May 12, 1959 G. W. HILL 2,885,801

TOOTH STRUCTURE FOR TRENCHERS AND THE LIKE

Filed March 6, 1956

Fig. 1

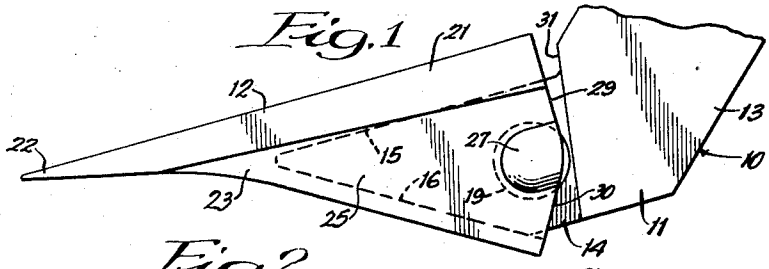


Fig. 2

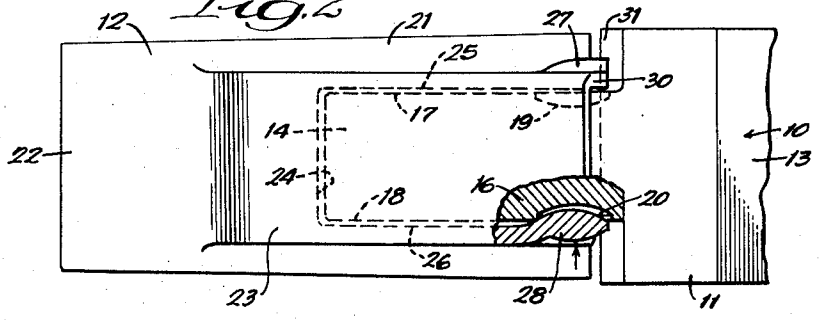


Fig. 3

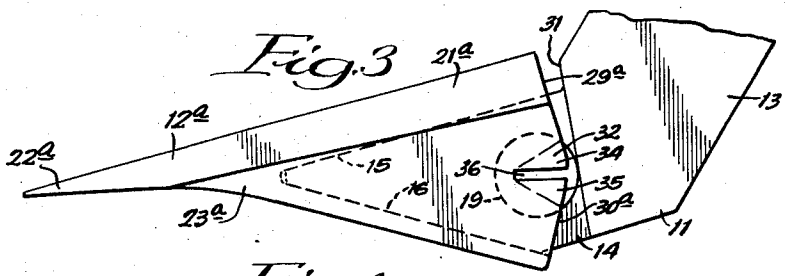


Fig. 4

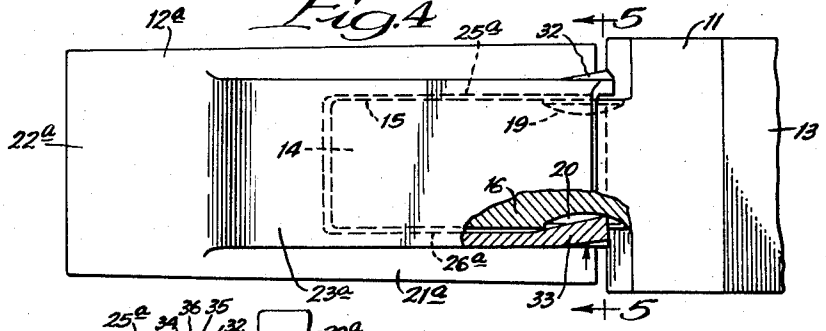
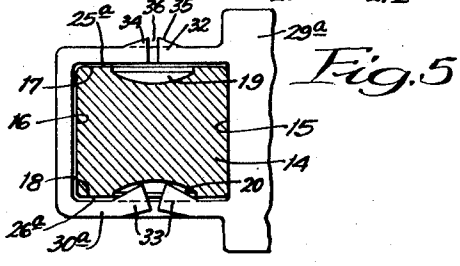


Fig. 5



INVENTOR.
George W. Hill,
BY
Dawson, Tilton & Graham,
ATTORNEYS.

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TOOTH STRUCTURE FOR TRENCHERS AND THE LIKE

George W. Hill, Newberg, Oreg., assignor to Electric Steel Foundry Company, Portland, Oreg., a corporation of Oregon

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3 Claims. (Cl. 37—142)

This invention relates to a tooth structure for trenchers and the like, and more especially to a tooth structure of two-piece construction comprising an adapter and box point, and to a means for locking the point in position upon the adapter.

In structures of this type, the adapter is carried by the bucket and is a somewhat malleable member providing great toughness. The box point, on the other hand, has hardened surfaces that offer considerable resistance to wear, and it is mounted upon the adapter in covering relation thereabout. The box point protects the relatively soft surfaces of the adapter, while the adapter provides considerable strength for the tooth structure. However, even though the box point has hardened surfaces that are wear-resistant, in time it will require replacement; and there is a need then to provide a means for removably securing the box point in position upon the adapter.

As a result, various arrangements have been devised for releasably securing the box point upon the adapter, and among these arrangements wherein the adapter is provided with recesses or channels, and the box point provided with malleable areas that can be pounded into the recesses or channels to effectuate a locking engagement therewith. The difficulty with known arrangements of this type is two-fold. First, they require the time and efforts of at least two persons to mount the box point upon the adapter—one for holding a punch or other driving tool, and the other to manipulate the hammer for impacting the punch. As an alternative to this arrangement, special tools and instruments must be used to force portions of the box point into the recesses or channels provided in the adapter. Secondly, known arrangements of this character make it difficult to remove the box point when this becomes necessary, with the result that considerable time and expense is involved in each removal of a box point.

It is, accordingly, an object of this invention to provide a tooth structure of the general character described that will overcome these and other disadvantages. Another object of the invention is in the provision of a tooth structure having an adapter and a box point removably mountable thereon, and wherein means are provided that will enable one man to secure the box point in position upon the adapter and that will permit the point to be removed with relative facility from the adapter when removal is required.

A further object is that of providing a box point adapted for mounting upon an adapter having locking recesses, and in which the box point is provided with a built-in punch for receiving hammer blows for hammering or driving portions of the box point into the recesses of the adapter for effectuating an interlock therebetween. Yet a further object is to provide a tooth structure comprising an adapter having a locking recess or recesses in certain of the walls thereof (the inclined bottom wall, for example, or the side walls as shown in the drawing),

and a box point adapted to be mounted upon the adapter and having areas of enlarged thickness alignable with the locking recess or recesses if there are more than one, these areas of enlarged thickness forming a head that initially provides a target or anvil adapted to be struck by hammer blows, and ultimately providing locking tongues after being driven into the recesses by such hammer blows. Additional objects and advantages will become apparent as the specification develops.

Embodiments of the invention are illustrated in the accompanying drawing, in which:

Figure 1 is a side view in elevation of a tooth structure embodying the invention; Figure 2 is a bottom plan view of the tooth structure shown in Figure 1, and in which certain portions of the tooth are broken away and shown in section; Figure 3 is a side view in elevation of a modified form of tooth structure; Figure 4 is a bottom plan view of the tooth structure illustrated in Figure 3, and in which certain portions of the tooth are broken away and are illustrated in section; and Figure 5 is a transverse sectional view taken along the line 5—5 of Figure 4.

The tooth structure illustrated in Figure 1 is designated generally with the numeral **10**, and comprises an adapter **11** and a box point **12**. The adapter **11** has a base **13** and nose **14** extending forwardly therefrom. The base **13** is adapted to be secured to a bucket or some similar earth-handling device, and may be attached thereto in any of a number of suitable manners well known in the art. For example, the base may be welded or secured by bolts to the lip of a bucket.

The nose **14** has a top wall **15** and a bottom wall **16** that taper with respect to each other to form a wedge in the general shape of a V. The side walls **17** and **18** of the nose, on the other hand, are substantially parallel with each other, as is shown best in Figure 2. The parallel side walls **17** and **18**, also as is shown most clearly in Figure 2, are provided respectively with depressed portions or locking recesses **19** and **20**, that in plan view are circular and that are arcuate so as to provide a relatively deep central portion and relatively shallow edge portions that are connected together by a smooth arcuate path. The locking recesses **19** and **20** are positioned generally intermediate the tapered top and bottom walls adjacent the area thereof where the nose **14** merges with the base **13**.

The box point **12** that is illustrated in Figures 1 and 2 has a hardened top wall **21** that tapers slightly toward the forward end thereof to provide a spike or cutting end **22**. Depending from the top wall **21** is a socket portion **23** that provides a tapered socket **24** therein that, from top to bottom thereof, is generally wedge-shaped so as to snugly accommodate therein the generally wedge-shaped nose **14** of the adaptor. Therefore, the top and bottom walls of the socket **24** are generally V-shaped and define an acute angle therebetween, while the side walls of the socket are substantially parallel and are adapted to extend in parallel relation along the side walls **17** and **18** of the nose. For purposes of identification, the side walls of the socket are designated with the numerals **25** and **26**.

While the top wall **21** of the box point is hardened to provide a wear-resistant work surface, the socket portion **23** is relatively malleable, and especially so are the walls **25** and **26** thereof. These walls **25** and **26** have adjacent the rear ends thereof areas of enlarged thickness that provide, respectively, heads **27** and **28**. The heads are alignable with the locking recesses **19** and **20** in the side walls of the nose **14**, as is clear from Figure 2. The heads **27** initially provide a target area or an anvil that projects outwardly from the plane of the side walls, as

is shown by the head **27**. Ultimately, the heads provide locking tongues that are received within the locking recesses, as is shown by the head **28** in Figure 2.

The heads are adapted to be pounded into the recesses of the adapter upon striking the heads with heavy hammer blows. Prior to the receipt of such blows, the side walls **25** and **26** of the socket portion extend in parallel relation, and interiorly in planar relation throughout their entire length, as is shown by the wall **25** in Figure 2. When the heads have been driven in to the locking recesses, as is shown by the head **28** provided in the side wall **26** in the Figure 2 illustration, the side walls are substantially planar along their outer surfaces while the head assumes an arcuate configuration corresponding to that of the locking recess in which it is embedded. In the form of the box point **12** shown in Figures 1 and 2, the heads are generally semi-circular in plan view. The heads are located at the apex of the angularly oriented rear end wall portions **29** and **30** of the box point, and these wall portions are spaced from the forward wall **31** of the base **13**.

The form of the invention shown in Figures 3 and 4, and also in sectional view in Figure 5, is substantially identical in structure with the form shown in Figures 1 and 2 and that has been heretofore described in detail. The adapter **11** is the same and, therefore, all of the parts thereof are designated with the same identification numerals. The box point is substantially the same, and to simplify the description all of the parts thereof that are identical have been designated with the same reference numeral, but with the letter "*a*" affixed thereto.

The difference in structure resides in the heads **32** and **33** carried, respectively, by the side walls **25***a* and **26***a* of the socket portion **23***a*. As is shown most clearly in Figure 5, each of the heads **32** and **33** comprises a pair of slitted ears **34** and **35** that are spaced apart by a slot **36**. Initially, the heads project outwardly from the outer face of the side walls and form a target or anvil that can be impacted by a hammer. Ultimately, and after the head—or more particularly, the ears **34** and **35**—have been driven into the locking recesses of the adapter, the head forms a locking tongue that anchors the box point in position upon the nose of the adapter.

Operation

In use of the structure, the box point **12** or **12***a* is positioned upon the nose **14** of the adapter, and is driven rearwardly thereon to bring the heads **27** and **28** into alignment with the locking recesses **19** and **20**, respectively (or the locking heads **32** and **33** into alignment with the locking recesses). The heads have an enlarged thickness and project outwardly from the side walls of the socket portion and form targets or anvils that can be struck impact blows by a hammer. Thus, after the box point is positioned upon the adapter, a single workman may complete the mounting by securing the box point to the adapter simply by driving the heads into the locking recesses.

In the case of the heads **27** and **28**, hammer blows may be directed toward the center portions of those heads; while with the heads **32** and **33**, the ears **34** and **35** thereof may be individually driven into the locking recesses or both of the ears may be impacted simultaneously. Following these operations, the outer surfaces of the walls **25** and **26**, or **25***a* and **26***a*, provide unobstructed planar surfaces unencumbered by protuberances etc. projecting outwardly therefrom. Initially, the inner surfaces of the socket walls are planar so that there is no interference to the free movement of the box point onto the noses of the adapters.

After the heads are positioned in the locking recesses, they form an interlock therewith that prevents inadvertent removal of the box point from the adapter, and the locking tongues or heads provide sufficient resistive force so that the tooth structure is able to meet all of the load and usage requirements imposed thereon.

In removal of the box point, when this is required, it is found that the box point can be removed without much difficulty by either a wedge driven between the wall **31** of the adapter and wall portions **29** or **30** of the box point, or by simply impacting the hardened top wall **21** with forwardly directed blows engaging the same at the wall portion **29** or wall portion **30**. To facilitate such removal, it is noted that the forward portions of the heads provide smoothly angled surfaces engaging the edges of the locking recesses so that the heads are incrementally spread upon movement of the box point relative to the nose of the adapter.

It will be appreciated that the tooth structure provided has a built-in punch enabling a single workman to accomplish both the mounting and removal of the box point; and that the heads not only provide a rigid anchoring of the box point upon an adapter, but are of such character that they do not seriously impede intentional removal of the box point.

While in the foregoing specification embodiments of the invention have been set forth in considerable detail for purposes of adequately disclosing the invention, it will be apparent that those skilled in the art may make numerous changes in those details without departing from the spirit and principles of the invention.

I claim:

1. In a tooth structure, a wedge-shaped adapter, said adapter having arcuate depressions in the opposite sides thereof, said depressions being generally circular in outline, and a wedge-shaped box point on said adapter, the top of said point being of hardened metal while the remainder is constructed of a more malleable metal, each side of said point being provided with an area of enlarged thickness providing a head aligned with one of said depressions, said head providing initially an anvil adapted to receive hammer blows and ultimately a locking tongue when driven into said recess by such hammer blows.

2. The structure of claim 1, in which each of said heads is generally arcuate and is adapted to substantially fill the depression in the adjacent side of said adapter.

3. A tooth structure for excavating machines, and the like, comprising a wedge-shaped adapter having a generally dished recess in each of the triangular side walls thereof, a wedge-shaped box point on said adapter and having thickened areas in the triangular side walls thereof aligned with said recesses when the point is installed on the adapter, the top wall of said point being constructed of a hardened material, while the remainder is constructed of a more malleable material, the thickened areas of said point being generally arcuate in transverse section and of a recess-conforming outline, said thickened areas initially being outstanding from the side walls of said point and being depressible into said recesses to substantially fill the same and provide resistance to shifting of said point on said adapter.

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