April 4, 1967 F. A. JOHNSON 3,312,004

RIPPER TOOTH ASSEMBLY

Filed June 1, 1964

Fig. 1.

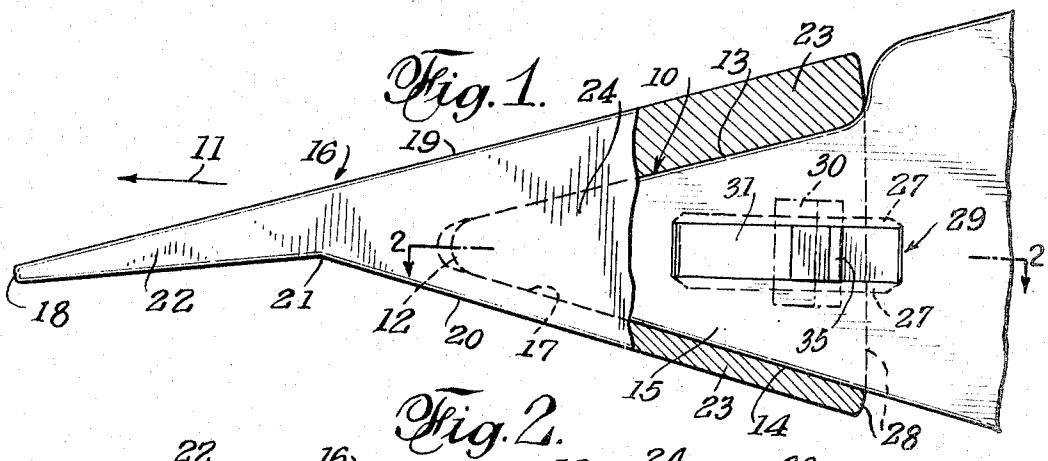


Fig. 2.

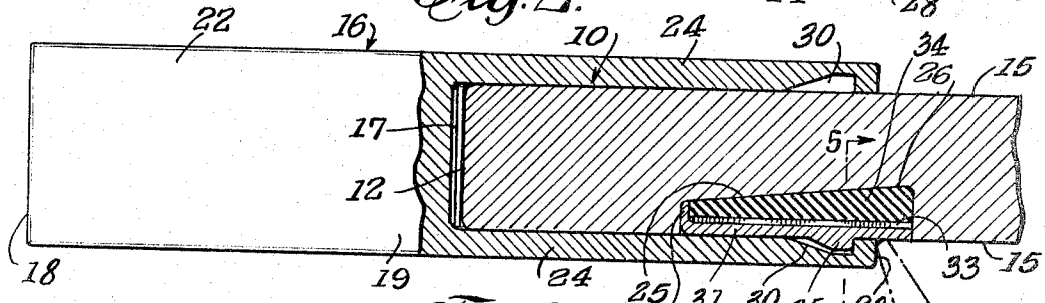


Fig. 3.

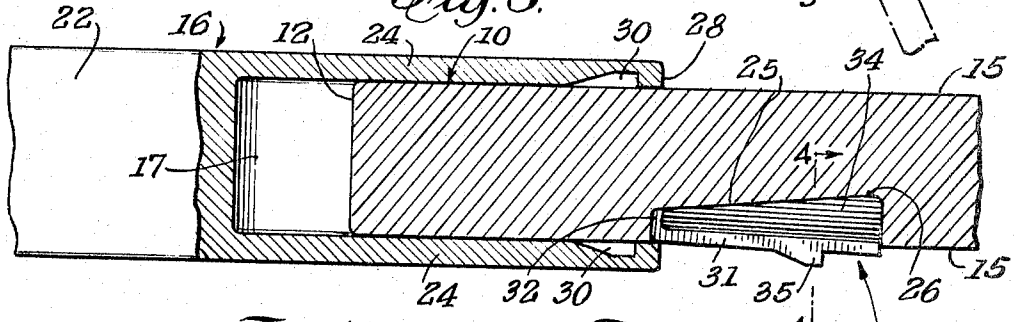


Fig. 4.

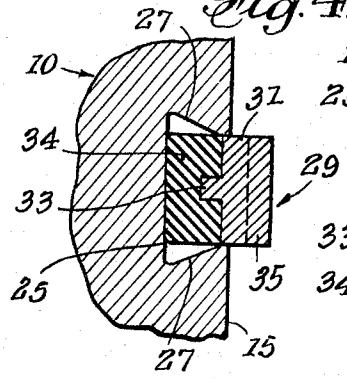
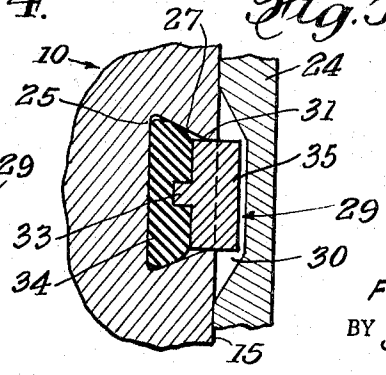


Fig. 5.



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RIPPER TOOTH ASSEMBLY

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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 spring detent action that separably connects a tooth to the toe of a shank or tine. 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 tine. 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 drawing. 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 drawing, 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 taken, 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, tine 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** 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**, effectively 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

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.

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