This invention relates to a ripper tooth assembly that is particularly adapted for effecting separable connection of a hardened soil-ripping point or tooth and the operative end projection or toe of a ripper shank or the like.

An object of the present invention is to provide novel and improved means carried by the shank in the toe thereof that has firm locking engagement with a replaceable and/or reversible tooth, the locking engagement being effected simply by driving the tooth onto the shank toe, and separation by depression of the means while simultaneously driving the tooth from the toe.

Another object of the invention is to provide means, as above characterized, that by imposing a resilient lateral bias on the tooth retains the same in position to absorb shocks which may result from encounters with stones and rocks in the soil being ripped by the tooth.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The objects above are realized in a construction having a spring detent action that separably connects a tooth to the toe of a shank or tire. A detent member is resiliently carried in a recess in one side of the shank toe, the same normally projecting from the side of the toe. The same has a latching or locking projection that, as the tooth is driven in position, snaps into a recess in a wall of the tooth, thereby effectively holding the tooth on the tire. By applying a bar or like tool to the exposed face of the detent member, and while pressing it in an inward direction applying a force against the inner end of the tooth in a direction to dislodge the same from the toe, the tooth is readily removed from the shank toe.

Such simple manners of assembly and removal greatly facilitate reversal of teeth that are formed for deeper or shallower soil ripping as required.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description and which is based on the accompanying drawings. However, said drawing merely shows, and the following description merely describes, one embodiment of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

FIG. 1 is a broken side elevational view of the toe of a shank or the like, with a replaceable and reversible tooth held in operative position on said toe by means according to the present invention.

FIG. 2 is a partial plan and partial sectional view taken on the line 2—2 of FIG. 1.

FIG. 3 is a view similar to FIG. 2, showing the tooth in partly assembled position on the toe.

FIGS. 4 and 5 are enlarged fragmentary cross-sectional views, respectively, on the lines 4—4 of FIG. 3 and 5—5 of FIG. 2.

The toe 10, as is common, may be a forwardly directed extension of a shank, tire or other such device usually mounted on or drawn by a tractor or other towing vehicle in a direction according to the arrow 11. The toe that is shown is provided with an apex 12 from which extend diverging top and bottom faces 13 and 14. As is usual, such a toe is rectangular in cross-section, side faces 15 combining with the faces 13 and 14 to form the four walls of the toe.

As shown in FIG. 1, the ripper tooth 16 is provided with a socket 17 conforming in shape to the toe 10 and adapted to receive said toe and which, by force applied to the ripper edge 18, may be driven onto the toe, as shown in FIG. 1. Certain teeth are symmetrical and do not require to be reversed except for the purposes of equalizing wear on the opposite faces 19 and 20. Other teeth as, for instance, the one that is illustrated, are unsymmetrical in that the faces 19 and 20 are differently formed.

As shown, the former are straight, and the latter are formed to have an angle 21 therein so that the ripper end 22 has a downwardly angled, shallow, ripping direction when the tooth is applied as in FIG. 1, or an upwardly angled, deeper, ripping direction when the tooth is reversed top for bottom. As can be seen, the socket 17 is defined between oppositely angled walls 23 top and bottom, and opposed side walls 24.

According to the invention, one side face 15 of the toe 10 is provided with a longitudinal recess 25 that is deeper at its end 26 that is most remote from the apex 12. As seen best in FIGS. 4 and 5, the upper and lower faces 27 are undercut in that they diverge inwardly. The recess 25 is so located with relation to the apex 12 that its deeper end extends beyond the end edges 28 of the socket walls. This is shown in FIGS. 1 and 2.

The present improvements comprise, generally, a detent unit 29 disposed in said recess 25, and a locking abutment recess 30 formed in the inner face of each side wall 24, and so disposed with relation to said end edges 28 of the tooth socket 17 as to effect operative engagement with the detent 29, if the latter is on the same side.

The detent unit 29 that is illustrated comprises a hardened plate 31 having an end wall 32, and a longitudinal rib 33 centrally between the upper and lower edges of the plate. The latter has a free fit in the recess 25 so it may readily swing or tilt into and out of said recess with the end wall 32 as a fulcrum. A wedge-shaped compressible pad 34 is bonded to the inner face of plate 31 and to the rib 33, its thinner end bonded to the wall 32 and its thicker end residing in the deeper end 26 of the recess 25. A camming dog 35 or like projection is provided on the outer face of the plate 31.

The pad 34 may be formed of any suitable natural or synthetic rubber and its width may be made to have a light friction engagement with the side edges of the recess 25 adjacent to the face 15. Hence, the unit 29 will be frictionally retained in its recess and yet be able to be removed for replacement and to move operatively when being locked in or released from a recess 30.

The side edges of the pad 34 are normally spaced from the undercut faces 27 of the recess 25 into which the same is fitted, and the thickness of pad 34 is such that at least the dog 35 projects laterally from the side face 15 of the toe. It will be clear that when a tooth 16 is pushed onto the toe 10, as in FIG. 3, the dog 35 is engaged by the edge 28 of the socket wall 24 on that side. Said edge will cause cam depression force on said dog and compression of the pad 34 against the sloping bottom wall 25 of the recess. The pad 34 will spread laterally into the undercut portion of the recess, as in FIG. 5, during such compression. When the dog 35 has been fully depressed, the same will be confined in the socket 17 of FIG. 3 until the aligned recess 30 in wall 24 moves into register. Then the elasticity of the pad will force the dog 35 into said recess 30, effecting locking the tooth onto the toe 10. The pressure imposed on the pad 34 is lateral. Therefore, the tooth will be drawn laterally to cause the face 15 of the toe on the opposite side to be drawn into firm contact with the inner face of the socket on said side. Thus, the tooth
3,312,004

16 is firmly yet resiliently held in operative position to minimize shock in use.

A bar or tool 36 applied against the exposed outer face of the plate 31, when struck, will cause said plate 31, by compressing the pad 34, to be depressed so as to cause its dog 35 to be withdrawn from the recess 30 with which it is engaged. Upon such withdrawal, the pressure of the tool 36 against the edge 28 will cause loosening of the tooth 16 from the toe 10 and longitudinal displacement of the tooth from the toe.

The pad 34 represents preferred elastic means against which the detent unit is depressed. Such a unit may be provided on both sides of the toe, but one, as shown, will serve and be easier to pry loose as described.

While the foregoing has illustrated and described what is now contemplated to be the best mode of carrying out the invention, the construction is, of course, subject to modification without departing from the spirit and scope of the invention. Therefore, it is not desired to restrict the invention to the particular form of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. Means to separably connect a ripper tooth to the toe on the operative end of a shank or the like and in which said tooth and shank have laterally engaged faces, the face in the tooth having a locking abutment recess and the face in the toe having a laterally undercut recess, said means comprising:

(a) a detent bar loosely fitted in the undercut recess,
(b) a locking dog having a cam face and extending outwardly from the detent bar,
(c) a compressible elastic pad bonded to the inner face of said bar and engaged with the bottom of the undercut recess, and
(d) an edge on the tooth to engage the cam face of the locking dog, as the tooth and toe are being engaged, to depress said dog and the detent bar, to compress the pad against the bottom of the undercut recess, the pad, when compressed, expanding into the undercut portions of the recess to allow the recess in the tooth to achieve registry with the locking dog which, by expansion of the pad, enters the latter recess to lock the tooth to the toe.

2. Means according to claim 1 in which the detent bar is provided at the end thereof directed toward the end of the toe with a wall that is in end abutment with an end of the undercut recess, said wall and recess end cooperating to form a fulcrum on which the bar is pivotally movable during compression and expansion of the pad.

3. Means according to claim 1 in which a longitudinal anchor rib is provided in the detent bar, the pad having a groove into which said rib is fitted.

References Cited by the Examiner

UNITED STATES PATENTS

1,312,298 8/1919 Bileck 279—77
2,124,230 7/1938 Hommer et al. 37—142
2,546,457 3/1951 Launder et al. 37—142
2,870,667 1/1959 Muriaugh 37—142
3,063,691 11/1962 Osgood 37—142

FOREIGN PATENTS


ANTONIO F. GUIDA, Acting Primary Examiner.
ABRAHAM G. STONE, Examiner.
A. E. KOPECKI, Assistant Examiner.