Sept. 27, 1949. J. BAER 2,483,032

EXCAVATING TOOTH

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Fig. 1

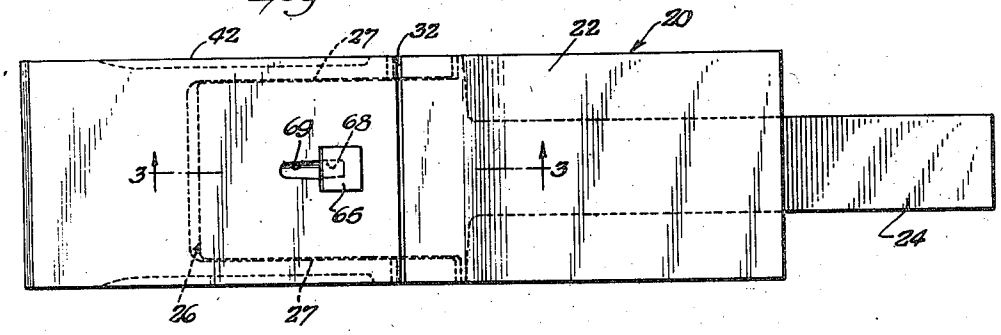


Fig. 2

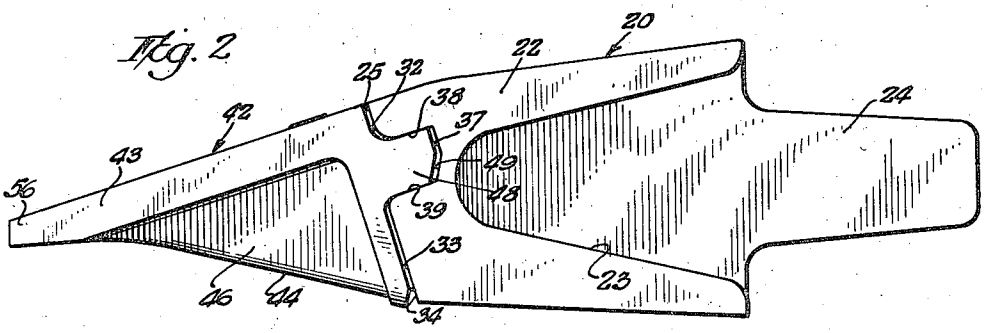


Fig. 3

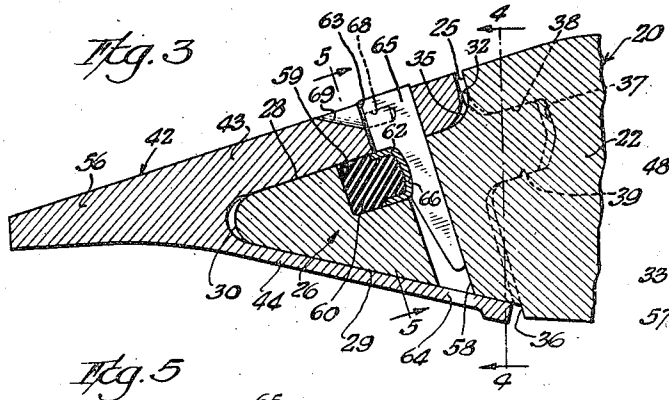


Fig. 4

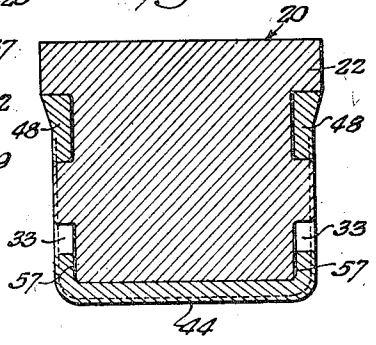
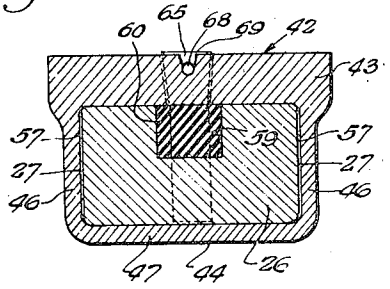


Fig. 5



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Fig. 6

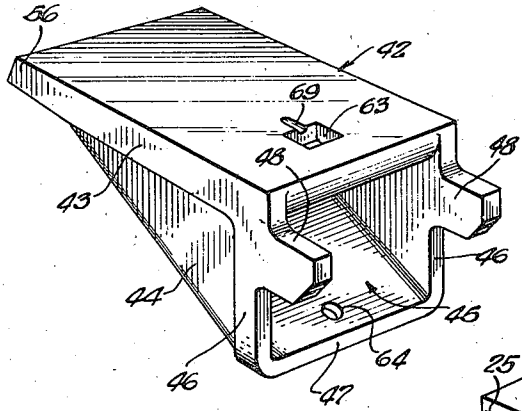


Fig. 8

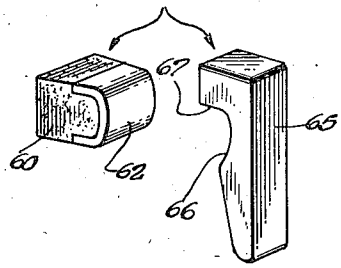


Fig. 7

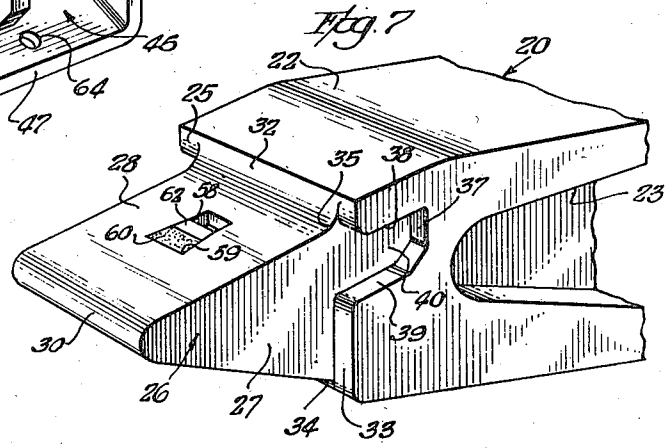


Fig. 9

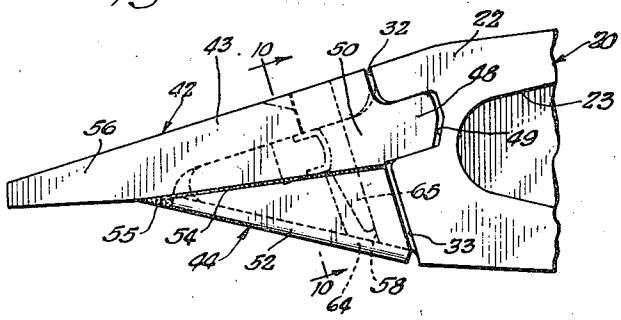
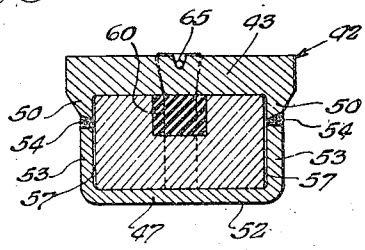


Fig. 10



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UNITED STATES PATENT OFFICE

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EXCAVATING TOOTH

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Application June 6, 1945, Serial No. 597,857

9 Claims. (Cl. 37—142)

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This invention relates to excavating teeth and particularly to those having replaceable tooth points and adapted to use on the cutting edges of power driven shovel dippers and the like.

It is a general object of the present invention to provide an improved structure for excavating teeth which includes a removable tooth point supported by a coacting adapter and held in place upon the adapter by a readily accessible and easily removable retaining part.

Another object of the invention is to provide an improved key and key retaining structure for holding the removable tooth point in place upon the adapter of an excavating tooth, and wherein the key is accessible for removal from a normally exposed face of the tooth.

The invention has for an additional object the provision of coacting adapter and replaceable tooth point parts for excavating teeth, the structures of which are adapted to interfit in a manner conducive to ruggedness and prevention of relative movement between the tooth point and adapter.

As an additional object, the invention comprehends the provision of an improved excavating tooth point structure adapted to fabrication by the welding together of selected component parts.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings, of which there are two sheets,

Figs. 1 and 2 are respectively top plan and side elevational views of an excavating tooth embodying a preferred form of my present invention;

Fig. 3 is a fragmentary side sectional view of the excavating tooth shown in Figs. 1 and 2 wherein the section is taken substantially on a line 3—3 of Fig. 1;

Figs. 4 and 5 are sectional views of the excavating tooth shown in Figs. 1, 2 and 3, with the sections taken substantially on lines 4—4 and 5—5, respectively, of Fig. 3 and viewed in the directions indicated by the arrows;

Figs. 6, 7 and 8 are perspective views of disassembled parts of the excavating tooth shown in Figs. 1 and 2;

Fig. 9 is a fragmentary side elevational view of an excavating tooth embodying a modification of my invention; and

Fig. 10 is a sectional view of the modified form of excavating tooth shown in Fig. 9 with the

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section taken substantially on a line 10—10 of Fig. 9 and viewed in the direction indicated by the arrows.

Although there are various ways in which excavating teeth of the general type disclosed may be mounted along the edge of a shovel, dipper or the like, the forms shown in the various views of the accompanying drawings have an adapter 20 including a shank portion 22 the sides of which are recessed as at 23 to fit over edge portions of the shovel or the like. A rearwardly projecting tang 24, which is formed integrally with the shank portion 22 of the adapter, is utilized for securing the adapter to the shovel or other structure upon which it is mounted.

Projecting from a front face 25 of the adapter, as shown in Figs. 3 and 7 and as indicated in dotted lines in Fig. 1, is an integral forwardly projecting wedge-shaped nose 26. Desirably the projecting nose 26 has substantially parallel side surfaces 27 of a generally triangular shape, as well as upper and lower wedge surfaces 28 and 29 connected at their projecting end by a curved surface 30. In the disclosed embodiment of my invention, the base of the projecting nose 26 which adjoins the shank portion of the adapter is smaller than the front face 25 so as to provide forwardly facing shoulders such as 32, 33 and 34 surrounding the base of the nose. It is considered preferable that the corners formed by the juncture of the wedge surfaces 28 and 29 with the shoulders 32 and 34 are filleted or rounded as indicated at 35 and 36, respectively, in Fig. 3 to exaggerate the wedge shape of the nose adjacent the shank portion of the adapter.

On opposite sides of the adapter, forwardly facing recesses 37 in the shank portion 22 provide upper and lower surfaces 38 and 39, respectively, which extend longitudinally of the adapter and by preference are substantially parallel to each other and to the wedge surface 28 of the nose. The side surfaces 40 of the recesses 37 are substantially continuations of the parallel side surfaces 27 of the nose.

Adapted for removable mounting upon the projecting nose 26 of the adapter 20, is a tooth point 42 comprising a spike portion 43 and a housing portion 44 which together form a wedge-shaped socket 45 having an open end at the rear of the tooth point, as shown in Fig. 6. The housing portion 44 of the tooth point includes substantially parallel side walls 46 of generally triangular shape and an integral connecting web 47.

Projecting rearwardly from and integrally formed with the side walls 46 on the tooth point

as well as being partial continuations of the side walls 46 adjacent the open end of the socket, are two tongues 48 adapted to fit into the recesses 37. Since the tongues 48 are provided on the tooth point 42 to improve the lateral stability of the tooth point with respect to the adapter as well as to prevent relative movement or creeping between the tooth point and the adapter, the tongues desirably fit snugly between the substantially parallel upper and lower surfaces 38 and 39 of the recesses 37. The length of the tongues is preferably less than the longitudinal depth of the recesses 37 to provide a clearance, as indicated at 49 in Fig. 2, between the end surfaces of the tongues and recesses so that the seating of the tongues may not interfere with the firm seating of the tooth point upon the nose of the adapter.

In the preferred embodiment of my invention, illustrated in Figs. 1 to 7 inclusive, the housing portion 44 of the tooth point is cast or otherwise integrally formed with the spike portion 43. However, in the modified structure illustrated in Figs. 9 and 10, the spike portion 43 may be made by forging or other suitable process and has integrally formed therewith side portions 50 of the housing and the projecting tongues 48. The remaining portion 52 of the side walls may be cast or otherwise formed separately from the spike portion of the tooth point.

The separately made spike and housing portions are welded together along the sides and one end as indicated at 54 and 55, respectively, in Figs. 9 and 10. By the use of the welded construction, the material characteristics of the spike portion and housing of the tooth point may be selected to suit their functions; that is, the material of the spike portion of the tooth may be selected to resist abrasion and the wear encountered in use, while the material of the housing portion may be suited to the provision and maintaining of firm seating engagement between the wedge surfaces of the nose 26 and the inner surfaces of the socket 45 as well as for resistance to shock and the retention of a close fit between the contacting surfaces. In both the welded and cast types of tooth points, the spike portion 43 has a tip 56 projecting beyond the end of the housing portion 44 and sharpened to provide a digging edge.

In order to provide effective and durable gripping surfaces on the projecting nose 26 and within the coacting socket 45, it is preferred that the surfaces which seat together shall be the wedge surfaces of the parts; that is, as illustrated in Figs. 4, 5 and 10, the interior of the housing portion is somewhat wider than the width of the nose so as to provide clearances 57 between the parallel sides 27 of the nose and the inside of the socket walls.

To allow for wear and the effects of impact against the tooth point in use, the dimensions of the nose relative to those of the socket are such as to provide end clearances, as shown in Figs. 2 and 3, between the inner end of the socket and the rounded end 30 of the nose as well as between the surfaces of the tooth point adjacent the open end of the socket and the shoulders at the forward end of the shank portion 22 of the adapter.

In order to hold the tooth point 42 firmly in position upon the adapter 20 with the engaging surfaces of the nose and socket seated together, and the tongues 48 seated in their respective side recesses, as well as to permit removal of the tooth point from the adapter with relative ease, a removable key and locking structure is provided.

For the provision of an effective key and locking structure, an opening 58 is provided in the midportion of the nose 26 which is preferably substantially perpendicular to the upper wedge surface 28 of the nose and desirably extends all the way through the nose. This opening, by preference, is substantially rectangular and, as well as being substantially perpendicular to the top wedge surface 28 of the nose, it is also substantially parallel to the side shoulders such as 33 at the forward end of the shank portion of the adapter. Adjacent and opening into the opening 58 and adjacent the wedge surface 28, is a recess 59 in which is mounted a block 60 of a suitable compressible resilient material such as rubber or one of the known rubber substitutes. The block of resilient material 60 may be secured in position within the recess by a vulcanization or by suitable fastening means. A curved metal cap 62 is secured to the end of the resilient block adjacent the opening 58 and provides a hard wear-resisting surface on the resilient block and projecting into the opening 58. The cap 62 is slidable in the recess and is biased to its projecting position and toward the opening 58 by the resilient block 60.

The spike portion 43 and preferably the housing portion 44 of the tooth point have openings 63 and 64, respectively, therein, which are adapted to align with the ends of the opening 58 when the tooth point is in its seated position upon the adapter. When the tooth point is thus seated upon the adapter, a key 65 fits into the opening 58 and extends through the opening 63 to hold the tooth point in position. A notch 66 in one side of the key is engaged by the similarly shaped cap 62 on the resilient block 60 to hold the key in position. When inserted, the key 65 is driven or otherwise forced into position and a shoulder 67 thereon engages the outer surface of the cap 62 to locate the key with its end surface flush with the surface of the tooth point.

In the disclosed embodiment, the key 65 has a bore 68 in one side thereof and spaced inwardly from the outer end of the key. Aligned with the bore 68 is an angular slot 69 in the surface of the spike portion of the tooth point. The provision of the aligned bore 68 and slot 69 permits the insertion of a lever type key removing tool such as a rod or screw driver for prying the key out of its holding position for the removal of a tooth point. In addition to the slot and bore for the insertion of a key removing tool, the provision of the opening 64 in the housing portion permits access to the end of the key for driving or otherwise forcing it out of its holding position.

From the foregoing description of the structure and relationship of parts, it may be understood that to facilitate manufacturing or to provide a structure which has long life under certain conditions of operation, the construction of the parts may comprise their integral formation or their fabrication by welding together separately made pieces. In either event, the disclosed construction provides coacting tooth point and adapter parts which effect and maintain firm seating engagement of the tooth point upon the adapter and prevent relative lateral or longitudinal movement between the adapter and tooth point. In addition, the tooth point is removably held in position by a readily accessible and easily removed key.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the

invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. An excavating tooth comprising, in combination, an adapter having a rear shank portion and an integral forwardly projecting wedge-shaped nose having wedge and side faces, said nose being smaller in section than said shank portion to provide a shoulder adjoining the nose at the forward end of the shank portion, said shank portion having recesses on opposite sides thereof and opening through opposite ones of said shoulders adjacent said side faces of the nose, said nose having a key receiving opening extending through the mid-portion thereof in substantially perpendicular relationship to one of said wedge faces, said nose also having a recess therein adjacent said one of the wedge faces and opening into the side of said key receiving opening remote from and facing the shank portion, a block of compressible resilient material mounted in said recess and having a metal face thereon and normally projecting into the key receiving opening, a separate tooth point having a rearwardly opening socket presenting opposed surfaces adapted to grip the wedge surfaces of the nose, said tooth point having on opposite sides integral projecting tongues adapted to fit snugly into said recesses on opposite sides of the shank portion, said tooth point also having a key receiving opening in position for alignment with the key receiving opening in the nose, and a key insertable into said key receiving openings for holding the tooth point in place on the adapter, said key having a notch in one side adapted to engage the metal face on said resilient block for releasably holding the key in said openings.

2. An excavating tooth comprising, in combination, an adapter having a rear shank portion and an integral forwardly projecting wedge-shaped nose, said nose being smaller in section than said shank portion to provide a shoulder adjoining the nose at the forward end of the shank portion, said shank portion including opposite side recesses having substantially parallel side walls and opening through opposite ones of said shoulders adjacent the nose, said nose having an opening extending laterally through the mid-portion thereof, said nose also having a recess therein adjacent one end of and opening into one side of said opening, a block of compressible resilient material mounted in said recess, means providing a hard wear resisting face on said block projecting into said opening, a separate tooth point having a rearwardly opening socket presenting angularly opposed surfaces adapted firmly to seat upon said nose, said tooth point having projecting tongues on opposite sides of the socket adapted to fit snugly between the side walls of said side recesses, said tooth point also having an opening adapted to align substantially with said opening in the nose, and means in said opening coacting with said tooth point, nose and resilient block for releasably holding the tooth point in place upon the adapter.

3. An excavating tooth comprising, in combination, an adapter having a shank portion and an integral wedge-shaped nose projecting forwardly therefrom, said nose having opposite wedge faces and substantially parallel side faces, said shank

portion having recesses on opposite sides thereof opening adjacent and toward the side faces of the nose, said recesses having side faces which are substantially continuations of said parallel side faces of the nose, said nose having an opening extending inwardly in a lateral direction from one of the wedge faces and a recess adjoining said opening adjacent said one of the wedge faces, resilient means mounted in the latter mentioned recess and having thereon a hard wear resisting surface projecting into said opening and biased toward the opening by the resilient means, a separate tooth point having a rearwardly facing socket presenting inner faces adapted to seat against the wedge faces of the nose, said socket being of a size to have clearance from the substantially parallel side faces of the nose and having on each side an integral projecting tongue adapted to fit into one of the shank recesses, said tooth point also having an opening therein adapted to align with said opening in the nose, and a key adapted to fit into said aligned openings and gripped therein by said resilient means for holding the tooth point in place upon the adapter.

4. An excavating tooth comprising, in combination, an adapter having a shank portion and an integral wedge-shaped nose projecting forwardly therefrom, said nose having opposite wedge faces, said nose also having a key receiving opening in the mid-portion thereof transverse to the wedge faces and a recess adjacent and opening into one side of said opening, resilient means mounted in said recess, latch means projecting from said recess into said opening and biased toward the opening by the resilient means, a separate tooth point including a spike portion and having a rearwardly facing socket presenting inner surfaces adapted to seat against the wedge faces of the nose, said spike portion of the tooth point having an opening therethrough, adapted to align with said key receiving opening and having a slot in the outer surface thereof adjoining said opening, and a key adapted to fit into said openings to hold the tooth point in place on said adapter, said key having a notch in one side adapted to interfit with said latch means for releasably holding the key in place, and said key having a side opening therein adapted to align with said slot so that a lever type key removing tool may be inserted into the last mentioned opening through the slot for effecting removal of the key.

5. An excavating tooth comprising, in combination, an adapter having a shank portion and an integral substantially wedge-shaped nose projecting forwardly therefrom, said nose having opposite wedge faces, said nose also having a key receiving opening extending laterally into the mid-portion thereof from one of the wedge faces and a recess adjoining the key receiving opening on the side thereof opposite said shank portion and adjacent said one of the wedge faces, a block of compressible resilient material mounted in said recess and having thereon a hard wear resisting surface projecting from the recess into said opening, a separate tooth point having a rearwardly facing socket presenting opposed inner surfaces adapted to seat against the wedge faces of the nose, adidtional means stabilizing the tooth point relative to the adapter in a direction laterally of the nose, said tooth point having an opening therein in position for alignment with said key receiving opening in the nose, and a key adapted to fit into the aligned openings for releasably holding the tooth point in place, said

key being removably retained in place by the block of resilient material.

6. In an excavating tooth comprising an adapter having a wedge-shaped nose, tongue-receiving recesses of predetermined length in the sides thereof, a key-receiving opening in the nose, a key for insertion in said key-receiving opening and means for releasably holding said key in said key-receiving opening, the combination with said adapter, key-receiving opening, key and means for releasably holding said key, of a removable tooth point adapted firmly to seat against the wedge-shaped nose comprising a spike portion of relatively heavy section, a housing portion having substantially parallel side walls and an integral web forming with the spike portion a wedge-shaped socket having an open end adjacent one end of the spike portion and of a depth and shape firmly to retain seating engagement on the wedge-shaped nose as wear progresses between the nose and socket and as a result of movement of the socket onto the nose, each of said side walls having thereon an integral tongue projecting from the wall and being a partial continuation of the wall adjacent the open end of the socket and having opposite side edges substantially parallel to the spike portion, said tongues being of a length so related to the predetermined lengths of said tongue-receiving recesses in the nose that the projecting ends of the tongues do not normally seat in said recesses, whereby said tooth seats on the nose and is braced laterally by said opposite side edges of the tongues, a key-receiving opening in the mid-portion of the spike portion having an axis substantially perpendicular to the spike portion, said web having an opening therein opposite and aligned with the key-receiving opening, and said key-receiving opening adapted to be aligned with the key-receiving opening in the adapter, so that said key holds said removable tooth in place on said adapter.

7. In an excavating tooth comprising a wedge-shaped removable tooth point, having integral projecting tongues and a key-receiving opening, a key for insertion in said key-receiving opening, and means for releasably holding said key in said key-receiving opening, the combination with said removable tooth point, key, and releasable key-holding means, of an adapter having a rear shank portion and an integral forwardly projecting wedge-shaped nose having wedge and side faces, said nose being smaller in section than said shank portion to provide shoulders adjoining the nose at the forward end of the shank portion, said shank portion having recesses on opposite sides thereof which open through opposite ones of said shoulders adjacent said side faces of the nose, said nose having a key-receiving opening extending through the mid-portion thereof in substantially perpendicular relationship to one of said wedge faces, and said nose also having a recess therein, adjacent said one of the wedge faces, which opens into that side of said key-receiving opening which is remote from and faces the shank portion.

8. An excavating tooth point adapted to receive the wedge-shaped nose of an adapter having upper and lower faces diverging from a substantially rounded front end portion, substantially parallel side faces, and an enlarged rear shank portion in which recesses extend from the side faces longitudinally of the nose and have substantially parallel side edges which are substantially parallel to one of the said diverging faces and disposed between the planes of the diverging faces, and comprising, in combination, a spike portion of relatively heavy section, a housing portion having side walls and an integral web forming with the spike portion, a wedge-shaped socket having an open end at one end of the spike portion, said wedge-shaped socket being of a depth and shape normally and firmly to receive the wedge-shaped nose of the adapter with space between the nose and adapter at the vertex of socket and with said spike and housing portions substantially spaced from the shank portion of the adapter, and said side walls of the housing portion having integral projecting tongues thereon adjacent the open end of the socket, and said tongues having substantially parallel side edges adapted to fit into said recesses of the adapter shank portion when the nose is seated in the socket, thereby to support the tooth on the adapter in directions transverse to the wedge faces.

9. In an excavating tooth, a removable tooth point adapted to maintain firm seating engagement on an adapter having a nose with rearwardly diverging wedge faces and an enlarged shank portion in which recesses provide substantially parallel edges in parallel relationship to one of the wedge faces and displaced laterally and rearwardly of the wedge faces, and comprising, in combination, integral spike and housing portions together forming a wedge-shaped socket having wedge faces of an angularity substantially equal to that of the diverging adapter wedge faces and lengths such that the adapter nose is normally spaced from the socket vertex, said housing portion having opposed and integral side tongues thereon displaced laterally of the socket wedge faces and projecting rearwardly from the housing portion, said tongues having substantially parallel edges in parallel relationship to one of the socket wedge faces and adapted to fit between the parallel edges of said recesses to provide support for the tooth point in addition to the wedge faces, and said tongues being normally too short to reach the ends of said recesses so as to prevent their interference with the seating of the wedge faces.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
915,809	Thomas	Mar. 23, 1909
957,030	Berryman	May 3, 1910
1,014,891	Medeiros	Jan. 16, 1912
1,925,420	Buskirk	Sept. 5, 1933
2,134,344	Seal	Oct. 25, 1938
2,251,487	Hosmer et al.	Aug. 5, 1941
2,259,456	Crawford	Oct. 21, 1941
2,307,359	Crawford	Jan. 5, 1943
2,312,802	Crawford	Mar. 2, 1943
2,325,991	White	Aug. 3, 1943