ROOTER ATTACHMENT FOR BULLDOZERS OR THE LIKE

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AGENTS.
ROOTER ATTACHMENT FOR BULLDOZERS OR THE LIKE

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This invention has to do with a ripper or rooter attachment for bulldozers, and the like, and it is particularly concerned with a structure that is easily and quickly applied to or removed from the blade and mold-board of a tractor or bulldozer, or like machine.

The rippers and rooters heretofore employed have been extremely heavy and cumbersome and have been applied to bulldozer machines in manners which develop undue stresses and strains. These stresses and strains are not only set up in the ripper or rooter attachment, but are also set up in the blade and mold-board structure of the machine, all of which results in wear and fatigue of the parts of the machine and in breakage of parts and general damage. Further, the constructions heretofore employed are characterized by rigid parts that transmit shock loads directly onto the blade and mold-board, there being no flexibility in the manner in which the parts are connected.

With the above problems in mind, it is a general object of this invention to provide a simple, inexpensive ripper or rooter attachment for bulldozers, and like machines, that is durable and effective in operation.

An object of this invention is to provide a rooter attachment that is easily and quickly applied to or removed from the blade and mold-board of the bulldozer and which is of minimum weight and bulk, so that it is easily handled.

Another object of this invention is to provide an attachment of the character referred to that imposes only simple forces and strains upon the blade and mold-board structure of the machine and which eliminates all complex forces which often result in fatigue and failure of the parts. With the structure that I have provided, the main element of the attachment is a simple, straight, lever-like part subject only to bending moments, while the mountings for the lever are simple pivotal mountings that independently transmit forces into the blade and mold-board.

It is still another object of this invention to provide an attachment of the character referred to that absorbs the shocks which are ordinarily transmitted directly into the blade and mold-board. In the construction that I have provided, the main lever-like element is flexible and yields to the loads imposed upon the attachment, while the mountings therefor are pivotal mountings that allow for movement of the lever and independent breathing or working of the mold-board. Further, the pivotal mountings include bodies of live rubber or the like that yield to the shocks imposed thereon.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a perspective view of a typical machine to which the attachment of the present invention is shown applied. Fig. 2 is an enlarged detailed elevation of the attachment that I have provided. Fig. 3 is a perspective view of the upper pivotal mounting fitting that I provide. Fig. 4 is a perspective view of the lower pivotal mounting fitting that I provide. Fig. 5 is an enlarged detailed view taken as indicated by line 5—5 on Fig. 2. Fig. 6 is an enlarged detailed sectional view taken as indicated by line 6—6 on Fig. 2. Fig. 7 is an enlarged detailed sectional view taken as indicated by line 7—7 on Fig. 6, and Figs. 8 and 9 are perspective views of the resilient pins that I have provided to secure the attachment in position.

In the operation of tractors such as the continuous tread type tractors, various earth handling structures are employed, one of the most common of these structures being a blade and mold-board structure. A tractor equipped with such a blade and mold-board is known as a bulldozer and it is this type of machine to which the ripper or rooter attachment of the present invention is particularly adapted to be applied. However, it is to be understood that the ripper or rooter attachment that I have provided may be employed in any similar machine of the character under consideration.

The present invention involves, generally, a tractor type vehicle X, a blade and mold-board Y, and a ripper or rooter attachment Z. The vehicle X is preferably a continuous tread type vehicle having a body 10 carrying a power plant 11, driving facilities 12, and a chassis 13 with spaced parallel side members 14, wheels 15 and treads 16.

The blade and mold-board Y is a unitary construction adapted to be applied to and carried by the vehicle X for the handling of earth, and involves a shiftable frame 17, a blade 18, a mold-board 19 and operating means 20. The frame 17 has a pair of parallel side members 21 pivotally secured at 22 to the side members 14 of the chassis 13. The side members 21 are pivoted on a common axis at the rear ends thereof and are rigidly joined with and carry the blade 18 and mold-board 19 at the forward ends thereof.

The blade 18 is a heavy part of durable material having a downwardly faced sharpened edge 23 along the lower portion thereof and having a forwardly faced side 24 of substantial vertical extent. In practice, the blade 18 may be a straight, horizontally disposed part of uniform cross-section positioned so that the side 24 pitches downwardly and forwardly, as clearly illustrated in Fig. 2 of the drawings.

The mold-board 19 is a durable part of somewhat lighter construction than the blade 18 and is preferably arcuate in cross-section. That is, it is concave as observed from the front side 25 thereof and extends upwardly and inwardly from the blade 18 and then somewhat outwardly. The mold-board 19 terminates at a horizontal upper edge 26 parallel with the edge 23 of the blade 18. The mold-board 19 has ends 27 normal to the edges 26 and 23, and as shown in the drawings, a reinforcing angle 28 extends along the edge 26 to strengthen the mold-board. It will be apparent how the frame 17 is rigidly secured to the blade and mold-board 18 and 19 to support them for vertical movement relative to the vehicle X.

The operating means 20 is provided for adjusting the vertical position of the blade 18 and mold-board 19 and may be any suitable means. I have indicated such means as including a cable lift 29 carried by the body 10 of the vehicle X that may be connected to the frame 17 at the forward end portion thereof.

The ripper or rooter Z of the present invention is in the nature of an attachment for a bulldozer or a tractor and blade structure, as above described, and involves, generally, a shank A, a cutting head B, a cutting tooth C and mounting means including a pivotal support D and
an anchor E. The shank A and cutting head B are integrally formed from a bar-like part which is adapted to extend vertically between the edges 26 and 23 above referred to, and the shank A is carried by the head B at the lower end of the shank A. The pivotal support D and anchor E secure the shank A to the blade 18 and mold-board 19 so that the shank A is flexibly mounted in a manner to eliminate complicated stresses and strains. The pivotal support D is located at the blade 18 while the anchor E is located at the upper portion of the mold-board 19.

The shank A is the main body of the attachment that I have provided and is a simple elongate bar 30 of durable material preferably of a steel having a substantial amount of resiliency. The bar 30 may be rectangular and may be substantially uniform in cross section throughout its length. However, in the preferred design, the bar 30 is slightly tapered toward its upper end. In most instances, the top edge 36 of the mold-board 19 is somewhat rearward of the cutting edge 23 of the blade 18, in which case the bar 30 extends upwardly and rearwardly at an incline. As shown, the upper end portion 32 of the bar 30 is substantially vertically disposed and has parallel front and rear walls 33 and 34 to be engaged by the anchor E, as hereinafter described.

The cutting head B is carried at the lower end of the bar 30 of the shank A and is preferably a continuation thereof, that is, the shank A and head B are formed of a single, integral body of material. The head B is in the nature of an enlargement at the lower end of the bar 30 and has a flat rear wall 35 and flat spaced side walls 36 with convergent forward portions 38 that come together at a sharpened cutting point or edge 37. The edge 37 extends vertically along the forward part of the head B. In accordance with the invention, one or more, preferably a series, of openings 40 extends through the head transversely thereof between the side walls 36. As shown, there are three such openings 40 which are provided to cooperate with the pivotal support D hereinafter described.

A tooth adapter 42 is provided at the lowermost end portion of the head B and is a tapered part pointed forwardly and downwardly. The adapter includes side walls 43 that are the continuations of the bar 30 and converging top and bottom walls 44 and 45 that come together at a point. An opening extends transversely through the adapter 42 between the side walls 43. The opening is elongate in cross section longitudinally of the adapter.

The cutting tooth C is a removable element adapted to be secured to the adapter 42 above described, and involves a tooth point 50 and a housing 51. The point 50 is a flat plate-like part sharpened at its forward end 52 and has a face 53 that has seating engagement with the top 44 of the adapter 42. The housing 51 is a U-shaped part with side sections spaced to receive the adapter 42 and with a lower wall 55 that converges forwardly where it joins the point 50. Openings are provided in the side sections to occur slightly forward of the opening in the adapter 42 and a flexible pin 57 is driven into the openings to yieldingly hold the tooth C on the adapter of the head B. The pin 57 is constructed of a pair of parallel members with a body of resilient material therebetween.

The pivotal support D that I have provided is carried at the lower portion of the mold-board 19 and is adapted to secure the shank A and/or the head B in proper working position. The support D involves, generally, a mounting bracket 60, a retatable saddle 61, retaining means 62 for the saddle, and a pivotal retainer 63 yieldingly holding the shank A in seating engagement with the saddle 61. The bracket 60 is applied to the blade 18 and is characterized by a base 64 having a flat bottom face 65 and a pair of upstanding ears 66. A series of equally spaced openings 67 with fasteners enganged therein is commonly employed in order to fasten the blade 18 to the mold-board 19, and, therefore, I have provided openings 68 in the base 64 that register with the saddle openings 67 so that suitable fasteners 69 may be employed to fasten the bracket 60 to the blade 18. The ears 66 are laterally spaced vertically disposed parts adapted to receive the shank A therebetween. Aligned openings 70 are provided in the ears 66 to receive the retainer 63 that passes through one of the openings 40 in the head above described. The desired opening 40 may be selected and engaged by the retainer 63 in order to position the attachment of the present invention at the proper height, as circumstances require.

It is a feature of the present invention to provide a retatable saddle 61 which is engaged by the shank A or head B to transmit stresses and strains directly into the blade 18. The saddle 61 is an arcuate member having a flat upper face 71 engageable with the rear wall 35 of the head B and having a curved bottom 72 adapted to have seating engagement with the bracket 60. The saddle 61 is carried in a recess 73 that occurs between the ears 66, the recess being characterized by a curved bottom seat 74. The bottom 72 of the saddle and seat 74 in the bracket are curved concentrically with the axis of openings 70 in the ears 66 so that the shank A and/or head B will have continuous bearing engagement with the face 71 of the saddle as the saddle is rotated relative to the pivotal axis of the support D.

The retaining means 62 for the saddle 61 may be provided to hold the saddle in working position in the recess 73 and between the spaced ears 66. The means 62 is a friction means and involves a plunger 95 shiftably carried in a guideway 96 in one side of the saddle 61, and a resilient member 97 operates the plunger. The member 97 may be a body of rubber or the like, or a spring, and yieldingly urges the forward end of the plunger into frictional engagement with the inner wall of one of the ears 66. Sufficient pressure is thus provided to insure retention of the saddle 61 in the recess 73. If so desired, a plate or section of metal of short length may be positioned between the ears 66 and held in place by the retainer 63 in order to retain the saddle in proper position when the shank A is removed.

The retainer 63 is a flexible pin-type construction that yieldingly urges the shank A and head B into tight seating engagement on the saddle 61. As shown, the retainer is round in cross-sectional configuration and involves two like parallel parts 76, each of which is semi-circular in cross-section, and a body of resilient material 77 such as rubber, or the like. The parts 76 are diametrically opposed to each other with the resilient material 77 therebetween, so that the parts 76 are urged apart when the material 77 is under compression. In practice, the openings 40 and 70 are somewhat offset, and the end portions 78 of the retainer 63 are tapered so that the retainer can be driven into place and held in working position under compression. As clearly shown in Figs. 6 and 8 of the drawings, the end portions 78 of the part 76 are in the nature of heads that project laterally or radially of the axis of the retainer 63. By providing the headed end portions 78, shoulders 79 are formed at the points where the end portions of the retainer join the central intermediate portion. That is, the shoulders 79 are formed at the end portions of the retainer and face inwardly to provide positive stop or positioning means for the retainer 63. Thus, the retainer 63 is held in proper working position by the shoulders 79 that engage the outer side walls 36 of the shank A.

The retainer may, in practice, be held in proper rotative position by means of friction so that the body of resilient material 77 is maintained in a plane parallel with the longitudinal axis of the shank A. However, I may employ a guide key 80 that is shown projecting from one of the heads of the retainer 63, which key 80 is slidable engaged in a keyway 81 in one of the ears 66.
This relationship of parts insures proper assembly of the parts so that the retainer is rotatably oriented with the body of the material 77 held in a plane substantially parallel with the wall 35.

The anchor E that I have provided is carried at the upper end of the mold-board 19 and is adapted to pivotally and slidably secure the shank A in position and against rotation. The anchor E involves a guide 85 and a retainer 86. The guide 85 slidably receives the upper end portion 32 of the shank A and has spaced lugs 87 that project forwardly from the mold-board 19, there being one lug 87 in the position 34 of the saw wall 33 of the upper end portion 32 of the shank slidably engages the upper edge 26 of the mold-board while the front wall 33 slidably engages the retainer 86. The guide 85 is preferably removable from the mold-board 19 and includes a clamp 88 and one or more set screws 89 that fasten the bracket at the reinforcing angle 28 on the top edge of the mold-board. Clearances is provided between the lugs 87 and the edge 26 of the mold-board so that the retainer 86 can be drawn into engagement with the end portion 32 of the shank. As shown, the rear face of the reinforcing angle 28 and the front wall 33 of the guide 85 are at tangent angles so that the bracket 85 is wedged into tight seating engagement with the mold-board when the set screw 89 is tightened. Further, guide bosses 82 are provided on the top of the mold-board in order to prevent shifting of the bracket 85, and a recessed centering plate 83 is provided to hold the screw 89 in proper bearing position.

The retainer 86, shown in Fig. 9 of the drawings, is essentially the same as the retainer 63 above described and involves two like parallel parts 90 and a body of resilient material 91 between the parts 90. The body of material is maintained in a plane substantially parallel with the upper end portion of the shank A by a flat 92 that engages the front wall 33 of the shank A so that the material is compressed when pressure is applied there-to as the shank A tends to rotate on the pivotal mounting D.

From the foregoing, it will be apparent that I have provided an extremely simple and light-weight attachment of the character described which may be easily and conveniently arranged at the blade and mold-board of a bulldozer, or the like, and which is flexible in action and is adapted to absorb shock loads through the resilient shank construction and resilient materials employed in the retainer pins that I have provided. As the attachment is designed so that A may bend, the shank blade and mold-board may independently bend or flex. That is, all of the various parts may work or deflect independently of each other without affecting one another. Further, the heavy loads and strains imposed upon the attachment are handled mainly by the saddle 61 so that the retainer 63 is employed only to hold the attachment in working position.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. An attachment for earth handling machines, including, an elongate resilient shank, a cutting head at the lower end of the shank and having a cutting point, and mounting means for the shank including, a pivotable support at the cutting head thereof, and a sliding anchor at the upper portion thereof.

2. An attachment for earth handling machines, including, an elongate resilient shank, a cutting head at the lower end of the shank and having a cutting point, and mounting means for the shank including, pivotable support at the cutting head thereof and comprising a bracket carrying a rotatable saddle, and a sliding anchor at the upper portion thereof, the said cutting head of said shank having flat bearing engagement with the saddle.

3. An attachment for earth handling machines, including, an elongate resilient shank, a cutting head with an opening therefrom at the lower end of the shank and having a cutting point, and mounting means for the shank including, a pivotable support at the cutting head end of the shank and comprising a bracket with ears projecting therefrom, a retainer pin carried by the ears and engaged in said opening through the head, and a rotatable saddle carried in a recess in the bracket, said cutting head of the shank having flat bearing engagement with the saddle, and a sliding anchor at the upper portion of the shank.

4. An attachment for earth handling machines, including, an elongate resilient shank, a cutting head with an opening therefrom at the lower end of the shank and having a cutting point, and mounting means for the shank including, a pivotal support at the cutting head end of the shank and comprising a bracket with ears projecting therefrom, a retainer pin carried by the ears and engaged in said opening through the head, and a saddle pivotally carried in a recess in the bracket and rotatable about the axis of the pin, said cutting head of the shank having flat bearing engagement with the saddle, and a sliding anchor at the upper portion of the shank.

5. An attachment for earth handling machines, including, an elongate resilient shank, a cutting head at the lower end of the shank and having a cutting point, and mounting means for the shank including, a pivotal support at the cutting head thereof and comprising a rotatable saddle loosely carried in a recess, and a sliding anchor at the upper portion thereof, the cutting head of said shank having flat bearing engagement with the saddle, there being a resilient retaining means frictionally maintaining the saddle in the recess.

6. An attachment for earth handling machines, including, an elongate resilient shank, a cutting head at the lower end of the shank and having a cutting point, and mounting means for the shank including, a pivotal support at the cutting head thereof and comprising a rotatable saddle and slidably engaging the upper portion of the shank.

7. An attachment for earth handling machine having a horizontally disposed blade and a mold board extending upwardly therefrom, including, an elongate vertically disposed resilient shank, a cutting head at the lower end of the shank and projecting below the blade and having a cutting point, and mounting means for the shank including, a pivotal support at the blade and comprising a rotatable saddle and carrying the cutting head end of the shank, and an anchor at the upper portion of the mold board and slidably engaging the upper portion of the shank.

8. An attachment for earth handling machines having a horizontally disposed blade and a mold board extending upwardly therefrom, including, an elongate vertically disposed resilient shank, a cutting head at the lower end of the shank and projecting below the blade and having a cutting point, and mounting means for the shank including, a pivotal support at the blade and comprising a rotatable saddle and carrying the cutting head end of the shank, and an anchor at the upper portion of the mold board and slidably engaging the upper portion of the shank.

9. An attachment for earth handling machine having a horizontally disposed blade and a mold board extending upwardly therefrom, including, an elongate vertically disposed resilient shank, a cutting head at the lower end of the shank and projecting below the blade and having a cutting point, and mounting means for the shank including, a pivotal support at the blade and comprising a rotatable saddle and carrying the cutting head end of the shank, and an anchor at the upper portion of the mold board and slidably engaging the upper portion of the shank.

10. An attachment for earth handling machine hav-
ing a horizontally disposed blade and a mold board extending upwardly therefrom, including, an elongate vertically disposed resilient shank, a cutting head with an opening therethrough at the lower end of the shank and projecting below the blade and having a cutting point, and mounting means for the shank including, a pivotal support at the blade and comprising a bracket with ears projecting therefrom, a retainer pin carried by the ears and engaged in said opening through the cutting head, and a saddle carried in a recess in the bracket and rotatable about the axis of the pin, said head end of the shank having flat bearing engagement with the saddle, and a sliding anchor at the upper end portion of the shank.

11. An attachment for an earth handling machine having a horizontally disposed blade and a mold board extending upwardly therefrom, including, an elongate vertically disposed resilient shank, a cutting head with an opening therethrough at the lower end of the shank and projecting below the blade and having a cutting point, and mounting means for the shank including, a pivotal support at the blade and comprising a bracket with ears projecting therefrom, a retainer pin carried by the ears and engaged in said opening through the cutting head, and a saddle carried in a recess in the bracket and rotatable about the axis of the pin, said cutting head end of the shank having flat bearing engagement with the saddle, and an anchor pivotally engaged with the upper end portion of the shank.

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