between said toggle linkage and the upper portion of said blade above said horizontal axis of the blade and normally urging the links of said linkage toward relative alignment to urge the lower edge of the blade forwardly into operative scraping position.

2. The combination of claim 1 in which said spring means extends across and intersects the said horizontal axis of the blade in the normal operative position of the latter whereby the rearward displacement of the lower edge of the blade and the resulting forward swinging of the upper portion of the blade displaces said spring means forwardly of said horizontal axis to exert a component of force on the blade assisting the said rearward movement of its lower edge.



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