

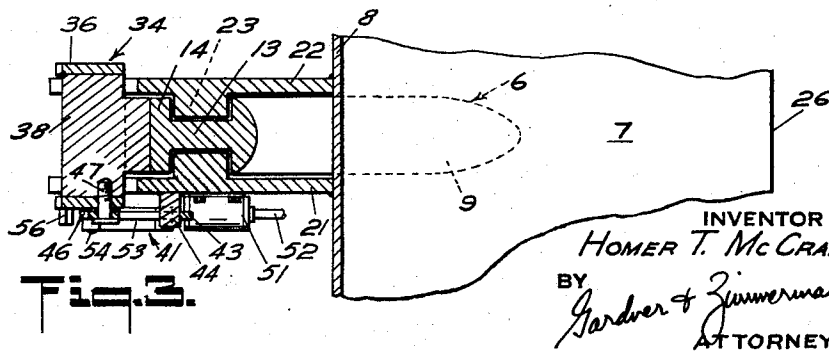
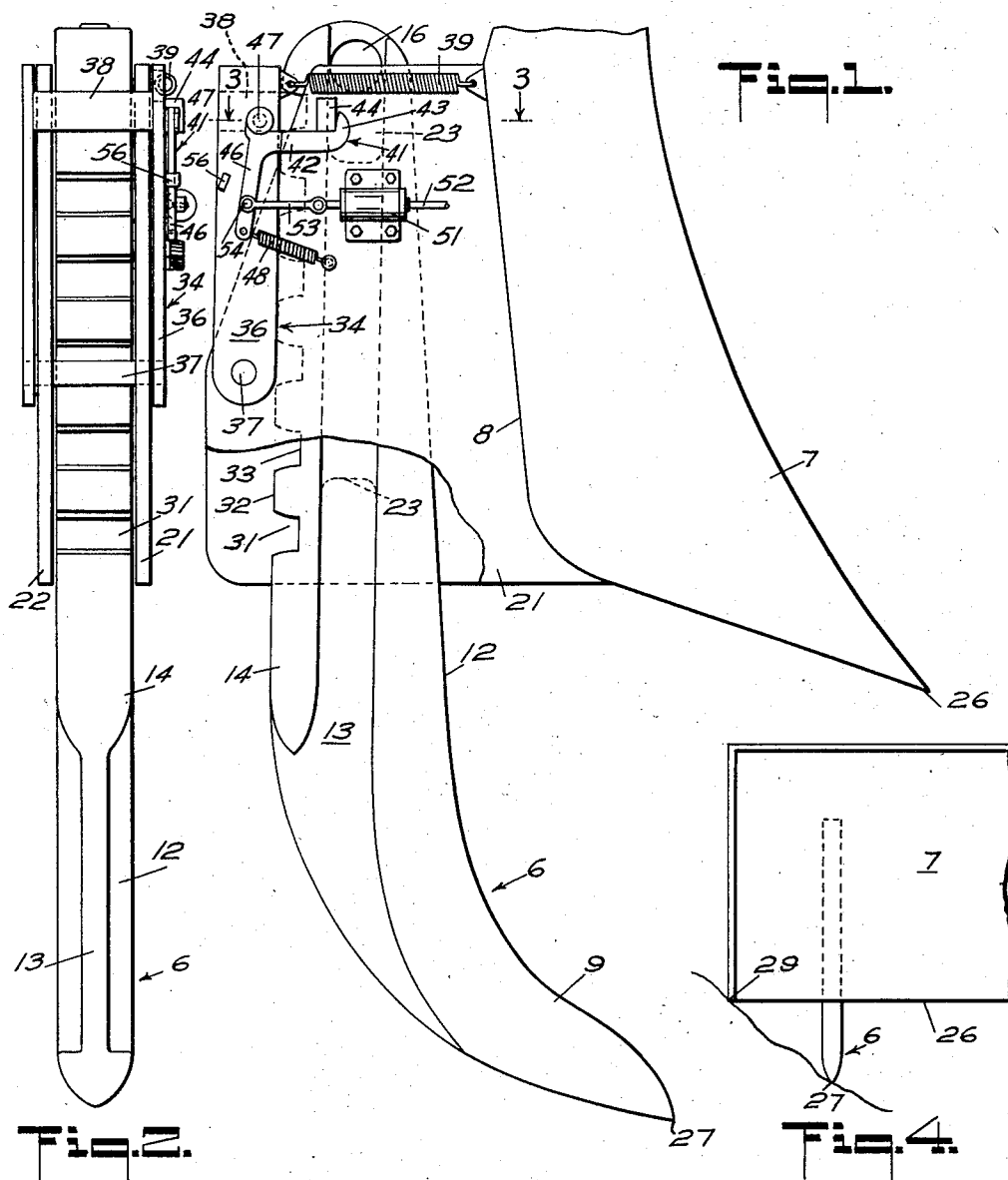
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RETRACTABLE RIPPER TOOTH

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RETRACTABLE RIPPER TOOTH

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This invention relates to a ripper tooth, and more particularly to a ripper tooth adapted for mounting on a bulldozer blade.

As is well known in the art, ripper teeth are used for breaking up hard dirt or clay, commonly referred to as hard pan, digging out rocks, roots and the like, or performing other jobs which a bulldozer or similar equipment cannot adequately perform or which would tend to injure the bulldozer blade or such other equipment.

It is an object of the present invention to provide a ripper tooth which is vertically adjustable so that the action of the tooth on or relative to the ground may be better controlled.

Another object of the invention is to provide a ripper tooth of the character described which may be readily raised and lowered into selected positions of vertical adjustment without requiring any manual effort.

A further object of the invention is to provide a ripper tooth as above defined which is adapted for mounting adjacent the rear surface of a bulldozer blade whereby the respective individual or combined functions of the tooth and blade may be available on a unitary piece of equipment, and in which the tooth may be selectively positioned in an operative or inoperative position.

A still further object of the invention is to provide apparatus of the character described in which the ripper tooth is positioned relative to the bulldozer blade so that the slope or gauge of the earth may be readily controlled.

Yet another object of my invention is to provide a ripper tooth arrangement which is positively locked in selected positions of vertical adjustment and which may be readily released to permit movement of the tooth to such positions.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a side elevational view of the front end of a bulldozer equipped with the ripper tooth of the present invention.

Figure 2 is a rear elevational view of the ripper tooth.

Figure 3 is a cross-sectional view taken substantially in the plane indicated by line 3—3 of Figure 1.

Figure 4 is a front elevational view diagrammatic in character of a bulldozer blade and associated ripper tooth.

The ripper tooth of my invention, generally indicated by the numeral 6 in the drawing, is shown and will be described in cooperative relationship with a bulldozer and its blade 7, but it will be apparent that the tooth

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structure could likewise be positioned on a separate piece of moving equipment, such as a tractor or the like, without departing from the scope of this invention.

One of the reasons for providing the tooth on a bulldozer is to permit the combined action of the normal tooth functions and those of the bulldozer. Heretofore when a ripper tooth was mounted on a bulldozer blade, the tooth was fixed in position with the lower end thereof extending below the lower edge of the blade. With the tooth attached in such a manner, it is impossible to utilize the bulldozer blade for its normal operations without first removing the tooth. Thus, as will be presently described, the tooth 6, although carried on the blade 7, is capable of being raised and lowered relative to the blade so that it may be lowered into an operative position when the tooth is to be used, and conversely raised into an inoperative position above the lower edge of the blade when conventional bulldozing operations are to be effected.

As here illustrated, the tooth is mounted on the rear surface 8 of the bulldozer blade 7, and is preferably constructed of a modified I-beam cross-sectional form. The form offers large strength, and permits the forward curving of the lower end 9 of the tooth at the low stress points. Also, as will be presently explained, this construction lends itself particularly well to the means for supporting the tooth as well as for locking the same in selected positions of vertical adjustment.

The tooth, with the exception of the curved lower end 9, is substantially vertically disposed with a leading edge flange 12, a central web 13, and a trailing edge flange 14. The upper end of the web may be provided with an aperture 16 which permits engagement of the tooth by a hook or the like in installing or removing the tooth from the bulldozer.

Extending rearwardly from the blade 7 is a pair of support plates 21 and 22 disposed in parallel spaced relation to each other, said plates being provided with directly opposed lugs 23 for fitting into the recesses formed between the flanges and web on each side of the tooth. As will be clear from Figure 3 of the drawing, the lugs are positioned to substantially prevent all but vertical movement of the tooth and actually serves as a guide for such movement.

The drawing illustrates the tooth in a lowermost position, with the lower ripping end thereof positioned substantially below the lower edge 26 of the blade 7. The tooth is what might be termed in operative position so long as the distal end 27 thereof is lower than the blade edge 26. When said blade end is vertically higher than such edge, the tooth serves no function and will not interfere with the normal uses of the bulldozer blade, being completely hidden behind the same. However, the vertical spacing between the blade edge 26 and the tooth tip 27, when the tooth is in operative position, is most important, as the control of the spacing may be utilized to gauge or control the ground slope by using a combination of tooth vertical adjustment and its fixed horizontal spacing from its adjacent tip 29 of the bulldozer blade.

This latter use is illustrated in Figure 4 of the drawing.

In accordance with the foregoing, means are provided for selectively varying such vertical spacing from zero to the maximum shown in the drawing, and for positively maintaining the tooth in such selected positions. Obviously, any hydraulic system could be utilized for raising and lowering the tooth, but as the illustrated environment for the tooth includes a bulldozer blade which is itself vertically adjustable (as is well known in the art); I prefer to utilize the vertical movability of the blade to provide the means for raising and lowering the tooth. This is accomplished by virtue of the sliding fit between

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the lugs 23 and the tooth. Thus, assuming the tooth tip 27 is resting on the ground, and in absence of any locking means which will be presently described, raising of the blade will leave the tooth stationary and increase the vertical spacing previously discussed. Contra movement or lowering of the blade will reduce such spacing.

In association with the foregoing, means are provided which secures the tooth to the blade at selected positions of relative vertical adjustment. As here shown, the rearmost edge of tooth flange 14 is formed in the nature of a vertically extending rack 31 having the usual alternate teeth 32 and sockets 33. A latch member 34 is arranged to cooperate with the selected teeth and sockets therebetween, and is formed of a pair of generally vertical parallel arms 36, pivotally attached adjacent their lower ends to the support plates 22 and 23 by means of a pin 37. The upper ends of the arms are secured together by a cross bar 38, the latter having a cross-sectional form permitting it to mesh in selected ones of the rack sockets 33. Thus, with the latch 34 positioned as illustrated in the drawing, the interfitting of the bar 38 thereon will positively resist any movement of the tooth relative to the blade. A spring 39 having one end connected to the upper end of one of the arms 36 and its other end connected to the blade 7 serves to yieldingly maintain the latch in its rack engaging position.

To insure such engagement, I provide a latch lock 41 in the form of a bell crank, one arm 42 thereof having a hook-like projection 43 for engagement with a latch lock lug 44 mounted on plate 21. The arm 46 on the other side of a pivot pin 47, by means of which the lock 41 is pivotally attached to the latch 34, is normally urged in a counterclockwise direction (as seen in Figure 1) by a spring 48, so that the projection 43 will engage the lug 44.

Thus, it will be seen that by virtue of the springs 39 and 48, the bar 38 will engage the rack, and will be maintained in such position by action of the interengagement of the latch lock projection 43 and lug 44.

Means are provided to effect a release of the latch lock and latch so as to permit tooth movement relative to the blade. Such means includes a piston 51 actuated through a hydraulic conduit 52. A piston rod 53 is pivotally connected to latch lock arm 46 by a pin 54, and release of the parts is effected in the following manner. Extension of the piston will move the latch lock in a clockwise direction about its pivot 47 until the arm 46 engages a stop lug 56 carried on latch arm 36. This movement is sufficient to release the latch lock from lug 44. Further piston movement results in counterclockwise rotation of the latch 34 about its pivot 37 and disengagement of its cross-bar from the tooth rack.

From the foregoing, it will be understood that if the blade 7 and tooth 6 are both in a raised position, piston actuation will permit a gravital dropping of the tooth. Release of hydraulic pressure at any time will permit the springs 39 and 48 to return the latch and latch lock to their normal locking position and hold the tooth in fixed relation to the blade.

What is claimed is:

1. Apparatus of the character described comprising a longitudinally extending ripper tooth, a pair of relatively fixed vertical members positioned substantially immediately adjacent opposed sides of said tooth restricting lateral movement thereof, means on said members restricting lateral planar movement in a direction normal to said first mentioned movement, a rack gear provided on one end surface of said tooth, a latch member, means pivotally attaching said latch member to said fixed members, means normally urging said latch member into engagement with said rack gear, and fluid actuated means operable to disengage said latch member from said rack gear.

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2. Apparatus as set forth in claim 1 in which said tooth is of a generally I-shaped cross-sectional form, and said fixed members and said means thereon are seated within the opposed surfaces of said tooth.

3. Apparatus as set forth in claim 1 including a latch lock normally maintaining said latch member in rack gear engagement, and in which said fluid actuated means upon operation first releases said lock from said latch member prior to moving the latter out of rack gear engagement.

4. Apparatus of the character described comprising a longitudinally extending ripper tooth, a pair of relatively fixed members positioned adjacent opposed sides of said tooth restricting lateral movement thereof, means on said members restricting lateral planar movement in a direction normal to said first mentioned movement, a rack gear provided on one end surface of said tooth, a latch member, means pivotally attaching said latch member to said fixed members, means normally urging said latch member into engagement with said rack gear, a latch lock having a pair of normally disposed arms and pivoted intermediate said arms to said latch member, a first lug carried on one of said fixed members and engageable by one of said latch lock arms, a second lug carried on said latch member adjacent the other of said latch lock arms, and means for rotating said latch lock about its pivot to disengage said first lug and effect engagement of said second lug for rotating said latch member to release the same from said rack gear.

5. Apparatus as set forth in claim 4 including spring means for urging said latch lock into engagement with said first lug.

6. In a bulldozer having a generally vertically disposed and movable blade, a vertically movable ripper tooth positioned adjacent the rear surface of said blade and provided with longitudinally extending grooves in the opposed sides thereof, a guide member mounted on said blade including a pair of elements positioned adjacent opposed sides of said tooth and having opposed portions extending into said grooves for relative sliding movement therebetween for guiding said vertical tooth movement and preventing lateral movement of said tooth, rack means carried on the rear side of said tooth, a latch member pivotally mounted on said guide member and having a rack tooth engaging element engageable with said rack means for locking the latter in selected positions of vertical relationship relative to said blade, means resiliently urging said latch member engaging element into engagement with said rack means, and latch release means operable from a spaced distance from said blade and said tooth for releasing said latch member from engagement with said tooth whereby said blade and said tooth may be vertically moved relative to each other.

7. Apparatus as set forth in claim 6 including means for locking said latch member in rack engaging relation, and hydraulic means for releasing said locking means and moving said latch member out of rack engagement.

References Cited in the file of this patent

UNITED STATES PATENTS

694,351	Chappel	Mar. 4, 1902
1,072,313	Conte	Sept. 2, 1913
2,042,196	Senz	May 26, 1936
2,246,787	Dall	June 24, 1941
2,246,793	Dall	June 24, 1941
2,475,710	McCauley	July 12, 1949
2,486,372	Rockwell	Oct. 25, 1949
2,657,914	McMahon	Nov. 3, 1953

FOREIGN PATENTS

38,000	Denmark	Sept. 19, 1927
991,748	France	June 27, 1951