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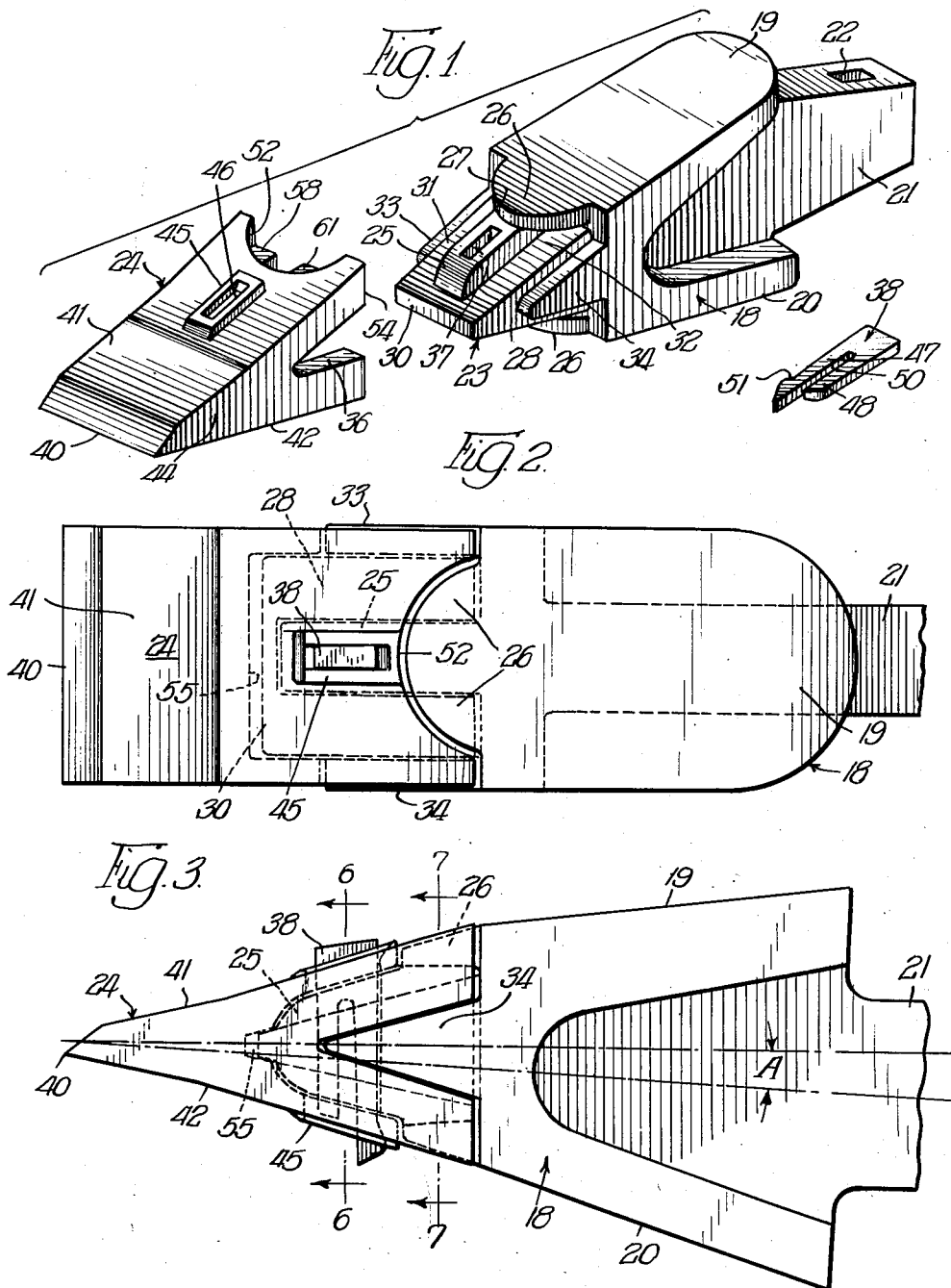
A. W. DANIELS ET AL

2,674,816

EXCAVATING TOOTH WITH REPLACEABLE POINT

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2 Sheets-Sheet 1



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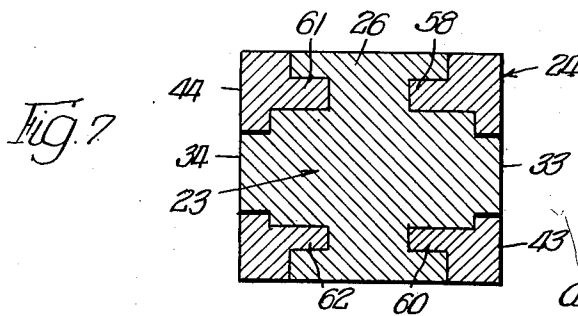
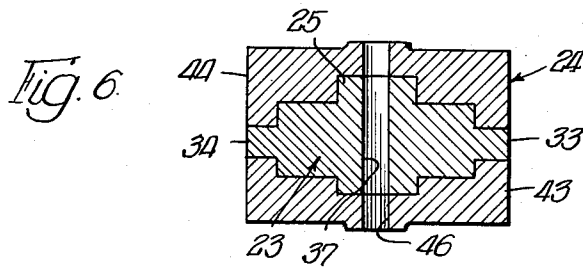
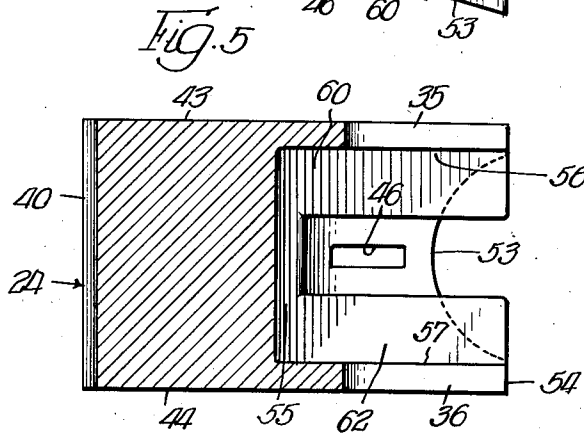
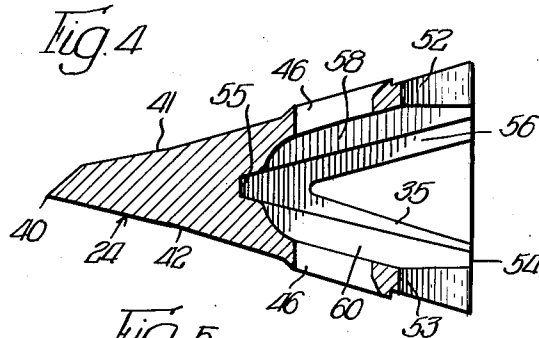
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EXCAVATING TOOTH WITH REPLACEABLE POINT

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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EXCAVATING TOOTH WITH REPLACEABLE POINT

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3 Claims. (Cl. 37-142)

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The invention relates to excavating teeth such as are used on the forward digging lip of power shovels, loading buckets, dippers and the like, and has reference in particular to a replaceable point for such teeth of box-like formation having an interior cavity complementary in shape to that of the adapter on which the point is releasably held by a vertically disposed key.

An object of the invention is to provide an excavating tooth which will be durable and rugged in service, economical to manufacture, consisting of two parts, namely, an adapter and a point, and wherein the adapter provides a nose portion and the point has a cavity interfitting the nose portion. In the excavating tooth of the invention the weight of the manganese steel employed in the parts is kept to a minimum although adequate metal section is provided of the proper contour and shape to take advantage of all the good qualities of the metal and at the same time strengthen the parts against bending or deformation of any kind.

Another object of the invention is to provide a replaceable point for an excavating tooth which is reversible on the nose portion of the adapter and which is releasably held on the nose by a key passing through aligned slots in the top and bottom walls of the point and through a passageway in the nose of the adapter which aligns with said slots.

A further object is to provide a two-part excavating tooth wherein the adapter has a nose portion of novel and improved design with the metal being so distributed and proportioned that advantage is taken of the total depth and most of the width of the nose portion at the point of greatest stress and leverage whereby to effectively resist shock loads imposed from all directions.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings which illustrate an embodiment of the invention, and wherein like reference characters are used to designate like parts—

Figure 1 is an exploded view illustrating in perspective the parts of the present composite tooth including the adapter, replaceable digging point, and the locking key;

Figure 2 is a top plan view of the composite tooth with parts in assembled relation;

Figure 3 is a side elevational view of the

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adapter and replaceable point in assembled relation as shown in Figure 2;

Figure 4 is a vertical sectional view taken longitudinally through the center of the replaceable point;

Figure 5 is a horizontal sectional view taken longitudinally through the center of the replaceable point;

Figure 6 is a transverse sectional view taken substantially along line 6-6 of Figure 3; and

Figure 7 is a transverse sectional view taken substantially along line 7-7 of Figure 3.

The composite tooth selected for illustrating the present invention includes an adapter or base portion indicated by numeral 18, having a top surface 19 and a bottom surface 20, and which is provided with a rearwardly extending tank 21 having a vertical key-way slot or opening 22 for receiving a key whereby the adapter may be detachably mounted in the forward digging lip of excavating buckets, shovels, dippers or the like, as is well understood by those skilled in the art. In accordance with the invention the adapter has a nose portion 23 of special shape and which nose portion has interfitting relation with the replaceable digging point 24, it being understood that the parts are assembled by relative longitudinal movement, the nose portion 23 fitting into a cavity located in the rear of the replaceable point. The cavity in said replaceable point is also of special design, having inwardly protruding lugs and recesses whereby the cavity is complementary in shape so that of the nose portion.

Referring more particularly to Figures 1, 2 and 3 of the drawings, the nose portion 23 of the adapter is shown as characterized by a web 25 which extends forwardly of the adapter, being nose-shaped in side elevation and disposed centrally on the vertical center line. The web 25 extends forwardly on the top and bottom surfaces of the nose portion from under the overlapping ribs 26 which are arcuate in shape as regards their periphery and which have an undersurface normal to the front wall of the adapter, with the outwardly disposed surface of each rib sloping toward the web 25. As a result each rib 26 has its narrowest portion at its forward extremity 27 which is in direct alignment with its respective web 25. Since the webs 25 divide each rib into two parts it will be seen that four rib parts or sections are provided with two on the bottom side of the adapter disposed on the respective sides of the web, and with two on the top side of the adapter, likewise being

disposed on the respective sides of the web. It will be understood as the description proceeds that these ribs have overlapping relation with inwardly projecting lugs within the cavity of the replaceable point. The nose portion 23 is further characterized by a body portion 28 substantially wedge-shaped in contour, with the base of the wedge being integral with the front wall of the adapter and which body portion extends beyond the webs 25 to form a tongue 30. The nose portion of the adapter accordingly tapers from its rear end in a direction forwardly, which taper is essentially the result of the wedge-shaped formation of the body portion 28. The surfaces on the respective sides of each web 25 on the top side of the body portion are indicated by numerals 31 and 32 and similar surfaces indicated by the same numerals are provided on the bottom side of the body portion, the said surfaces having contact with inwardly projecting lugs within the replaceable point, as will be clearly understood as the description proceeds.

On each side of the body portion 28 the same is provided with laterally projecting lugs 33 and 34, also of substantially wedge-shape formation, and which lugs are adapted to enter triangular openings 35 and 36, respectively, in the side walls of the replaceable point. Due to the taper of the body portion 28 of the nose of the adapter and the laterally projecting lugs 33 and 34, the replaceable point has an interfitting relation with said nose portion and which will become increasingly tight as greater digging pressure is applied to the point. The vertical opening 37 located in the webs 25 provides a keyway or passageway for receiving a key 38 by means of which the replaceable point is releasably locked in assembled relation on the nose portion.

As illustrated in Figure 3, the nose portion is disposed on the adapter 18 at a slight angle in a downward direction with respect to the longitudinal center line of the composite tooth, the angle being indicated by A in Figure 3. The purpose of this construction is to provide clearance on the underside of the cutting point. With the replaceable point set at the proper angle on the adapter the cutting edge 40 becomes self-sharpening because a new cutting edge is being established on the top as the lower surface is being worn away. This new cutting edge is made available by reversing the replaceable point and it will be understood that this self-sharpening feature of the point together with the clearance which is maintained on the under side eliminates any tendency of the adapter to force the digging tip out of the work digging operations.

The replaceable point 24 is box-like in formation, having top and bottom walls 41 and 42 and side walls 43 and 44. The top and bottom walls are each provided with a central boss portion 45 comprising a projection on its respective surface and which has the effect of thickening each wall at its location. Each boss portion is apertured to provide a key-way slot 46 and the slots in the top and bottom walls are of course in alignment with each other and in alignment with the passageway 37 when the parts are properly assembled. The said point 24 is locked on the nose portion 23 by the key 38 which is slotted longitudinally to provide the spaced prongs 47 and 48, there being located between the prongs a resilient insert 50 of rubber or other suitable material to apply tension to the prongs when compressed. Prong 47 at its terminal end is notched as at 51 so that the key 38 upon being inserted

through the aligned key-ways to its full extent will have locking relation with the bottom wall 42 of the point as a result of the tension exerted by the prongs of the key.

The cavity in the rear wall of the replaceable point is best illustrated by Figures 4 and 5. As previously explained, the cavity has a shape which is complementary to that of the nose portion. The cavity is characterized by recesses 52 and 53 of arcuate shape formed in the top and bottom walls 41 and 42, respectively, of the replaceable tooth. The said recesses have a shape which will accommodate the protruding ribs 26 on the top and bottom surfaces of the adapter and when said ribs are located in the recesses provided therefor in the tooth, it will be observed that the lugs 33 and 34 on each side of the nose portion have interfitting relation with the V-shaped slots 35 and 36, respectively, formed in the side walls of the tooth. This structural feature permits interlocking of all four inside corners of the tooth with the overlapping ribs on the adapter. In order to accommodate the body portion 28 of the nose the said tooth is longitudinally recessed on each side wall, each recess tapering in a forward direction from the rear wall 54 toward the cutting edge of the point, and it will be observed that each recess terminates in a groove 55 which in effect connects the recesses and thus in effect provides a cavity for receiving the tongue 30. The recess adjacent side wall 43 is indicated by numeral 56, Figures 4 and 5, whereas the recess adjacent side wall 44 is indicated by numeral 57.

The recess formed in each side wall of the replaceable tooth in combination with the other structural features of the tooth produce lugs that protrude inwardly of the cavity. Said lugs extend on each side wall from the rear wall 54 to adjacent the groove 55, with each side wall having two lugs, one being located adjacent the top wall and the other adjacent the bottom wall. For side wall 41 the top lug is indicated by numeral 58 and the bottom lug by numeral 60. For side wall 44 numeral 61 indicates the top lug and numeral 62 the bottom lug. As best shown in Figure 4, each lug at its rear end has a substantially flat and approximately horizontal surface which is adapted to coact with the undersurface of an overlapping rib 26, the undersurface of said rib being likewise flat and horizontal for the purpose. As a result the replaceable tooth has a special interlocking fit on the nose portion of the adapter with each web 25 being disposed between a pair of spaced lugs that protrude inwardly from opposite side walls in the cavity of the tooth.

The tooth and nose portion of the adapter are symmetrical about vertical and horizontal center lines. The recesses 56 and 57 in the tooth are triangular in shape for receiving the body portion 28 and likewise the openings 35 and 36 are triangular for receiving the lugs 33 and 34. The spaced relation of the top lugs 58 and 61 and also the bottom lugs 60 and 62 provides longitudinal slots for accommodating the top and bottom webs 25, respectively. As a result of the above structural features the four corners of the tooth have an interlocking relation with the overlapping ribs 26. The rear end of the lugs 58, 60, 61 and 62 fit under a rib section on each side of central web 25. This interfitting and interlocking of the tooth on the adapter is very desirable in a replaceable tooth of the present kind and the coaction of the parts is such that the greater the digging pressure the tighter the fit.

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The invention is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawings as various forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. A tooth for excavating implements and the like including an adapter having a nose portion of special shape and design for receiving a replaceable point, said nose portion essentially consisting of a body portion of triangular shape in side elevation and having top and bottom surfaces that slope forwardly toward each other, a projection on the top and bottom surfaces of the body portion providing a nose shaped web and which projects vertically, being disposed on the center line of the body portion, said webs terminating short of the forward edge of the body portion whereby said forward edge comprises a tongue, a lug extending laterally on each side of the body portion and of similar triangular shape to that of the body portion but of smaller dimensions, ribs of arcuate shape projecting forwardly of the nose portion and forming respectively a portion of the top and bottom surfaces of said nose portion, each of said ribs being disposed outwardly in overlapping relation to its adjacent web, and each rib having its greatest thickness adjacent its connection with the adapter and tapering in a forward direction to a thinner edge where the rib merges with its web.

2. A tooth for excavating implements and the like as defined by claim 1, wherein said body portion has a vertical keyway slot formed therein, being disposed substantially centrally of the nose portion and extending through the webs located on the top and bottom surfaces of said body portion.

3. A tooth for excavating implements or the like including an adapter having a nose portion of special shape and design, said nose portion essentially consisting of a body portion of tri-

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angular shape in side elevation with the base being located adjacent the body of the adapter and the apex forming a tongue, a projection on the top and bottom surfaces of the body portion providing a nose shaped web and which is disposed vertically on the center line of the nose portion, a lug extending laterally on each side of the body portion and of similar triangular shape to that of the body portion but smaller in size, a rib of arcuate shape projecting forwardly of the nose portion and providing respectively a portion of the top and bottom surfaces of the same, each rib being in overlapping relation with respect to its adjacent web, said nose portion having a vertical keyway disposed centrally and extending through the webs on the top and bottom surfaces of the nose portion, and a replaceable point for securement to said nose portion, said point having a cavity in the rear thereof for receiving the nose portion, said cavity being characterized by recesses in the side walls of the point and by other recesses in the top and bottom walls respectively, the recesses in the side walls being triangular and being disposed so as to receive the triangular shaped lugs, the other recesses in the top and bottom walls of the point being semi-circular for accommodating the arcuate shaped ribs, and said point having an opening in the top and bottom wall thereof adapted to align with the keyway in the nose portion when the parts are assembled for receiving a key to lock the parts in assembled relation.

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