Sept. 8, 1970 R. J. BERNOTAS ET AL 3,527,308

RIPPER ATTACHMENT FOR TRACTOR

Filed June 9, 1967 2 Sheets-Sheet 1

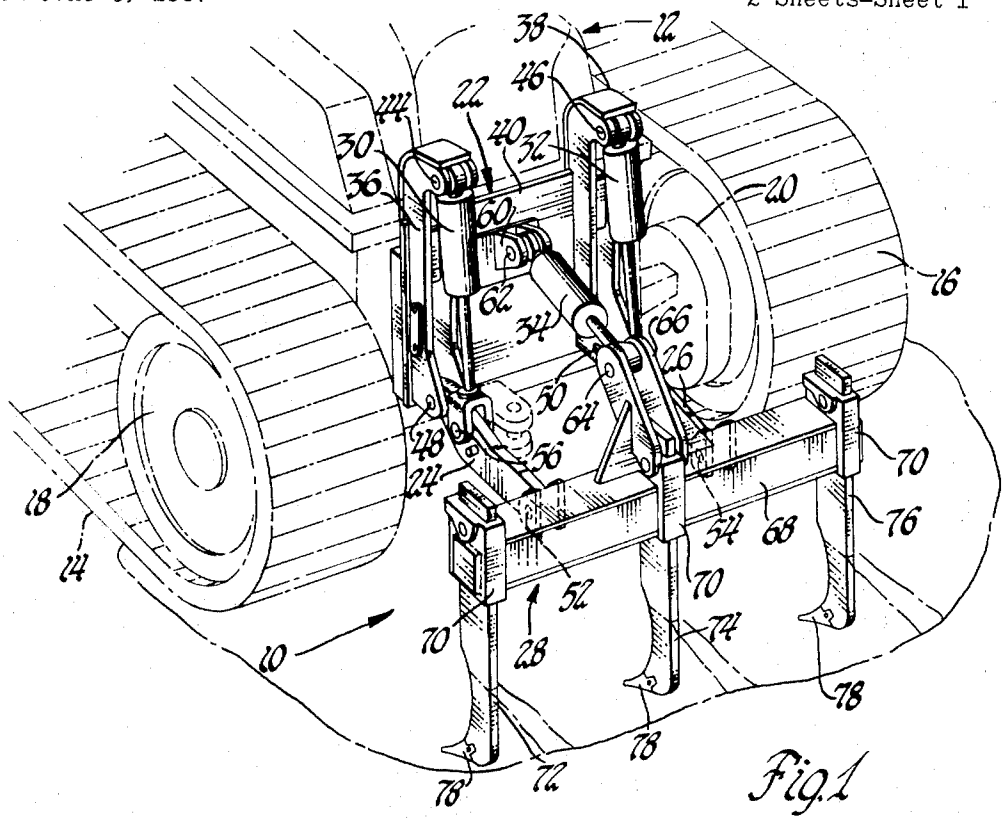



Fig. 1

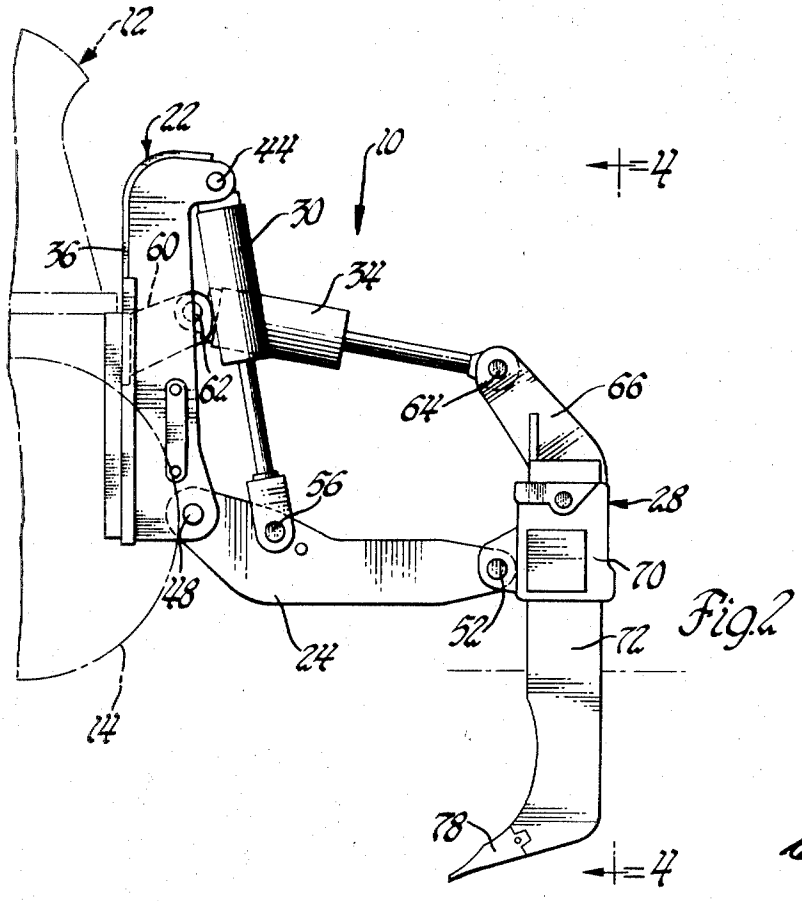



Fig. 2

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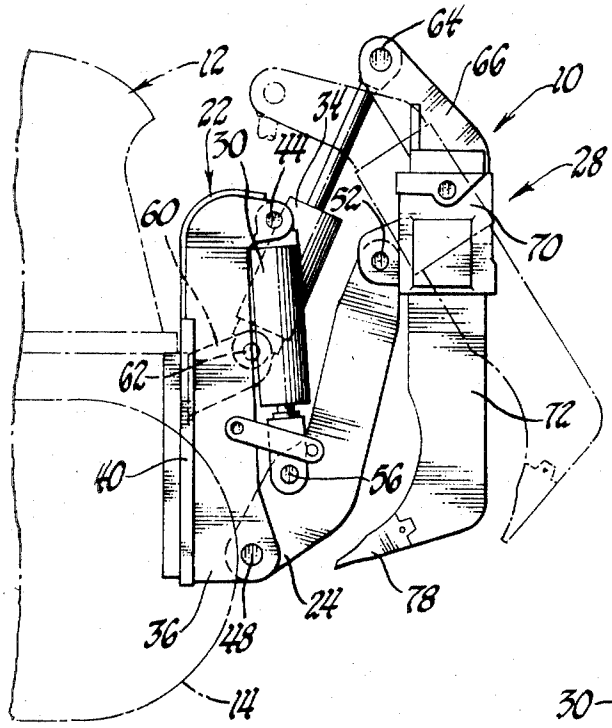



Fig. 3

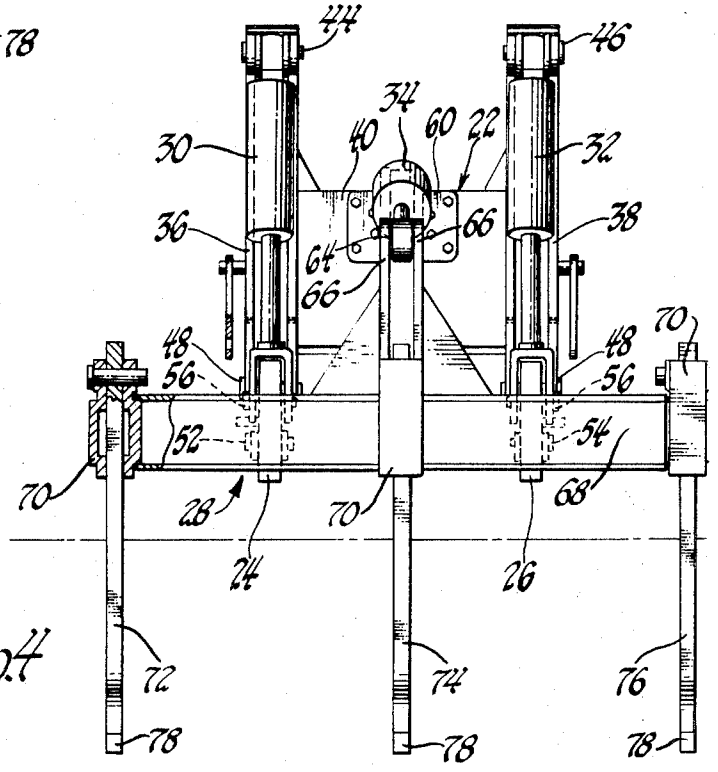



Fig. 4

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# RIPPER ATTACHMENT FOR TRACTOR

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U.S. Cl. 172—464 1 Claim

## ABSTRACT OF THE DISCLOSURE

A ripper attachment having a parallelogram linkage that supports a ripper shank assembly for movement between a raised-carry position and a lowered-rip position. The linkage includes an extensible link which permits the shank assembly to be angularly adjusted about a transverse horizontal axis relative to the ground when located in either of the above-mentioned positions or any positions therebetween.

There are two basic types of rippers presently used with tractors; one being the radial-lift type ripper and the other the so-called parallel-lift ripper. As is well known to those skilled in the art, the radial-lift ripper permits the shank to be raised and lowered through an arc while the parallel-lift ripper incorporates a parallelogram linkage for maintaining the shank in a substantially vertical plane as it moves between a raised and a lowered position.

The parallel-lift type ripper is gaining popularity among contractors because it offers a constant ripping angle for the point and, thus, efficient ripping regardless of the depth of earth penetration. Another advantage of this form of ripper is that the constant angle feature prevents the point from being dragged along the ground prior to reaching penetration depth as in the case of the radial-lift ripper. As a result, point wear is reduced to a minimum when operating abrasive materials such as sandstone.

Although the parallel ripper enjoys the advantages described above, one difficulty with this type of device is that during a raising operation, the point moves toward the tractor and can therefore wedge large slabs, boulders, or the like, between the rear of the tractor and the point. Another drawback has been the inability of the operator to vary the angle of the point and therefore determine the optimum ripping angle for the type of material being ripped.

Accordingly, the objects of the present invention are to provide a parallel-lift ripper having a point that can be angularly varied during a ripping operation; to provide a ripper having a linkage arrangement that permits the ripper to assume a desired ripping angle and maintain substantially such angle while being lowered to penetration depth; to provide a linkage for a parallel ripper that includes means for moving the ripper tooth away from the tractor while at penetration depth; and to provide a parallelogram linkage for a ripper having one link thereof that can be varied in length and thereby cause the point to change its angular relationship while maintaining a constant ripping depth.

Other objects and advantages of the present invention will be more apparent from the following detailed description when taken with the drawings in which:

FIG. 1 is a perspective view showing a ripper attachment made in accordance with the invention and secured to the rear of a crawler tractor;

FIG. 2 is an elevation view of the ripper attachment shown in FIG. 1 and shows the latter in the lowered-rip position;

FIG. 3 is a view similar to FIG. 2 but shows the ripper attachment in the raised-carry position, and

FIG. 4 is an end view taken on line 4—4 of FIG. 2.



Referring to FIG. 1, a ripper attachment **10** made in accordance with the invention is shown rigidly secured to the rear end of a crawler tractor **12** having the usual endless tracks **14** and **16** respectively entrained about driving sprockets **18** and **20**. The ripper attachment **10** comprises, in general, a mounting frame **22** which pivotally supports a pair of laterally spaced arms **24** and **26** which, in turn, are pivotally connected to and support a shank assembly **28**. A pair of double-acting hydraulic jacks **30** and **32** are connected between the mounting frame **22** and the arms **24**, **26** for purposes of moving the shank assembly **28** between a lowered-rip position, as shown in FIG. 2, and a raised-carry position as shown in FIG. 3. A third double-acting hydraulic jack **34** extends between the central portion of the frame **22** and the shank assembly **28** for varying the angular relationship of the latter with respect to the ground about a transverse horizontal axis in a manner to be described in detail hereinafter.

More specifically, the mounting frame **22** includes a pair of upstanding brackets **36** and **38** rigidly connected to a rectangular mounting block **40** which is adapted to be secured through bolts or the like to the tractor. Both of the brackets **36** and **38** are identical in form and comprise a pair of spaced plates, the upper ends of which extend rearwardly to provide transversely aligned pivotal connections **44** and **46** for respectively supporting the cylinder ends of the double-acting jacks **30** and **32**. The lower ends of the respective brackets pivotally support the forward ends of the arms **24** and **26** for movement about a transverse horizontal axis passing through pivotal connections **48** and **50**. The arms **24** and **26** extend rearwardly from the points **48** and **50** for pivotal attachment with the shank assembly **28** and serve to support the latter for rotational movement about a horizontal axis passing through the pivotal connections **52** and **54**. It will be understood that although the arms **24** and **26** are shown to be independently supported by the brackets, they are intended to operate together and therefore could be interconnected through a cross member if so desired. Moreover, it will be noted that the piston rod portions of the jacks **30** and **32**, respectively are connected to the arms **24** and **26** at intermediate points thereof by pivotal connections **56** and **58**.

As shown in FIGS. **1**, **2**, and **4**, a support ear **60** is rigidly connected to the mounting block **40** between the brackets **36** and **38**. The support ear **60** is provided with a pivotal connection **62** which serves to support the cylinder end of the hydraulic jack **34** which extends rearwardly for pivotal connection at a point **64** with a forwardly projecting flange **66** secured to the shank assembly **28**.

The shank assembly **28** consists of a transversely extending box section or beam **68**, the end portions and central portion of which are formed with identical pockets **70** which serve to fixedly support shanks **72**, **74**, and **76**. The lower ends of the shanks are provided with the usual detachably mounted ripper tooth or point **78**.

It should be apparent from the above description that by expansion or contraction of the jack **34**, the shank assembly **28** can be angularly adjusted about the aligned about the aligned pivotal connections **52** and **54** with the support arms so as to vary its relationship with the ground. Moreover, during operation, the shank assembly **28** can be moved from the raised-carry position of FIG. 3 to the lowered-rip position of FIG. 2 by expanding

the jacks **30** and **32**. In this connection and assuming the jack **34** is in the full line position of FIG. 3, the shanks **72**, **74**, and **76** will move downwardly in a substantially vertical plane extending transversely of the tractor until the penetration depth of FIG. 2 is realized. During such time the driving power of the tractor will cause the ripper tooth to rip the material at the established depth and, when the ripping operation is completed, the shank assembly **28** may be raised out of the ground by contracting the cylinders **30** and **32**. If, however, difficulty should occur in removing the shanks from the ripped material as, for example, due to the ripper point encountering a boulder or the like, the jack **34** may be contracted so as to cause the shank assembly **28** to pivot counterclockwise, as seen in FIG. 2, about its pivotal connections **52** and **54** with the support arms **24** and **26**. By so doing, the ripper tooth **78** moves rearwardly and thereby facilitates removal of the ripper shanks from the ground. In the embodiment shown in FIG. 2 of the drawings, the extensible link or jack **34** is of a size which provides for rearward movement of the ripper tooth **78** only. However, it will be understood that forward or clockwise movement of the tooth **78** could be accomplished by increasing the stroke of the jack.

Finally, it will be noted that FIG. 3 shows another feature of the present invention; namely, the ability of the shank assembly **28** to have its position varied prior to being lowered into the ground. In other words, by contracting the jack **34**, it is possible to move the upper end of the shank assembly **28** counterclockwise about its pivotal connection with the arms and thereby provide an increase in angular penetration of the ripper tooth as seen in phantom lines.

Various changes and modifications can be made in this construction without departing from the spirit of the invention. Such changes and modifications are contemplated by the inventors and they do not wish to be limited except by the scope of the appended claim.

We claim:

**1.** A ripper attachment for a tractor, comprising a mounting frame adapted to be secured to the rear of the tractor, said frame including upstanding bracket means at either side thereof, support arm means pivotally connected at one end to the lower end of each of the bracket means, a beam member pivotally supported by the opposite ends of said support arms for movement about a transverse horizontal axis, a plurality of ripper shanks supported by said beam member forming a beam and shank assembly, a first double acting hydraulic jack located above the support arm means and substantially parallel thereto, means pivotally connecting one end of said hydraulic jack to said mounting frame, a bracket member secured to said beam member, means pivotally connecting the other end of said hydraulic jack to said bracket member, said hydraulic jack adapted to be expanded and contracted when the tractor is moving and during a ripping operation to cause the beam member and the ripper shanks to vary their angular relationship about said axis with the surface of the ground, a pair of second double-acting hydraulic jacks each being directly pivotally connected between an upper end of said upstanding bracket means and an intermediate portion of said support arm means for raising the beam and ripper shank assembly to raised-carry position and for forcing the beam and shank assembly into the earth while moving to a lower-rip position, said beam and ripper shank assembly being maintained in a vertical plane when said first hydraulic jack is extended and said second hydraulic jacks are operated to raise and lower said beam and shank assembly whereby upon lowering said ripper shanks directly engage the earth, retraction of said first double-acting hydraulic jack rotating said ripper shanks counterclockwise to provide for release of any objects engaged between the shanks and the tractor during raising thereof.




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