March 5, 1968 R. W. SWANSON 3,371,436

DIGGER TOOTH WITH REPLACEABLE POINT

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FIG. 1.

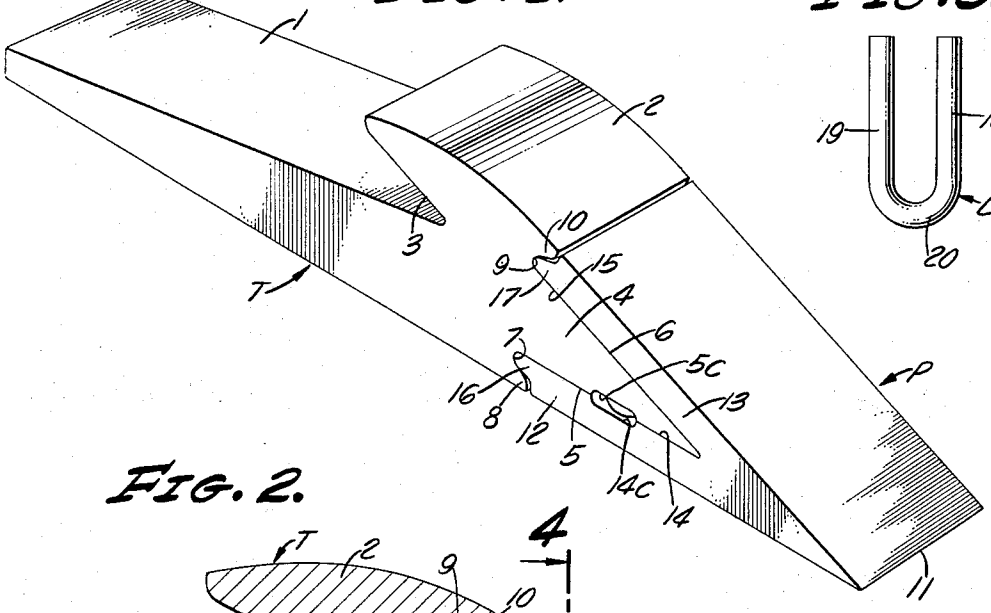
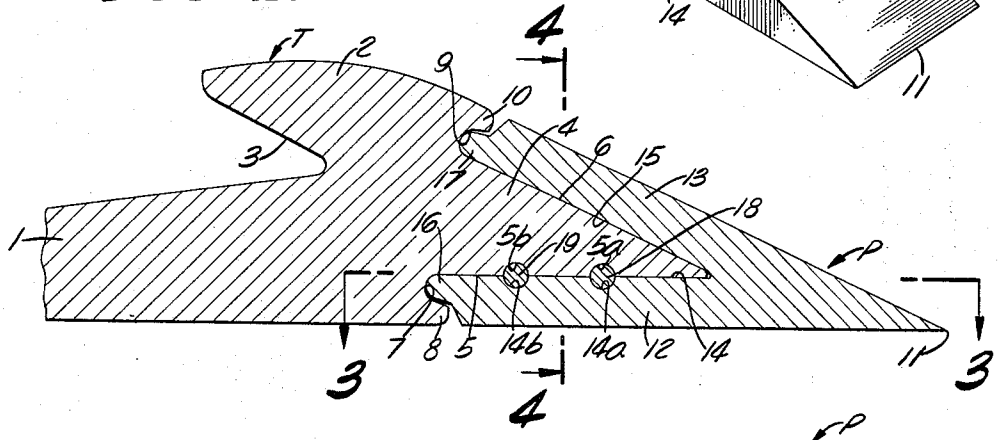


FIG. 5.

FIG. 2.



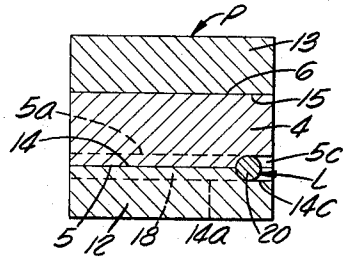


FIG. 4.

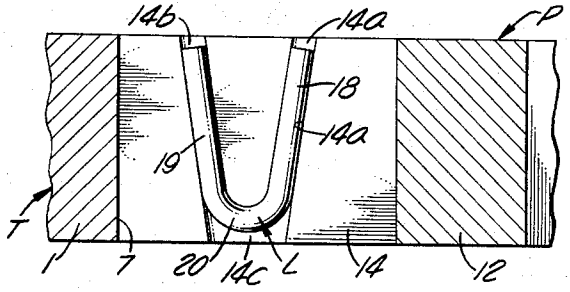


FIG. 3.

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DIGGER TOOTH WITH REPLACEABLE POINT

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ABSTRACT OF THE DISCLOSURE

A digger tooth assembly having a tooth body, a point mounted on the body for separation from the body by selective relative movement of the point with respect to the body along longitudinal and lateral direction lines of the body, and one or more removable keys disposed within keyways recessed into co-engaging faces on the body and point and extending in acute angular relation to both the longitudinal and lateral direction lines of separation movement of the point from the body in such a way that the point is releasably keyed against both longitudinal and lateral separation from the body.

The present invention relates to digger teeth and more particularly to a digger tooth having a replaceable point.

In the use of earth digging equipment such as power operated shovels, buckets, clamshells, and the like, it is the practice to provide the digging edge of the equipment with digging teeth having replaceable points. The present invention contemplates such a digger tooth having a replaceable point removably secured thereto in such a manner that the point is engaged with the tooth so as to be resistant to the strains to which the point is subjected during use, but yet is readily detachable from the digger tooth.

In the usage of replaceable point digger teeth, removal of the point should desirably be permitted without particular regard for the disposition of the bucket, shovel, clamshell or the like on which the tooth is mounted and without hinderance by earth or clay which may be deposited between the teeth. Therefore, an object of the present invention is to provide a removable digger tooth point which may be removed by shifting the point either laterally of the tooth or longitudinally of the tooth following the removal of a retaining element.

In addition, it is desirable that retaining means for holding removable digger tooth points upon the digger tooth be susceptible of removal with ease and that such retaining means not be subjected to the damaging effect of the passage of the tooth through the earth, but instead, the retaining element should desirably be protected. Therefore, another object of the invention is to provide retainer means for holding a replaceable digger tooth point on the digger tooth body, which retainer means is completely protected when installed and which may be readily and easily removed.

In a more specific sense, an object of the invention is to provide a digger tooth point and digger tooth assembly wherein the point is removably retained upon the digger tooth body by a retainer or locking element which cooperates with the digger tooth body and with the point to hold the point against movement laterally of the body as well as to hold the point against movement longitudinally of the body, but the point being separable from the digger tooth body upon removal of the retainer element, either laterally or longitudinally of the body.

Other objects and advantages of the invention will be hereinafter described or will become apparent to those skilled in the art, and the novel features of the invention will be defined in the appended claims.

In the accompanying drawing:

FIG. 1 is a view in perspective illustrating a digger tooth and removable point assembly made in accordance with the present invention;

FIG. 2 is a fragmentary view in longitudinal section through the assembly of FIG. 1;

FIG. 3 is a fragmentary view in section as taken on the plane of the line 3—3 of FIG. 2;

FIG. 4 is a transverse sectional view as taken on the line 4—4 of FIG. 2; and

FIG. 5 is a detailed view in plan showing the resilient retainer element employed in the assembly.

Like reference characters in the several views of the drawing and in the following description designate corresponding parts.

In FIG. 1 there is illustrated one form of digger tooth and replaceable point assembly wherein the digger tooth is generally designated at T and the replaceable point is generally designated at P. The tooth comprises, as is customary, a shank 1 joined with a body 2, the body and shank defining therebetween a generally V-shaped slot 3 whereby the tooth may be mounted at the ground engaging edge of earth digging or excavating equipment such as a bucket, shovel, clamshell, or the like, whereat the tooth T is customarily welded or otherwise suitably secured to the bucket, shovel, clamshell, or the like.

Projecting outwardly from the body 2 in the illustrative embodiment of the invention is a V-shaped section 4 having a lower face 5 extending generally longitudinally of the tooth T and an upper face 6 diverging relative to the face 5. At the juncture of the face 5 with the body 2 the latter is formed with a transversely extended groove 7 spaced inwardly from the base of the body and a forwardly extended flange 8. Similarly, at the juncture of the face 6 with the body 2 the latter is provided with a transversely extended groove 9 spaced inwardly from the upper surface of the body 2 and a forwardly extended flange 10.

Point P is generally V-shaped and has a cutting edge 11 adapted for engagement in the earth, and extended rearwardly from the cutting edge 11 are a pair of divergent walls 12 and 13. The walls 12 and 13 have inner divergent faces 14 and 15 which are complemental to the divergent faces 5 and 6 on the V-shaped section 4 of the tooth T. At the rearward extemities of the walls 12 and 13 they are provided with means coengageable in and with the grooves and flanges 7, 8, and 9, 10, respectively, on the body 2 to stabilize the point P against rocking motion on the V-shaped section 4.

As herein illustrated, the wall 12 is provided with an edge flange 16 which extends into the groove 7 in overlapped relation to the flange 8 and the wall 13 of the point is provided with an edge flange 17 which extends into the groove 9 in overlapped relation with the flange 10. It will be observed from the foregoing that the point P may be placed on the V-shaped section 4 by a simple relative longitudinal movement whereby to cause the walls 12 and 13 of the point to coengage with the faces 5 and 6 of the V-shaped section of the body 2. In addition, the faces 5 and 6 and the complemental faces 14 and 15 are preferably disposed in parallel relation to one another in all transverse planes so that the point P may be moved laterally relative to the V-shaped section 4 without interfacial interference.

In accordance with one of the features of the invention, it is desired that a simple yet efficient and well protected means be provided for releasably connecting the point P to the body 2 of tooth T, therefore, there is provided a locking means which effects co-engagement between the V-shaped section 4 of the tooth body 2 and one of the divergent and complemental point faces. This

locking means is so constructed as to cooperate with the V-shaped section 4 and point P in such a manner as to prevent both longitudinal movement of the point relative to the tooth body and lateral movement of the point relative to the tooth body. Illustrative of such a locking means is a generally U-shaped locking element L comprising a pair of arms 18 and 19 interconnected by a bight portion 20. Each of the arms 18 and 19 effectively constitutes a key, and in the illustrative embodiment the complemental face 5 of section 4 and face 14 of the point P are provided with opposing grooves respectively designated 5*a* and 14*a* for reception of the arm 18, and said faces are also provided with opposing grooves 5*b* and 14*b* for reception of the arm 19. In addition, the point P is recessed at 5*c* adjacent one end of the grooves 5*a* and 5*b* to provide a clearance space for reception of the bight portion 20 of the locking member L. Similarly, the face 14 is provided with a recess 14*c* adapted to register with the recess 5*c* when the point is disposed upon the V-shaped section 4 for the reception of the bight portion 20 of the locking element 1 so that said bight portion may be disposed wholly inwardly of the side face of the tooth and point assembly in a fully protected location.

As best seen in FIG. 3, the grooves 14*a* and 14*b*, and likewise it will be understood, the grooves 5*a* and 5*b* are at an angle of more or less than 90° to a plane longitudinally of the assembly so that each of the locking element arms 18 and 19 when disposed in the grooves will prevent lateral movement of the point relative to the body 2 and will also prevent longitudinal movement of the point relative to the body 2.

The locking element L is constructed so that it will be self-locking, or in other words, inherently retained in the grooves 5*a*, 14*a* and 5*b*, 14*b*. Thus, as seen in FIG. 5, the locking element L is normally generally U-shaped with the arms 18 and 19 disposed in substantial parallelism. However, the bight portion 20 resiliently interconnects the arms 18 and 19 to allow the latter to be moved divergently upon insertion of the free extremities of the arms 18 and 19 through the opening formed by recesses 5*c* and 14*c* into the arm receiving grooves 5*a*, 14*a* and 5*b*, 14*b*. However, the locking element L may be readily removed from locking coengagement between the point and the V-shaped projection 4 by the simple insertion of a drift or other instrument into one of the openings into engagement with an end of either of the arms 18 and 19 and tapping the drift or other instrument with a hammer to drive the locking element out of the assembly in the direction of the bight portion 20.

While specific details of the invention have been herein shown and described, it should be understood that changes and alterations may be resorted to without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. A digger tooth assembly, comprising: a tooth body; a point; means removably locking said point on said body; said body and said point having coengaged surfaces extending longitudinally thereof; said surfaces being transversely planar whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; and said locking means including a pair of keys and keyways formed between said coengaged surfaces of said body and said point; said keys and said keyways being disposed at divergent acute angles relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body.

2. A digger tooth assembly, comprising: a tooth body; a point; means removably locking said point on said body; said body and said point having coengaged surfaces extending longitudinally thereof; said surfaces being transversely planar whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; said locking means including a pair of keys and keyways formed between said coengaged surfaces of said body and said point; said keys and said keyways being disposed at divergent acute angles relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body; and a bight portion interconnecting said keys.

3. A digger tooth assembly, comprising: a tooth body; a point; means removably locking said point on said body; said body and said point having coengaged surfaces extending longitudinally thereof; said surfaces being transversely planar whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; said locking means including a pair of keys and keyways formed between said coengaged surfaces of said body and said point; said keys and said keyways being disposed at divergent acute angles relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body; and a bight portion interconnecting said keys; said body and said point having recesses defining an opening in which said bight portion is disposed.

4. A digger tooth assembly, comprising: a tooth body having a forwardly extending section projecting therefrom and having transversely planar faces; a point having walls provided with transversely planar faces complemental with said faces on said projection, whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; one of said faces on said projection and one of said faces on one of the walls of said point having complemental pairs of divergent grooves forming keyways; a pair of keys disposed in said keyways and locking said point on said section; each said keyway and key extending at an acute angle relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body; and said keyways opening laterally at one side of said section and point.

5. A digger tooth assembly, comprising: a tooth body having a forwardly extended section projecting therefrom and having transversely planar faces; a point having walls provided with transversely planar faces complemental with said faces on said projection, whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; one of said faces on said projection and one of said faces on one of the walls of said point having complemental pairs of divergent grooves forimng keyways; a pair of keys disposed in said keyways and locking said point on said section; each said keyway and key extending at an acute angle relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body; said section and point having recesses defining an opening at one side of said section and point leading into said keyways; and a bight portion interconnecting said keys and disposed in said opening.

6. A digger tooth assembly, comprising: a tooth body having a forwardly extended section projecting there-

from and having transversely planar faces converging toward the outer extremity of said section; a point having walls with faces complemental with said faces on said projection, whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; one of said faces on said projection and one of said faces on one of the walls of said point having complemental pairs of divergent grooves forming keyways; a pair of keys disposed in said keyways and locking said point on said section each said keyway and key extending at an acute angle relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body; and said keyways opening laterally at one side of said section and point.

7. A digger tooth assembly, comprising: a tooth body having a forwardly extended section projecting therefrom and having transversely planar faces converging toward the outer extremity of said section; a point having walls with faces complemental with said faces on said projection, whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; one of said faces on said projection and one of said faces on one of the walls of said point having complemental pairs of divergent grooves forming keyways; a pair of keys disposed in said keyways and locking said point on said section; each said keyway and key extending at an acute angle relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said keys lock said point against both longitudinal and lateral separation from said body; said section and point having recesses defining an opening at one side of said section and point leading into said keyways; and a bight portion interconnecting said keys and disposed in said opening.

8. A digger tooth assembly, comprising: a tooth body having a forwardly extended section projecting therefrom and having transversely planar faces converging toward the outer extremity of said section; a point having walls with faces complemental with said faces on said projection, whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; one of said faces on said projection and one of said faces on one of the walls of said point having complemental pairs of divergent grooves forming keyways; and a resilient generally U-shaped key having a pair of arms and a bight portion connecting said arms in laterally spaced relation; said arms being disposed in said keyways for locking said point on said section, said keyways and said key arms extending at acute angles relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said key locks said point against both longitudinal and lateral separation from said body.

9. A digger tooth assembly, comprising: a tooth body having a forwardly extended section projecting therefrom and having transversely planar faces converging toward the outer extremity of said section; a point having walls with faces complemental with said faces on said projection, whereby said point may be separated from said body by movement of said point relative to said body along direction lines extending, respectively, longitudinally and laterally of said body; one of said faces on said projection and one of said faces on one of the walls of said point having complemental pairs of divergent grooves forming keyways; a resilient generally U-shaped key having a pair of arms and a bight portion connecting said arms in laterally spaced relation; said arms being disposed in said keyways for locking said point on said section, said keyways and said key arms extending at acute angles relative to both the longitudinal direction line and the lateral direction line of separation movement of said point relative to said body, whereby said key locks said point against both longitudinal and lateral separation from said body; and said section and point having recesses defining an opening at one side of said section and said point leading into said keyways; said bight portion being disposed in said opening.

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