

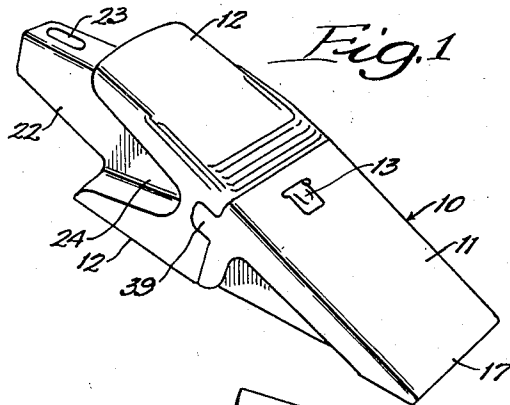
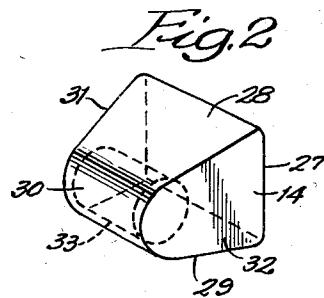
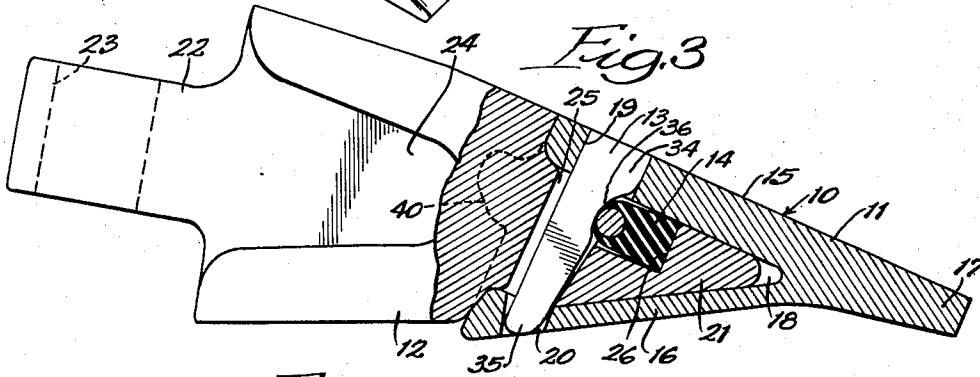
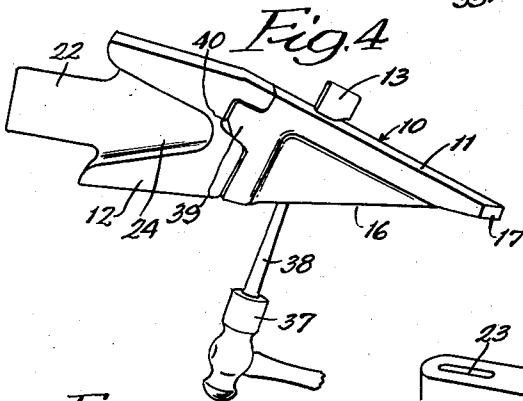
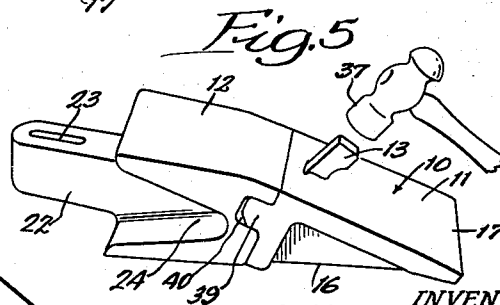
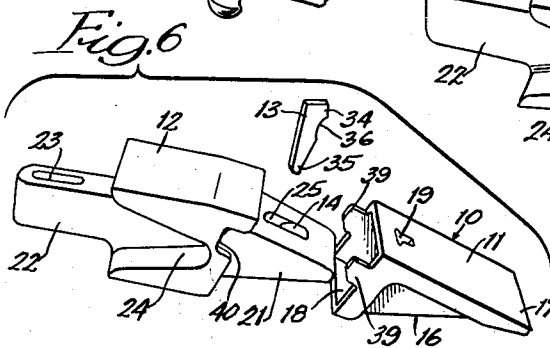
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TOOTH ASSEMBLY

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2,846,790

TOOTH ASSEMBLY

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6 Claims. (Cl. 37—142)

This invention relates to a tooth assembly, and more especially to a tooth assembly comprising an adapter and removable point useful, for example, with dippers, buckets, loaders, etc.

In tooth assemblies having an adapter and a removable point, the adapters are relatively permanent structures secured rigidly to the dipper or bucket, etc. with which they are used, but the points are intended to be replaced from time to time because they become worn through use. Therefore, means are provided for releasably securing the points to the adapters. Efforts are constantly being made to develop improved releasable securing means that are simple, and wherein exchange of points may be accomplished in a minimum of time and with little effort through use of the simplest tools. At the same time, however, such means must provide a suitable anchor-charge of the point upon the adapter—one that is able to withstand the rigorous usage to which tooth assemblies are subjected.

It is, accordingly, an object of this invention to provide a tooth assembly having the desirable attributes set forth hereinbefore. Another object of the invention is to provide a tooth assembly having an adapter, removable point and means for releasably securing the point to the adapter, the assembly having increased resistance to shocks, and particularly those absorbed from the lowest side thereof due to back-slap of the dipper or bucket, etc. on which the assembly is mounted.

Still another object is in the provision of an adapter and removable point, in which a locking pin extending through these members locks the point firmly upon the adapter at both the top and bottom thereof, the pin being arranged so that it can be driven both into and out of its locking position. A further object is in providing an adapter and point assembly of the character described, in which a keeper is used for locking the pin in position, the keeper comprising a tapered, resilient plug having a steel nose imbedded therein for engagement with the pin, the tapered configuration of the keeper serving to prevent it from being inadvertently dislodged during movement of the point onto the adapter. Additional objects and advantages will appear as the specification proceeds.

An embodiment of the invention is illustrated in the accompanying drawing, in which—

Figure 1 is a perspective view of a tooth assembly embodying the invention; Figure 2 is a perspective view of the keeper; Figure 3 is a longitudinal sectional view taken through substantially the longitudinal center line of the tooth assembly; Figure 4 is a perspective view showing the step of removing the locking pin so as to free the point from its position on the adapter; Figure 5 is a perspective view showing the step of driving the locking pin into position; and Figure 6 is a perspective view of the assembly showing the adapter, point and locking pin in spaced apart relation.

The tooth assembly is shown assembled in Figure 1, and is designated generally with the numeral 10. The

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tooth assembly comprises a point 11 and an adapter 12. The point 11 is intended to be releasably secured to the adapter 12, and the means for accomplishing this result is seen best in Figure 3 and includes a locking pin 13 and a keeper 14.

The point 11 may be any of the usual box points that are used in the industry as a part of the tooth assembly for dippers, buckets, loaders, etc., and the exterior configuration of the point may vary somewhat depending on the particular use intended for the point. The point has a relatively flat and straight top wall 15, and a bottom wall 16 that diverges downwardly and outwardly from the top wall 15, but is integral therewith adjacent the forward end of the tooth point, and together said walls provide the sharp or pointed end 17. The point 11 provides a cavity or chamber 18 therein that is defined in part by the top wall 15 and the diverging bottom wall 16, whereby the chamber is generally wedgeshaped. The top wall 15 has an opening 19 therein and the base or bottom wall 16 of the point has an opening 20 therein. The openings 19 and 20 are generally in alignment with each other and are intended to receive the end portions of the locking pin 13 therein, as is seen best in Figure 3.

The adapter 12 is equipped with a tapered nose portion 21 that is generally wedge-shaped, and that is adapted to be received within the chamber 18 provided by the point 11. In the specific illustration set forth in the drawing, the adapter 12 is provided with a rearwardly extending tongue 22 having an elongated opening or passage 23 extending vertically therethrough. The tongue 22 and the passage 23 therethrough are intended to provide a means for rigidly securing the adapter to a bucket or dipper or other similar structure with which the tooth assembly is to be used. It will be appreciated that insofar as the specific invention being considered is concerned, other means may be employed for securing the adapter to a bucket or dipper. If desired, the side wall portions of the adapter 12 may be provided with recesses 24 that are useful in mounting the adapter.

The nose portion 21 of the adapter 12 is provided with an enlarged passage 25 extending vertically therethrough. The passage 25 is generally in alignment with the openings 19 and 20 provided by the point 11, and the longitudinal axis of the passage 25 is substantially normal to the top surface of the nose 21, which in turn is substantially parallel to the wall 15 of the point. The locking pin 13 is adapted to extend through the passage 25, as shown in Figure 3. The nose 21 is also provided with a forwardly extending recess 26 adjacent the upper surface thereof, and that opens into the passage 25. The recess 26 is adapted to receive the keeper member 14 therein, as is shown best in Figure 3.

The keeper or plug 14 has a flat rear wall 27 and converging top and bottom walls 28 and 29 that meet in a rounded forward portion 30. The side walls 31 and 32 of the plug are inclined forwardly and inwardly from the rear wall 27 and toward the rounded forward end 30 of the plug. The keeper or plug is formed from a material that is resilient and that can be compressed slightly, but which provides a substantial force of restoration tending to return the plug to its precompressed shape. The keeper may be formed of a relatively hard rubber, for example. Imbedded in the plug 14 adjacent the rounded forward end portion 30 thereof is a reinforcing member 33 that may be a steel rod.

The locking pin 13 is generally tapered from a relatively large head 34, that has substantially the dimensions of the opening 19 in the wall 15, to a reduced lower end portion 35, that generally fills the opening 20 provided in the wall 16 of the point. Intermediate the ends of the pin 13, a notch or locking groove 36 is formed in one side thereof that is adapted to have the reinforced end

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portion 30 of the plug 14 bear thereagainst when the pin is in its locking position, as is shown best in Figure 3. The notch 36 is effective to prevent inadvertent removal of the pin 13.

The tooth structure 10 may be assembled and disassembled through use of a hammer 37 and driving pin 38, in a manner that will be described hereinafter.

In use of the tooth structure, the adapter 12 will ordinarily be rigidly secured to a bucket or dipper, or to some other similar digging structure. A point 11 is selected to meet the requirements of the particular digging or picking operation, etc that is to be carried out. The keeper member 14 will be positioned within the recess 26 provided by the nose 21, and it will assume the position shown in Figures 3 and 6. The point 11 is positioned so that the cavity 18 therein is aligned with the nose 21 of the adapter. The point is then moved toward the adapter to position the nose 21 within the cavity 18. This operation does not disturb the position of the keeper 14, for as is noted in Figure 3, the inclined top and bottom walls 28 and 29 result in the keeper member retreating from the wall 15 of the point toward the base or rear portion thereof. Thus, there is no engagement of the point with the keeper as the point is being moved into position about the nose 21 of the adapter.

Since the nose 21 and cavity 18 are generally wedge-shaped, a firm and positive positioning of these two members relative to each other is provided. At the same time, the ears 39 that extend rearwardly from the point 11 and on each side thereof are received within the grooves or recesses 40 provided by the adapter 12 on each side thereof. The engagement of the ears 39 with the recesses 40 further contributes to the positive positioning of the point upon the adapter. At this time, the keeper or plug 14 will be subjected to no compressive forces, and the rounded end portion 30 thereof will project slightly into the passage 25 through the nose 21. To firmly lock the point in position upon the adapter, the locking pin 13—and particularly the reduced end portion 35 thereof—is inserted into the passage 25 through the opening 19. In its downward movement, the edge portion of the locking pin having the notch 36 therein will engage the rounded end portion 30 of the keeper 14. Since the keeper is substantially resistive to compression, it will then be necessary to drive the pin 13 further into position, and this may be accomplished by striking the head 34 of the pin as with the hammer 37, as shown in Figure 5 which illustrates this step. The pin 13 will be driven inwardly until the head 34 thereof is substantially flush with the upper surface of the top wall 15 of the point. At this time, the reinforced end portion 30 of the keeper will project into the notch 36 in the locking pin, and will bear thereagainst to rigidly hold the pin in its locking position.

Removal of the locking pin 13 is a simple operation and requires only that the pin be driven upwardly through the passage 25. This may be accomplished by engaging a striking pin 38 with the reduced end portion 35 of the pin and imparting blows to the striking pin in a manner that is illustrated in Figure 4. The lower end portion 35 of the locking pin is accessible for this operation since it is positioned within the opening 20 in the bottom wall of the point. Therefore, access to the pin is readily provided through the opening 20. When the pin is being driven upwardly from the passage 25, there is a tendency for the plug 14 to pivot slightly in a direction that would cause the rounded end portion 30 thereof to follow along with the movement of the pin 13. Such movement, however, is substantially constrained through engagement of the flat rear wall 27 of the keeper with the complementary wall of the recess 26. Any tendency toward pivotal movement, then, would result in a slight compression of the keeper, which would be resisted by the inherent forces therein that tend to maintain it in an unstressed condition. While these forces

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can be overcome readily by striking the pin to move it upwardly through the passage 25, these forces substantially aid in maintaining the pin in its locking position during normal use of the tooth assembly.

The keeper 14 could be bonded to the walls of the recess 26, but we have found it preferable to permit the keeper to sit freely within the recess. Because of the particular construction thereof, there is no tendency for the keeper to become dislodged during the mounting of the point upon the adapter, and since it is not bonded to the walls of the recess it may be replaced with ease after it has been worn through repeated usage. Normally, however, the keeper can be used for long periods without requiring replacing.

The tapered construction of the resilient keeper 14 provides a slight relief, that is, results in an unfilled portion of the cavity defined by the walls of the recess and the top wall 15 of the point. Therefore, no interference or resistance, except from within the plug itself, to compression of the keeper when the locking pin 13 is driven into its locking position, is present.

It is noted particularly in Figure 3 that the locking pin 13 is elongated and provides end portions that are received within the openings 19 and 20 provided in opposite faces of the point 11. This is important for it locks both the top and bottom surfaces of the point to the nose of the adapter and increases the resistance to shocks absorbed from the lower side of the tooth assembly due to back-slap of a shovel dipper or dragline bucket upon which the tooth assembly may be mounted. At the same time, the opening 20 is substantially filled with the reduced end portion 35 of the pin, and dirt and other materials are prevented from entering the opening and from becoming packed solidly therein. The lower end portion of the pin is always available, then, for a striking operation to drive the pin from its position, and to release the point from the adapter.

While in the foregoing specification an embodiment of the invention has been set forth in considerable detail for purposes of illustration, it will be apparent to those skilled in the art that numerous changes may be made in those details without departing from the spirit and principles of the invention.

We claim:

1. In a tooth assembly adapted to be mounted on buckets and the like, an adapter equipped with a tapered nose having a passage extending vertically therethrough, a point having facing diverging walls defining a tapered chamber therein adapted to receive said nose, said facing walls being provided with openings therethrough alignable generally with said passage, a locking pin provided with a notch intermediate the ends thereof and extending through said passage with the ends thereof positioned within each of the respective openings, the top wall of said nose having a forwardly extending recess therein opening into said passage, and a resilient keeper member positioned within said recess and only partially filling the same and being adapted to bear against said pin at the notched portion thereof, said keeper member having tapered top and bottom walls converging toward said pin, said keeper member having also a hardened reinforcing member horizontally embedded therein adjacent the end thereof adapted to bear against said pin.

2. The structure of claim 1 in which said openings are of different size, and in which the end portions of said pin are receivable within said openings and substantially fill the same.

3. A tooth assembly of the character described, comprising an adapter equipped with a nose portion and a point provided with a chamber adapted to receive said nose portion therein, said nose portion having a passage extending vertically therethrough and said point having openings in the top and bottom walls thereof aligned generally with said passage, a pin adapted to extend through said passage for locking said point upon said

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adapter, said nose portion being provided with a recess in the top wall thereof opening into said passage, and a tapered resilient keeper positioned in said recess, said keeper having tapered top and bottom walls providing room for said keeper to move vertically in said recess and having an end portion of reduced cross-section engageable with said pin for locking the same within said passage, said reduced end portion being equipped with a hardened reinforcing member.

4. In a tooth assembly of the character described having an adapter equipped with a nose portion and a point provided with a chamber adapted to receive said nose portion therein, said point providing the forward portion of said tooth assembly, said nose being provided with a passage extending vertically therethrough and said point being provided with openings in the top and bottom walls thereof generally alignable with said passage, a locking pin extending through said passage and openings for securing said point in position upon said adapter, the top wall of said nose portion being provided with a forwardly-extending recess therein opening into said passage, an inner portion of said point providing a top wall for said recess, and a rearwardly-tapering resilient keeper member freely positioned in said recess and being equipped with a hardened reinforcing member embedded therein adjacent the end thereof having the smaller dimension, the top wall of said keeper and the top wall-providing inner portion of said point diverging in the direction of said pin to permit vertical movement of said keeper in said recess, said keeper member being engageable with said locking pin to confine the same in position within said passage and openings.

5. The structure according to claim 4, in which said locking pin is provided with a notch in an edge portion thereof adapted to receive the reinforced end of said keeper member therein, the said openings in said point

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being of different size, and in which said pin is generally tapered and provides end portions that substantially fill said openings.

6. A tooth assembly of the character described, comprising an adapter equipped with a nose portion and a point provided with a chamber adapted to receive said nose portion therein, said nose portion having a passage extending vertically therethrough and said point having openings in the top and bottom walls thereof aligned generally with said passage, a pin adapted to extend through said passage for locking said point upon said adapter, said nose portion being provided with a recess in the top wall opening into said passage, an inner portion of said point providing a top wall for said recess, and a tapered resilient keeper positioned in said recess, the top wall of said keeper and the top wall-providing inner portion of said point diverging in the direction of said pin, permitting vertical movement of said keeper in said recess, said keeper having an end portion of reduced cross-section engageable with said pin for locking the same within said passage, said reduced end portion being equipped with a hardened reinforcing member.

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