Nov. 27, 1951 M. D. HOSTETTER 2,576,225

DETACHABLE LOCKING MEANS FOR AN EXCAVATING BUCKET TOOTH

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Fig. 1.

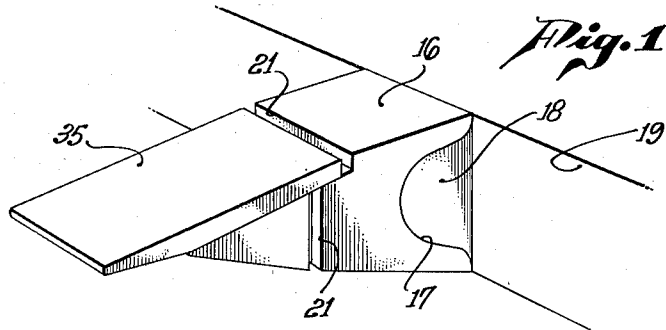


Fig. 2.

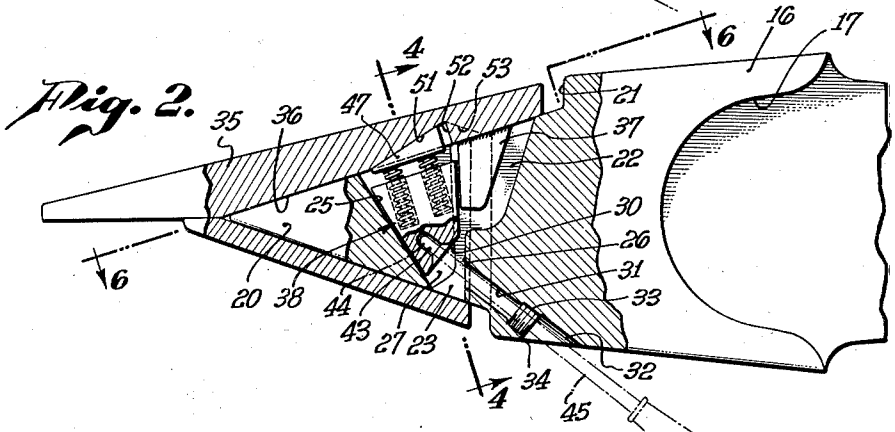


Fig. 3.

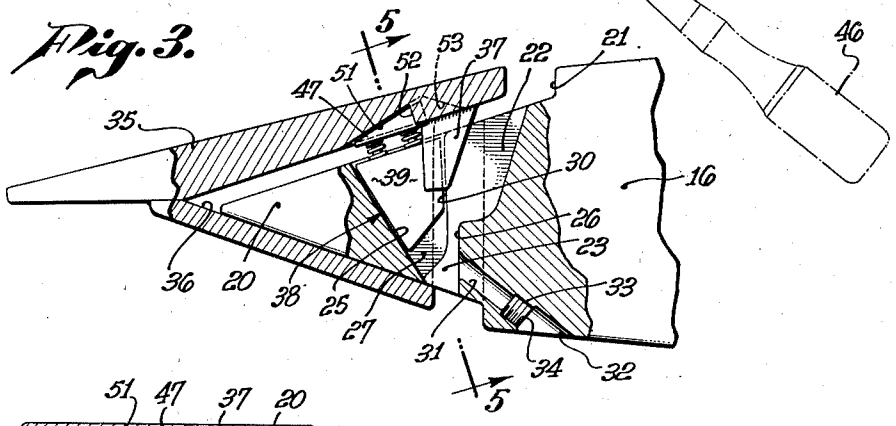
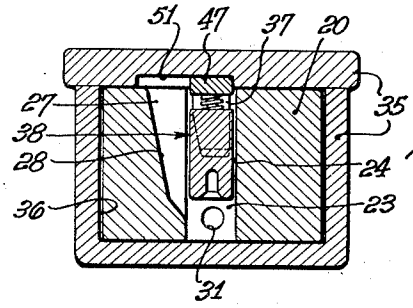


Fig. 4.



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DETACHABLE LOCKING MEANS FOR AN EXCAVATING BUCKET TOOTH

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Fig. 5.

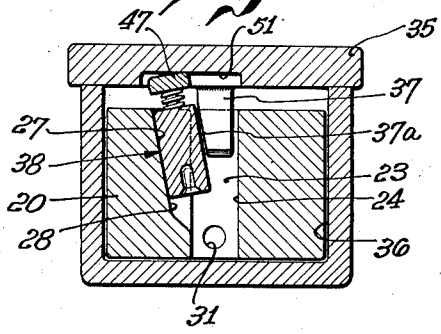


Fig. 7.

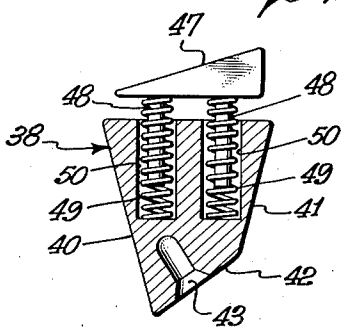


Fig. 8.

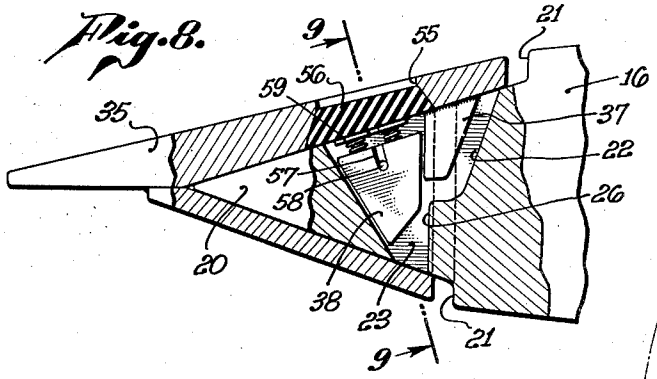


Fig. 9.

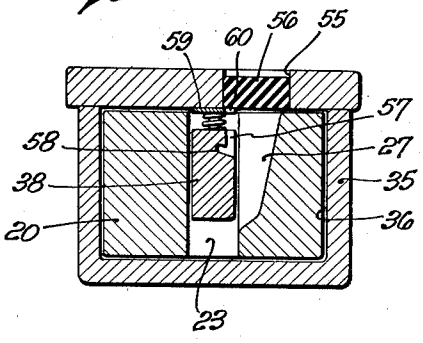
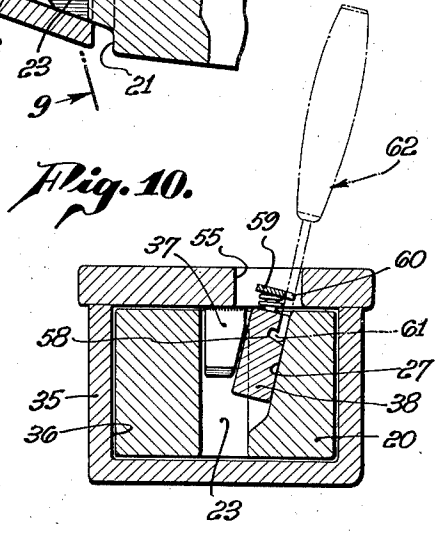


Fig. 10.



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Fig. 6.

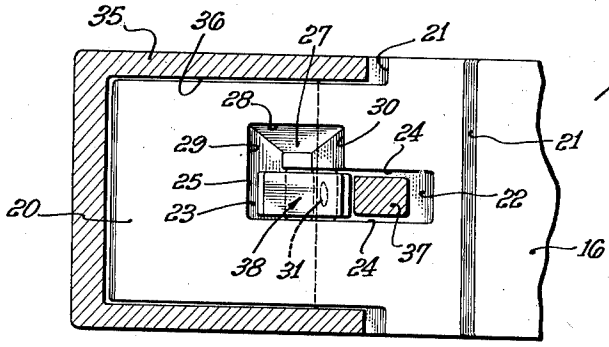


Fig. 11.

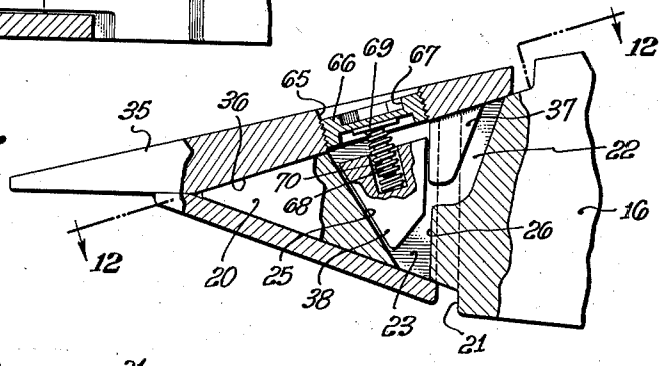


Fig. 12.

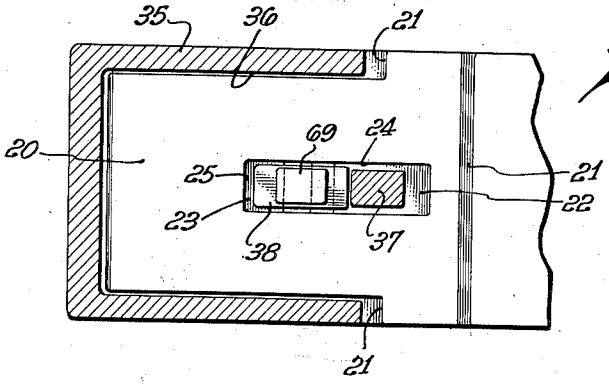


Fig. 13.

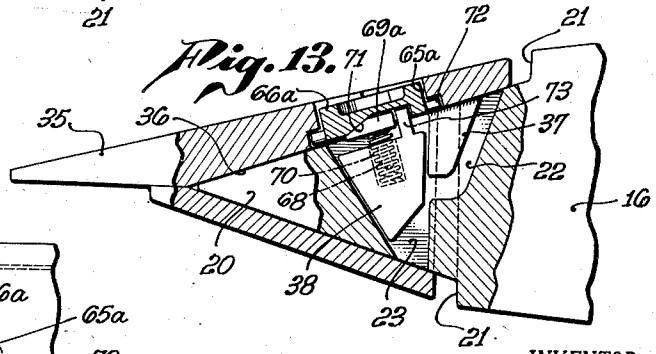
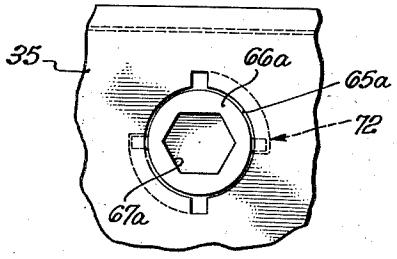


Fig. 14.



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Patented Nov. 27, 1951

2,576,225

UNITED STATES PATENT OFFICE

2,576,225

DETACHABLE LOCKING MEANS FOR AN EXCAVATING BUCKET TOOTH

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Application April 2, 1946, Serial No. 659,047

5 Claims. (Cl. 37—142)

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My invention relates to an improved digger tooth construction for digging buckets, shovel dippers, trenching machines and the like, and particularly to that type of tooth construction which includes a socketed digging point mounted on a tapered tang of a supporting body or base carried by the bucket or other earth moving implement, the point being detachably secured on the supporting body to permit of resharpening or replacement thereof.

Various means has been heretofore provided for releasably locking the digging point on the tang and in such manner as to maintain the point against loose play on the body. In all cases with which I am familiar, the construction of the point or the tang or both, is such that earth and other foreign matter can enter and clog or otherwise interfere with operation of the locking means to effect release and detachment of the point from the body. Also, the parts of the locking means are associated with the point and tang so as to be subjected to those forces produced as a result of the point being thrust into hard formations. Resultant of these forces the parts of the locking means become damaged or jammed and, hence, the locking means cannot be actuated to effect release and detachment of the point from the tang, nor does it remain effective to absorb play occurring between the point and the tang.

It is a purpose of my invention to provide a digger tooth construction embodying a locking means which is constantly and effectively operable to maintain the point releasably locked on the tang, and to automatically take up any slack occurring between the point and the tang during use of the tooth.

It is also a purpose of my invention to provide in a digger tooth construction, a point locking means which operates by gravity, or by spring pressure, or by cams, to take up play of the point on the tang to maintain the point tightly seated on the tang.

A further purpose of my invention is the provision of a digger tooth construction in which the locking means is associated with the point and tang in such manner as to be completely housed, and thus protected against the entrance of earth formations to insure permanent operativeness thereof both to the end of absorbing play of the point on the tang, and releasing the point for detachment when desired.

A further purpose of my invention is the provision of a point locking means which is correlated with the point and tang as to be protected against damage by the forces produced by the point being thrust into formations, and thus operativeness of its parts is preserved.

I will describe only four forms of digger teeth constructions, each embodying my invention, and

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will then point out the novel features thereof in claims.

In the accompanying drawings:

Fig. 1 is a view showing in perspective one form of digger tooth construction embodying my invention in applied position on the forward edge of a bucket.

Fig. 2 is an enlarged view showing in side elevation, and partly in section the tooth construction of Fig. 1, and with the tooth point in locked position on the tang.

Fig. 3 is a view similar to Fig. 1 showing the point in released position to allow detachment thereof from the tang.

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a view similar to Fig. 4 and taken on the line 5—5 of Fig. 3.

Fig. 6 is a longitudinal sectional view taken on the line 6—6 of Fig. 2.

Fig. 7 is an enlarged detail view partly in section showing the locking means for the tooth point.

Fig. 8 is a view similar to Fig. 2 showing another form of tooth construction embodying my invention.

Fig. 9 is a vertical sectional view taken on the line 9—9 of Fig. 8.

Fig. 10 is a view similar to Fig. 9 and showing the locking key in a released position.

Fig. 11 is a view similar to Fig. 8 showing a third form of digger tooth construction embodying my invention.

Fig. 12 is a sectional view taken on the line 12—12 of Fig. 11.

Fig. 13 is a view similar to Fig. 11 showing a fourth form of digger tooth construction embodying my invention.

Fig. 14 is a fragmentary plan view of the point shown in Fig. 13.

Referring specifically to the form of my invention shown in Figs. 1 to 7, the supporting body 16 of this tooth construction, is of rectangular form in cross section, tapers forwardly from its rear end; and its rear end formed with rearwardly opening socket 17 receiving a supporting boss 18 which, by any suitable means, is fixedly secured on and projects from the forward edge 19 of a bucket.

This supporting body 16 includes an integral and forwardly extending tang 20 also tapered, and bordered at its rear end on both sides and the top and bottom by shoulders indicated generally at 21. Ahead of the top shoulder, the tang 20 is formed with a slot 22 which communicates at its forward side with an opening or keyway 23 having parallel side walls 24 and downwardly converging front and rear walls 25 and 26 to give a wedge form to the opening as a whole, with the wide end uppermost and opening to the top side

of the tang. The slot 22 and the opening or keyway 23 are disposed in the same vertical plane, and one which preferably coincides with the major axis of the tang.

Laterally of the opening 23 the tang 20 is formed with a pocket 27 which opens to the top of the tang and to the opening 23 at one of its sides, the other side or wall 28 and the forward and rear edges or walls 29 and 30 converging downwardly to give a tapered form to the pocket as a whole. For a purpose to be described later herein, the rear wall 30 is in advance of the rear wall 26 of the opening 23. (See Fig. 6.)

Likewise for a purpose to be described later herein, the body 16 and the tang 20 are provided at their undersides with a common passage 31 which extends upwardly and forwardly to communicate with the lower end of the wedge opening 23. This passage has an entrance end 32 leading to a screw-threaded portion 33, the end portion exceeding in diameter that of the passage proper, and the portion receiving a plug 34 to normally close the passage.

The removable digging point of the tooth construction is indicated at 35, and is tapered substantially symmetrically with the taper of the body 16, with its rear end formed with a forwardly tapering, rearwardly opening socket 36. This socket is adapted to receive the tang 20 with a close fit, but with the rear edges of the digging point at the sides, bottom and top spaced from the shoulders 21.

Fixed adjacent the rear upper edge of the point 35 so as to extend downward into the socket 36, is a lug 37 of a width to be received in the slot 22 without contacting the walls thereof, when the tang 20 is seated in the socket. The shape of the lug 37 is such that when within the slot, its forward edge is forwardly of but parallel to the rear wall 26 of the opening 23, for a purpose to be later described herein.

The locking means of this form of my invention, for releasably securing the digging point 35 on the tang 20, may comprise a key 38 in the form of a solid body of a size to be received in the opening or keyway, and having substantially parallel sides 39, and forward and rear edges 40 and 41 converging downward to a sloping bottom edge 42, to give a wedge form to the body.

Extending inwardly from the edge 42 is a socket 43 for receiving the rounded free end 44 of a shifting tool 45 having a handle 46. The wedge key 38 may be associated with a cam 47 mounted on its upper or wide end by a pair of studs 48 fixed to the cam and surrounded by coiled compression springs 49, and the studs and springs are received in recesses 50 in the key body to allow the studs to telescope in the body against the tension of the springs.

The cam 47 is adapted to have contact with a complemental cam surface 51 formed by recessing the underside of the top wall of the socket 36. The width of this cam surface is substantially twice the width of the cam 47, and that portion thereof directly above the opening 23 terminates at the deep end in an abrupt shoulder 52, while the corresponding end of that portion of the surface above the pocket 27, terminates in a rearwardly sloping shoulder 53.

To mount the point on the tang, the key 38 must be first positioned in the pocket 27 (see Figs. 5 and 6) in order that it shall be disposed at one side of the path of movement of the lug 37 as the point is passed onto the tang. During this operation the cam 47 is engaged by the under flat surface of the point and depressed against

the tension of the springs 49 until it reaches the cam recess when it will rise into contact with the cam surface 51. Because of the outer inclined wall 28 of the pocket 27, both the cam and the key will assume a tilted position as shown in Fig. 5, and for the lug 37 to clear the key, it may be beveled on one corner thereof as indicated at 37a.

The point having been moved onto the tang so that the latter is snugly fitted in the socket 36 (see Fig. 2), the forward edge of the lug 37 is now in a position to permit the key 38 to be shifted from the pocket 27 into the opening or keyway 23. Such shifting of the key may be accomplished by first removing the plug 34, and then extending the tool 45 upwardly into the passage 31, until its end 44 engages within the socket 43. By now moving the tool laterally away from the pocket 27, (the diameter of the passage permitting of this) the key 38 together with the cam 47, can be shifted into the keyway 23 to be interposed between the forward wall 25 and the forward edge of the lug 37. (See Fig. 2). In this shifted position of the key 38, the cam 47 is still in contact with the cam surface 51, and the springs 49 are compressed to urge the key downwardly in the keyway. Also, because the rear wall 26 of the opening 23 is to the rear of the rear wall 30 of the pocket 27, the key, once moved into the opening, cannot fall back into the pocket.

Because of the tapering form of the wall 25, the forward edge of the lug 37, and the corresponding tapering of the forward and rear edges 40 and 41 of the key 38, it becomes clear that the key, under the pressure of the springs, functions to lock the point on the tang. Once such locking is effected, the tool 45 is withdrawn from the passage 31, and the plug 34 reapplied to close the passage against the entrance of earth or other foreign matter. As so locked the point is snugly fitted on the tang, but the rear edges of the point are and permanently remain out of contact with the body shoulders 21, as also does the forward edge of the lug 37. However, there is a bridging of the lower end of the keyway and the upper ends of the keyway, pocket 27 and slot 22, by the point 35 to close these cavities against the entrance of earth and other foreign matter, so that in conjunction with the plug 34, the parts of the point locking means are completely housed and thus maintained operative to release the point when desired.

With the point 35 locked on the tang 20 as described, any movement of the point rearwardly on the tang causes a corresponding movement of the lug 37. As this occurs, the key under the action of the springs 49, moves downward in the keyway to absorb the movement of the lug, and take up any possible play of the point on the tang to maintain the point tightly fitted on the tang.

Under rearward movement of the point the cam surface 51 is moved likewise, to force the cam 47 downward, and in this manner any loss of tension of the springs 49 by reason of downward adjustment of the key to compensate for rearward movement of the lug 37, is restored to insure holding of the key in firm contact with both the lug 37 and the tang wall 25.

Any tendency of the point to move forwardly on the tang resultant of dragging the point rearwardly out of a formation, is resisted not only by the key 38 but by the cam 47 abutting the shoulder 52.

The greater the angle between the surfaces of

the wall **25** and the forward edge of the lug **37**, the greater the tendency of the wedge key to slip upwardly in the keyway and loosen the point. As so designed this angle is about 30 degrees in order that the key may be easily moved upward by the tool **45** to release the point as will be later described, but to prevent such accidental movement as well as to insure proper downward feeding of the key, the springs **49** are employed. Should the angle be decreased to prevent any such upward slipping tendency, then the springs could be dispensed with but naturally, it would require more manual effort to raise the key by the tool. Also, where no springs are employed, gravity can be relied upon to feed the key downward to take up any play occurring between the point and tang and thus maintain the point tightly on the tang.

To operate the locking means to release the point for detachment from the tang, the plug **34** is first removed, and then the tool **45** extended through the passage **31** into the socket **43**, whereupon by first forcing the tool upwardly the key is raised in the keyway, and then by pressing the tool toward the pocket **27**, the key can be pushed back into the pocket. Thus the key is now to one side of the lug **37**, so that the point is ready for removal from the tang.

As the point is removed, the wide end of the cam **47** engages surface **53**, and because the latter slopes downward, it presses the cam downward against the tension of the springs **49** to permit the point to pass over the cam and off of the tang. The key cannot fall back into the keyway during this point removing operation, because the key is in tilted position against the pocket wall **28** and pressed downward in the pocket by the springs **49** and the cam **47**, to hold it in such position.

Referring now to Figs. 8, 9, and 10, I have here shown another digger tooth construction in which the tang **20** and the point **35** are the same in construction as in the first form, with the following exceptions:

The tang is without the passage **31**, and the point is without the cam recess **51**. The point instead has in its upper socket wall, an opening **55** therethrough directly above the pocket **27**, normally closed by a compressible plug **56** preferably formed of rubber. The opening way **55** may be rectangular with its end walls chamfered (see Fig. 8), and the plug correspondingly shaped so as to be under compression when within the opening, to secure the plug against accidental removal from the opening.

The wedge key **38** is also identical to the first form, except it is provided in one of its sides with a groove **57** leading downward to a socket **58**. Also, the cam **47** is substituted by a flat head **59**, with a recess **60** in its right hand edge.

The key **38** is insertable into the pocket **27** through the opening **55** by first removing the plug **56**, and it can be moved laterally into the keyway **23** and in advance of the lug **37**, by extending the hooked end **61** of a tool **62** downwardly through the opening, the recess **60**, the groove **57**, and finally into the socket **58**, when, by moving the tool toward the keyway and pressing downwardly, the key and the head **59** can be moved into the keyway with the head beneath the upper wall of the point socket (see Fig. 9).

In this position, the key coacts with the wall **25** and the lug **37** to lock the point on the tang and to take up any play which might develop between the point and the tang, as in the first form of my invention.

Once the key is in locking position, the plug **56** is replaced in the opening **55** to close such opening against the entrance of earth formations into the pocket **27**, and there being no other openings through which earth can enter the point socket or the tang, it becomes manifest that operativeness of the point locking parts is preserved to insure release and detachment of the point when desired.

When detaching the point, the key can be shifted from the keyway **23** to the pocket **27** by first removing the plug **56**, extending the tool **62** downwardly through the opening, and then laterally to cause the hook **61** to seat within the socket **58**, when, by reversing the aforesaid movements of the tool, the key can be moved into the pocket, and withdrawn from the pocket if desired.

Referring to the form of my invention shown in Figs. 11 and 12, this digger tooth construction likewise comprises a digging point **35** having a tapered socket **36** receiving a tapered tang **20**. The tang has a tapered keyway **23** extending vertically therethrough, and a slot **22** to the rear of the keyway, but the pocket **27** is omitted.

The point **35** is likewise provided with the lug **37** receivable in the slot **22**, but the upper wall of the point socket is formed with circular opening **65** directly above the keyway, which is normally closed by a plug **66** screw-threaded therein, and having a wrench receiving socket **67** for turning the plug. The locking wedge key **38** is insertable into the keyway **23** through the opening **65**, upon removal of the plug **66**.

For urging the key downward to lock and absorb play of the point on the tang, a stud **68** is telescopically fitted in the upper end of the key, and on the upper end of the stud is fixed a flat head **69**. Surrounding the stud and fitted in the key, is a coiled spring **70**.

With the plug **66** applied, its inner side bears against the head **69** to maintain the spring **70** under compression and thereby cause the spring to urge the key downward and hold it in firm contact with the wall **25** and the lug **37** to lock the point on the tang, and to feed the key downward as the lug moves rearward to absorb any play which may develop between the point and the tang. To detach the point from the tang, the key can be removed from the keyway by first removing the plug.

Referring to Figs. 13 and 14, a fourth form of digger tooth construction is disclosed, which is identical to the form shown in Figs. 11 and 12, with the following exceptions:

The head **69***a* is in the form of a cam, and under the pressure of the spring **70**, engages a cam surface **71** on the under side of a plug **66***a* removably secured in an opening **65***a* in the top of point **35** by a bayonet slot connection **72**.

The cam **69***a* coacts with the surface **71** in the same and for the same purpose as described in connection with the cam **47** and the surface **51**, of the first form of my invention.

To prevent possible shearing of the cam **69***a* off of the stud **68**, under the force exerted axially thereagainst by the surface **71** as the point is moved rearwardly on the tang, a projection **73** is fixed to the key **38** at the wide end of the cam to engage the latter and thus brace the cam against axial movement.

Certain structural and functional characteristics are common to all forms of my invention. The wedge key being within a vertically disposed wedge keyway, is responsive to gravity to automatically feed the key downward to maintain it in engagement with the lug, which serves not

only to lock the point on the tang, but to absorb any play developing between the point and tang. To prevent possible slippage of the key upwardly, springs are employed to positively urge the key downwardly.

In addition, in all cases the keyway, the key and the other parts of the point locking means are completely enclosed in the tang by the point socket, so that earth formations cannot gain access to the locking means and thus damage or interfere with operation of the locking means when required to release and detach the point. Last, but not least, the locking means parts, by virtue of being contained wholly within the tang, are not subject to the damaging forces of the point when digging, and, hence, remain operative at all times.

Although I have herein shown and described only four forms of digger tooth constructions embodying my invention, it is to be understood that various changes and modifications may be made therein without departing from the spirit of my invention and the spirit and scope of the appended claims.

I claim:

1. A digger tooth construction, including: a supporting body having a forwardly extending tang provided with a tapered opening extending downwardly therethrough, a tapered pocket laterally of and communicating with said opening, and a recess rearwardly of and alined with said opening; a point having a rearwardly opening socket receiving said tang; a lug fixed to said point within said socket; and a wedge key normally in said pocket to allow application of said point to said tang, but after application shiftable from said pocket into said opening by extending a tool upwardly through the bottom of said opening, so as to be interposed between said lug and the forward tapered wall of said opening to coact therewith in locking said point on said tang, and whereby as said lug moves rearwardly under rearward movement of said point, said key will gravitate downwardly in said opening to take up play between the key and the lug.

2. A digger tooth construction, including: a supporting body having a forwardly extending tang provided with a tapered opening extending downwardly therethrough, a tapered pocket laterally of and communicating with said opening, and a recess rearwardly of and alined with said opening; a point having a rearwardly opening socket receiving said tang; a lug fixed to said point within said socket; a wedge key normally in said pocket to allow application of said point to said tang, but after application shiftable from said pocket into said opening by extending a tool upwardly through the bottom of said opening, so as to be interposed between said lug and the forward tapered wall of said opening to coact therewith in locking said point on said tang; and resilient means between said point and said key for urging said key downwardly in said opening, whereby as said lug moves rearwardly under rearward movement of said point, said key operates to take up play between the key and the lug.

3. A digger tooth construction, including: a supporting body having a forwardly extending tang provided with a tapered opening extending downwardly therethrough, a tapered pocket laterally of and communicating with said opening, and a recess rearwardly of and alined with said opening; a point having a rearwardly opening socket receiving said tang; a lug fixed to said point within said socket; a wedge key normally in said pocket to allow application of said point to said tang, but after application shiftable from said pocket into said opening by extending a tool upwardly through the bottom of said opening, so as to be interposed between said lug and the forward tapered wall of said opening to coact therewith in locking said point on said tang; and cams on said point and said key coacting under rearward movement of said point on said tang to press said key downwardly to take up play between the key and the lug.

4. A digger tooth construction, including: a supporting body having a forwardly extending tang provided with a tapered opening extending downwardly therethrough, a tapered pocket laterally of and communicating with said opening, and a recess rearwardly of and alined with said opening; a point having a rearwardly opening socket receiving said tang; a lug fixed to said point within said socket; a wedge key normally in said pocket to allow application of said point to said tang, but after application shiftable from said pocket into said opening by extending a tool upwardly through the bottom of said opening, so as to be interposed between said lug and the forward tapered wall of said opening to coact therewith in locking said point on said tang; cams on said point and said key coacting under rearward movement of said point on said tang to press said key downwardly to take up play between the key and the lug; and spring means between the key cam and the key for urging the key downwardly.

5. A digger tooth construction, including: a supporting body having a forwardly extending tang provided with a tapered opening extending downwardly therethrough, a tapered pocket laterally of and communicating with said opening, and a recess rearwardly of and alined with said opening; a point having a rearwardly opening socket receiving said tang; a lug fixed to said point within said socket; a wedge key normally in said pocket to allow application of said point to said tang, but after application shiftable from said pocket into said opening by extending a tool upwardly through the bottom of said opening, so as to be interposed between said lug and the forward tapered wall of said opening to coact therewith in locking said point on said tang; resilient means between said point and said key for urging said key downwardly in said opening, whereby as said lug moves rearwardly under rearward movement of said point, said key operates to take up play between the key and the lug; and cam means between said point and said resilient means, acting under rearward movement of said point on said tang, to compensate for any loss in tension of said resilient means resultant of downward movement of said key.

MORGAN D. HOSTETTER.

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