Sept. 23, 1930. E. C. BAUER 1,776,676

DIPPER TOOTH

Original Filed Aug. 29, 1928 2 Sheets-Sheet 1

Fig. 1.

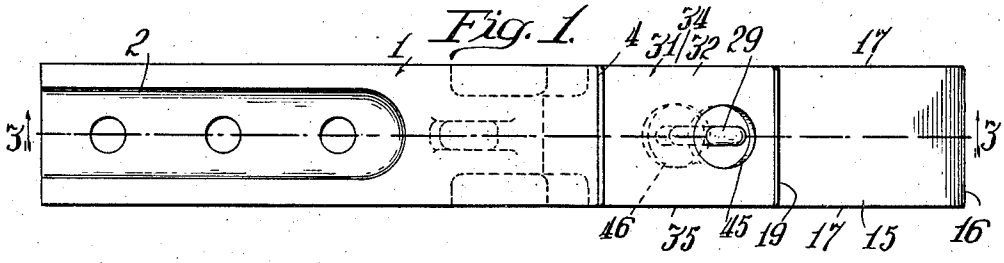


Fig. 2.

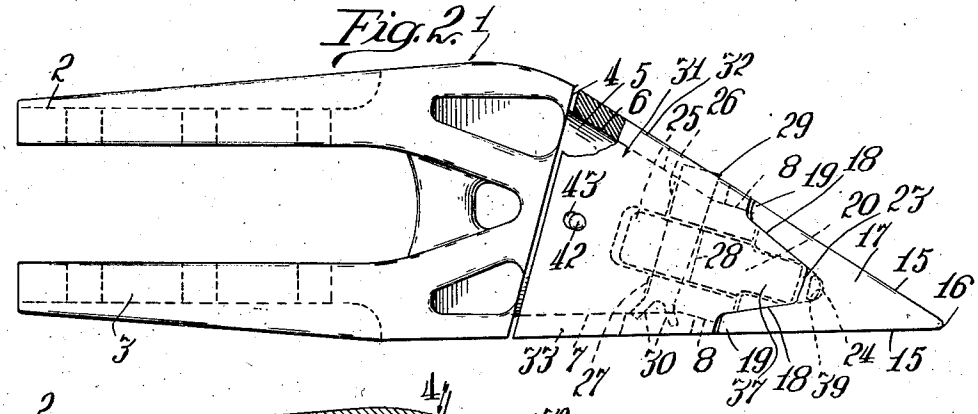


Fig. 3.

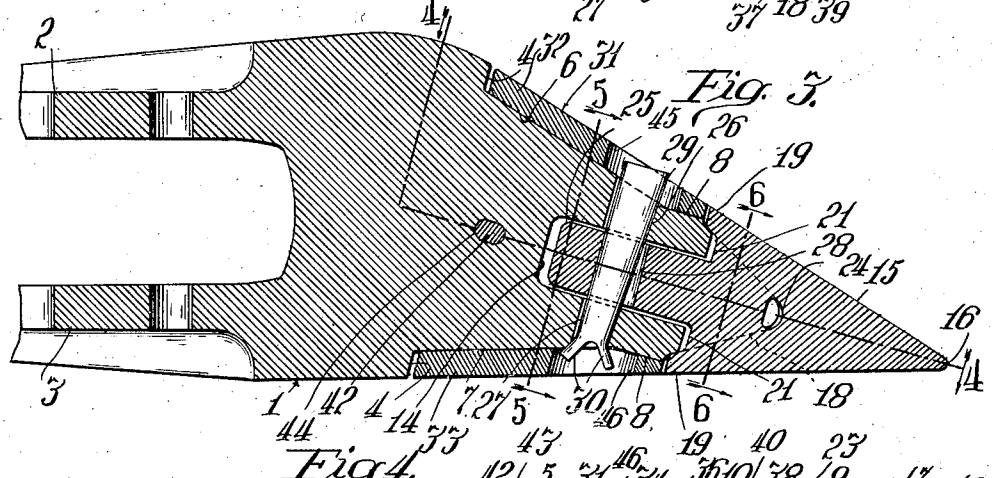
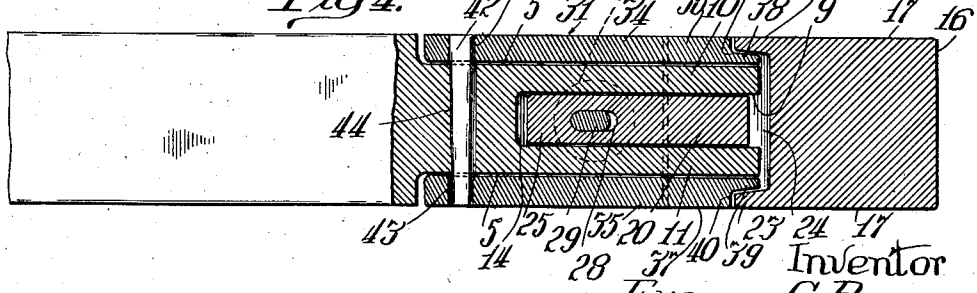


Fig. 4.



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Original Filed Aug. 29, 1928 2 Sheets-Sheet 2

Fig. 7.

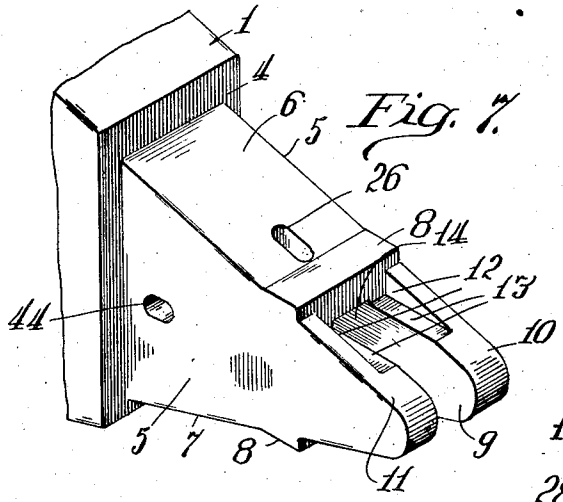


Fig. 9.

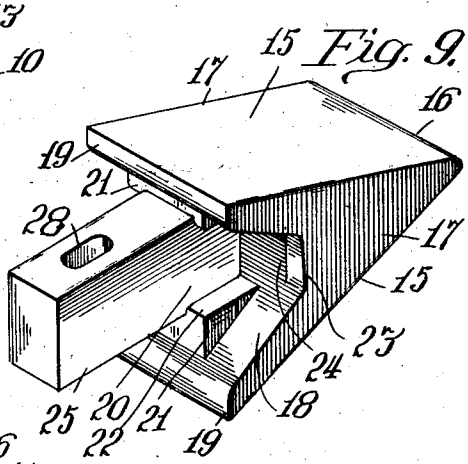


Fig. 8.

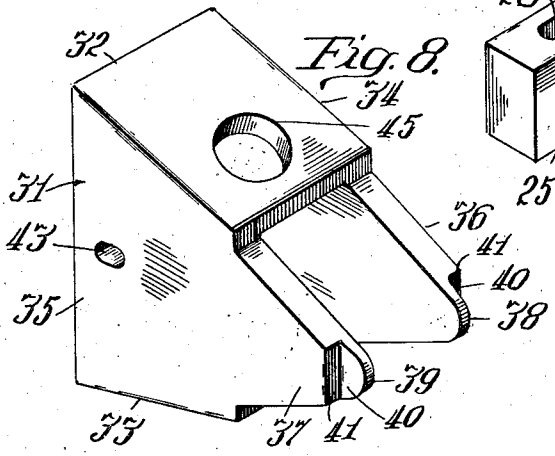


Fig. 5.

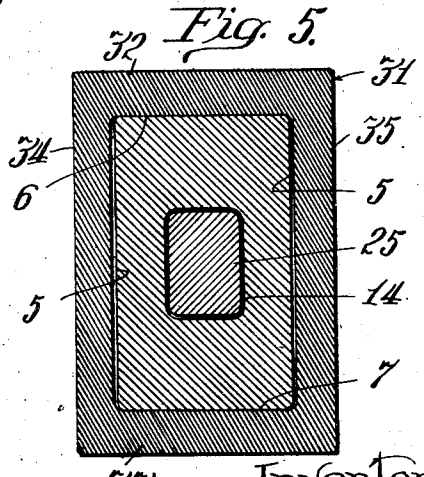
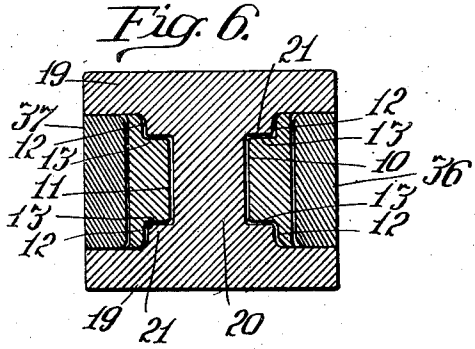


Fig. 6.



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UNITED STATES PATENT OFFICE

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DIPPER TOOTH

Application filed August 29, 1928, Serial No. 302,680. Renewed July 18, 1930.

This invention relates to a new and improved dipper tooth for excavating buckets, and more particularly to a tooth including a permanent base portion, a removable and reversible point therefor, and a removable and reversible protecting member for that portion of the base adjacent the point.

The point of the dipper tooth, which performs the greater portion of the digging operation, is subject to considerable wear, is usually made as a separate removable part so that it may be renewed, and is also often made reversible. The part of the base adjacent to the point is also subject to wear, and it is necessary to replace bases after they have become worn. It has also been necessary to make the removable points excessively long in order to accept most of the wear on the point and reduce the wear on the base to a minimum. According to the present invention, a protector sleeve is mounted around that portion of the base adjacent the point, this sleeve being removable, reversible, and renewable when worn, the same as the point. Practically all of the wear is accepted by the removable point and the removable sleeve so that the base becomes practically a permanent installation on the dipper. With this protecting sleeve installed, it is possible to use a much smaller point or tip, so that the cost of renewing this portion of the tooth is much reduced. The wear on the sleeve will be much less than the wear on the point, and the sleeve may also be renewed, but at much less frequent intervals than the point.

In the particular form of tooth here shown by way of example, the assembled base, sleeve and point form a continuous wedge which tapers to a forward cutting edge. The tapered base is reduced or recessed to receive the sleeve, and terminates in a wedge-shaped nose, the sides of which converge more rapidly than the sides of the tooth, the nose being bifurcated at right angles to the wedge to form two similar forwardly projecting arms. The protecting sleeve fits around the four sides of the reduced portion of the base, and is provided with opposite parallel forwardly projecting side arms which cover the side arms of the nose and conform thereto. The end portions of these side arms of the sleeve are cut away externally so as to leave inner projections which are received in pockets formed in the point so that the spreading of the arms of the base and sleeve is prevented. The wedge-shaped point is cut away at the sides to receive the arms of the nose and sleeve, leaving jaw portions at the diverging sides of the wedge which engage the upper and lower sides of the wedge-shaped arms of the nose and sleeve. A web connects the jaw portions, this web being received in the space between the arms of the nose. A tongue projects rearwardly as a continuation of this web, the tongue being received in a central recess formed in the base, and wedge-shaped locking means is passed through mating openings in the tongue and base to lock the point in place. Larger openings are formed in the sleeve to permit the insertion and removal of this locking means. A separate locking means is provided for holding the sleeve in position on the base. Furthermore, inter-engaging ledges and recesses are formed on the overlapping portions of the base and point to accept lateral strains and relieve the tongue and latching means of these strains.

The principal object of this invention is to provide improvements in dipper teeth, such as briefly described hereinabove, and disclosed more in detail in the description which follows.

Another object of the invention is to provide removable means for protecting that portion of the base of a dipper tooth, adjacent the point, from wear.

Another object is to provide a removable protecting sleeve for covering that portion of the base adjacent the removable point of a dipper tooth, and accepting the wear to which the base would otherwise be subjected.

Another object is to provide an improved dipper tooth, embodying a much smaller removable point than has hitherto been possible, thus greatly reducing the cost of renewing the dipper tooth.

Other objects and advantages of this invention will be more apparent from the following detailed description of one approved

form of dipper tooth embodying the principles of this invention.

In the accompanying drawings:

Fig. 1 is a plan view of the assembled dipper tooth.

Fig. 2 is a side elevation of the tooth.

Fig. 3 is a central vertical longitudinal section through the tooth, taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal section through the assembled tooth, taken substantially on the line 4—4 of Fig. 3.

Fig. 5 is a substantially vertical transverse section taken substantially on the line 5—5 of Fig. 3.

Fig. 6 is a section taken substantially on the line 6—6 of Fig. 3.

Fig. 7 is a perspective view of the base.

Fig. 8 is a perspective view of the protecting sleeve.

Fig. 9 is a perspective view of the removable point.

The rear portion of the base 1 comprises a pair of opposite jaws 2 and 3 which are secured to the top and bottom faces of the edge of the dipper, in the usual manner. It is to be understood that a plurality of these teeth are mounted in spaced parallel relation along the edge of the dipper. The base 1 is recessed or reduced at 4 to receive the protecting sleeve, hereinafter described, and the forwardly extending portion of the base comprises opposite parallel side walls 5, and top and bottom walls 6 and 7 which converge forwardly toward one another to give a wedge shape to this portion of the base. The top and bottom walls 6 and 7 end in substantially parallel horizontal portions 8, from which projects forwardly a tapering nose, the top and bottom of which converge more rapidly than the main portion of the base just previously described. This nose is bifurcated vertically at 9 to form similar parallel side arms 10 and 11. The inner rear portions of the top and bottom of the nose are recessed, as indicated at 12, to form substantially horizontal top and bottom shoulders 13. These recesses 12 are adapted to receive the ledges formed on the removable point, as hereinafter described. A central rectangular recess 14 projects rearwardly into the base member from the rear of the bifurcation 9 in the nose, to receive the tongue of the point, as hereinafter described.

The top and bottom faces 15 of the point diverge continuously from the cutting edge 16. The wedge-shaped sides 17 of the point are recessed at 18 to receive the arms 10 and 11 of the base, leaving jaws 19 which fit against the top and bottom faces of the nose on the base. A vertical web 20 centrally connects the two jaws 19, this web 20 being received in the space 9 between the arms 10 and 11 of the nose. Ledges or shoulders 21 are formed at the sides of web 20, where the web joins the jaws 19, these ledges 21 being adapted to fit within the recesses 12 of the nose and engage the shoulders 13. The engaging shoulders 13 and 22 (on ledges 21) accept vertical stresses, thus relieving the tongue and locking means, hereinafter described, of these strains. Furthermore, the thickened portions formed by these ledges 21 assist the web 20 in reinforcing and strengthening the recessed rear end of the point between the jaws 19.

The jaws 19 are connected at their forward ends by side flanges 23, and between the flanges 23 and in front of the base of web 20, the point is cored out to form a pocket 24, in which are received the fingers or extremities of the side members 10 and 11 of the nose of the base, also the recessed extremities of the protecting sleeve, as hereinafter described. Separated recesses or pockets at each side of web 20 and behind the flanges 23, could be used, but it is more expedient in forming and machining the point to connect these recesses in the form of a single pocket 24 extending behind the web 20.

The central portion of web 20 is extended rearwardly in the form of a rectangular tongue 25 adapted to fit within the central recess 14 in the base 1, rearwardly of the nose. Openings 26 and 27 in the top and bottom of the tapered portion of the base member are adapted to align with an opening 28 formed in the tongue 25, these mating openings 26, 28 and 27 receiving the wedge-shaped locking pin 29. This pin 29, in the example here shown, has a oval cross-section so as to obtain the requisite strength without having its smaller transverse diameter large enough to require an unduly large opening 28 in the tongue 25. This pin 29 tapers from its larger upper end to its smaller lower end, and the openings 26, 28 and 27 are so spaced in the inter-engaging members, that as the locking pin is driven down through the mating openings the point will be drawn snugly into engagement with the base member. The smaller lower end of pin 29 may be bifurcated to form forks 30, which are spread apart within the enlarged lower end of opening 27, and a bottom opening in the protecting sleeve, as hereinafter described, so as to lock the pin 29 in place.

While the wedge-shaped locking pin is here shown as projecting vertically through the base member and tongue, it could be positioned horizontally through these members, by suitably changing the direction of the receiving openings in the base and point.

It will be noted that the upper and lower halves of the removable point are symmetrical, so that this point may be reversed to equalize the wear on the two halves thereof.

The removable and reversible protecting sleeve 31, which forms the particular improvement of this invention, is shown in perspective in Fig. 8. This sleeve comprises a hollow shell consisting of upper and lower

walls 32 and 33, and side walls 34 and 35, adapted to fit about and enclose the tapered portion of base 1, between the shoulder 4 and the forwardly extending nose. Integral side walls or cover plates 36 and 37 project forwardly from the side walls 34 and 35, so as to fit against and protect the side members 10 and 11 of the nose of the base. The forward extremities 38 and 39 of the projections 36 and 37 are recessed on the outside, as indicated at 40, so as to form shoulders 41 which fit against the rear ends of side flanges 23 of the point, the projections 38 and 39, together with the extremities of the side members 10 and 11 of the nose, being received within the pocket 24 in the point. The side flanges 23 thus prevent spreading of the spaced side members of both the nose and the protecting sleeve. The side jaws 19 of the point fit over the top and bottom edges of the side members 36 and 37 of the sleeve, and the protecting sleeve 31 lies within the confines of the base, as recessed at shoulder 4, so that the base, protecting sleeve and point, when fitted together, as shown in Figs. 1 to 4, will have a substantially smooth and unbroken outer surface. A tapered locking pin 42 is passed laterally through registering openings 43 in the sides 34 and 35 of the sleeve and a mating opening 44 in the base member, so as to lock the sleeve in place. The top and bottom walls of the protecting sleeve are provided with openings 45 and 46 to permit the insertion and removal of the wedge-shaped pin 29 which locks the point within the base. These openings also serve to house and protect the projecting end portions of this pin.

It will be noted that the protecting sleeve 31, like the removable point, is entirely symmetrical above and below a central horizontal plane, so that this sleeve may be removed and reversed to equalize the wear on the upper and lower halves thereof.

It will be noted that the removable point is much smaller and shorter in proportion to the total length of the tooth than in previous constructions. This will throw some of the wear formerly taken by the tooth upon the protecting sleeve 31, but since this sleeve is also removable and replaceable, the base member 1 receives very little wear and is practically a permanent part of the installation. It will also be noted that the removable point and sleeve are each separately and individually attached to the supporting base, so that the point may be removed and reversed or replaced without disturbing the sleeve. This is desirable since the point will wear out much more quickly than the sleeve, that is, it will be necessary to reverse or replace the sleeve at much less frequent intervals than the point. Since the removable point member is rather short, the rearwardly projecting tongue 25 permits the locking pin to be placed rearwardly of the inter-engaging side arms and jaws of the base and point members, so that these members are not unnecessarily weakened by the openings that would be necessary if the locking pin were placed nearer the cutting edge 16 of the point. Since these portions of the interlocking base and point need not be made sufficiently thick to accommodate a locking pin, the entire tooth may be made narrower, that is, having a longer taper than would otherwise be possible.

While the invention has here been illustrated, by way of example, in the form of a single protecting sleeve completely enclosing that portion of the base adjacent the point, it is also contemplated that this member might be made in the form of a plurality of separate plates or connected plates removably attached to and protecting some portion or all of the base member at the locations most subject to wear. All such modifications are considered to be within the scope of the invention as covered by the following claims.

While the protecting sleeve disclosed herein has been shown and described in connection with a preferred form of dipper tooth, it is to be understood that this protecting sleeve might be applied to other forms of dipper teeth, provided with other forms and sizes of removable point, and that the invention includes all such modifications within the scope of the claims which follow.

I claim:

1. A dipper tooth comprising a base, a removable point, and a removable protecting sleeve enclosing that portion of the base adjacent the point, the base being recessed to receive the sleeve whereby the outer surfaces of the sleeve extend rearwardly in substantial alignment with the corresponding outer surfaces of the point.

2. A dipper tooth comprising a base, a reversible point removably attached to the base, and a removable and reversible sleeve enclosing that portion of the base adjacent the point, the base being recessed to receive the sleeve whereby the outer surfaces of the sleeve extend rearwardly in alignment with the corresponding surfaces of the point.

3. A dipper tooth comprising a base, a removable protecting sleeve for the base, and a removable point, said point having top and bottom surfaces diverging rearwardly from a forward cutting edge, the wedge shaped sides being recessed to form upper and lower diverging jaws connected by a central vertical web, there being side flanges connecting the forward ends of the jaws at each side of the point and pockets projecting forwardly into the point between the web and side flanges, and a central tongue projecting rearwardly as an extension of the web, the base being formed with a tapered nose portion

adapted to be received between the jaws of the point, the base being bifurcated to receive the web and having a rearwardly extending central recess to receive the tongue, the protecting sleeve being hollow to fit about the four sides of the base and having opposite side projections extending forwardly and covering the sides of the nose of the base, the front ends of these side projections being externally recessed to extend into the pockets in the point behind the side flanges, a locking member extending through the base and sleeve, and a wedge shaped locking pin extending through mating openings in the base and tongue, there being openings in the sleeve to permit the insertion and removal of this pin.

4. A dipper tooth comprising a base, a removable protecting sleeve for the base, and a removable point, said point having top and bottom surfaces diverging rearwardly from a forward cutting edge, the wedge shaped sides being recessed to form upper and lower diverging jaws connected by a central vertical web, there being side flanges connecting the forward ends of the jaws at each side of the point and pockets projecting forwardly into the point between the web and side flanges, and a central tongue projecting rearwardly as an extension of the web, the base being formed with a tapered nose portion adapted to be received between the jaws of the point, the base being bifurcated to receive the web and having a rearwardly extending central recess to receive the tongue, the protecting sleeve being hollow to fit about the four sides of the base and having opposite side projections extending forwardly and covering the sides of the nose of the base, the front ends of these side projections being externally recessed to extend into the pockets in the point behind the side flanges, and means for separately locking the sleeve and point to the base, so that the point may be removed without disturbing the sleeve.

5. A dipper tooth comprising a base, a removable protecting sleeve for the base, and a removable point, said point having top and bottom surfaces diverging rearwardly from a forward cutting edge, the wedge shaped sides being recessed to form upper and lower diverging jaws connected by a central vertical web, there being side flanges connecting the forward ends of the jaws at each side of the point and pockets projecting forwardly into the point between the web and side flanges, and a central tongue projecting rearwardly as an extension of the web, the base tapering forwardly and terminating in a tapered nose portion adapted to be received between the jaws of the point, this nose being bifurcated to receive the web, there being a rearwardly extending recess in the base to receive the tongue, the sleeve consisting of a hollow shell tapering forwardly to fit about the four sides of the base and having opposite side projections extending forwardly and covering the sides of the nose, the front ends of these projections being externally recessed to extend into the pockets in the point behind the side flanges, a locking pin extending through the base and sleeve, and a wedge shaped locking pin extending through mating openings in the base and tongue, there being openings in the sleeve to permit the insertion and removal of this pin.

6. A dipper tooth comprising a base, a removable protecting sleeve for the base, and a removable point, said point having top and bottom surfaces diverging rearwardly from a forward cutting edge, the wedge shaped sides being recessed to form upper and lower diverging jaws connected by a central vertical web, there being side flanges connecting the forward ends of the jaws at each side of the point and pockets projecting forwardly into the point between the web and side flanges, there being inwardly projecting ledges formed on the jaws at the sides of the web, and a central tongue projecting rearwardly as an extension of the web, the base tapering forwardly and terminating in a tapering nose portion adapted to be received between the jaws of the point, this nose being bifurcated to receive the web, the tops and bottoms of the diverging sides of the nose being inwardly recessed to receive the ledges in the point, there being a rearwardly extending recess in the base to receive the tongue, the sleeve consisting of a hollow shell tapering forwardly to fit about the four sides of the base and having opposite side projections extending forwardly and covering the sides of the nose, the front ends of these projections being externally recessed to extend into the pockets in the point behind the side flanges, a locking pin extending through the base and sleeve, and a wedge shaped locking pin extending through mating openings in the base and tongue, there being openings in the sleeve to permit the insertion and removal of this pin.

7. A dipper tooth comprising a base, a removable protecting sleeve for the base, and a removable point, said point having top and bottom surfaces diverging rearwardly from a forward cutting edge, the wedge shaped sides being recessed to form upper and lower diverging jaws connected by a central vertical web, there being side flanges connecting the forward ends of the jaws at each side of the point and pockets projecting forwardly into the point between the web and side flanges, there being inwardly projecting ledges formed on the jaws at the sides of the web, and a central tongue projecting rearwardly as an extention of the web, the base tapering forwardly and terminating in a tapering nose portion

adapted to be received between the jaws of the point, this nose being bifurcated to receive the web, the tops and bottoms of the diverging sides of the nose being inwardly recessed to receive the ledges on the point, there being a rearwardly extending recess in the base to receive the tongue, the sleeve consisting of a hollow shell tapering forwardly to fit about the four sides of the base and having opposite side projections extending forwardly and covering the sides of the nose, the front ends of these projections being externally recessed to extend into the pockets in the point behind the side flanges, and means for separately locking the sleeve and point to the base so that the point may be removed without disturbing the sleeve.

8. A wedge-shaped dipper tooth comprising a base, a removable point, and a removable sleeve enclosing that portion of the base adjacent the point, this portion of the base being recessed to receive the sleeve whereby the outer surfaces of the sleeve will lie in the same planes as the outer surfaces of the removable point.

9. A wedge-shaped dipper tooth comprising a base, a removable and reversible point, and a removable and reversible sleeve enclosing that portion of the base adjacent the point, this portion of the base being recessed to receive the sleeve whereby the outer surfaces of the sleeve will lie in the same planes as the adjacent outer surfaces of the removable point.

10. In a dipper tooth, a protecting sleeve adapted to be inset in a base member in rear of and in prolongation of a removable point, said sleeve comprising a hollow casing having top and bottom walls converging toward one another at similar angles from the rear to the front of the casing, and substantially parallel side walls connecting the top and bottom walls.

11. In a dipper tooth, a protecting sleeve adapted to be inset in a base member in rear of and in prolongation of a removable point, said sleeve comprising a hollow casing having top and bottom walls converging toward one another at similar angles from the rear to the front of the casing, and substantially parallel side walls connecting the top and bottom walls, the side walls having integral forward extensions with top and bottom edges converging at substantially the same angle as the top and bottom walls of the casing.

12. In a dipper tooth, a protecting sleeve adapted to be inset in a base member in rear of and in prolongation of a removable point, said sleeve comprising a hollow casing having top and bottom walls converging toward one another at similar angles from the rear to the front of the casing, and substantially parallel side walls connecting the top and bottom walls, the side walls having integral forward extensions with top and bottom edges converging at substantially the same angle as the top and bottom walls of the casing, the forward free ends of these extensions being externally recessed to form inner tongues for projecting into pockets in the removable point.

13. A wedge-shaped dipper tooth comprising a base, a removable point, and a removable protecting member for a portion of the base member adjacent the point, this portion of the base member being recessed to receive the protecting member whereby the outer surfaces of the protecting member will lie in prolongations of the same planes as the corresponding adjacent outer surfaces of the removable point.

14. A wedge-shaped dipper tooth comprising a base, a removable and reversible point, and a removable and reversible protecting member for a portion of the base member adjacent the point, this portion of the base member being recessed to receive the protecting member whereby the outer surfaces of the protecting member will lie in prolongations of the same planes as the corresponding adjacent outer surfaces of the removable point.

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