

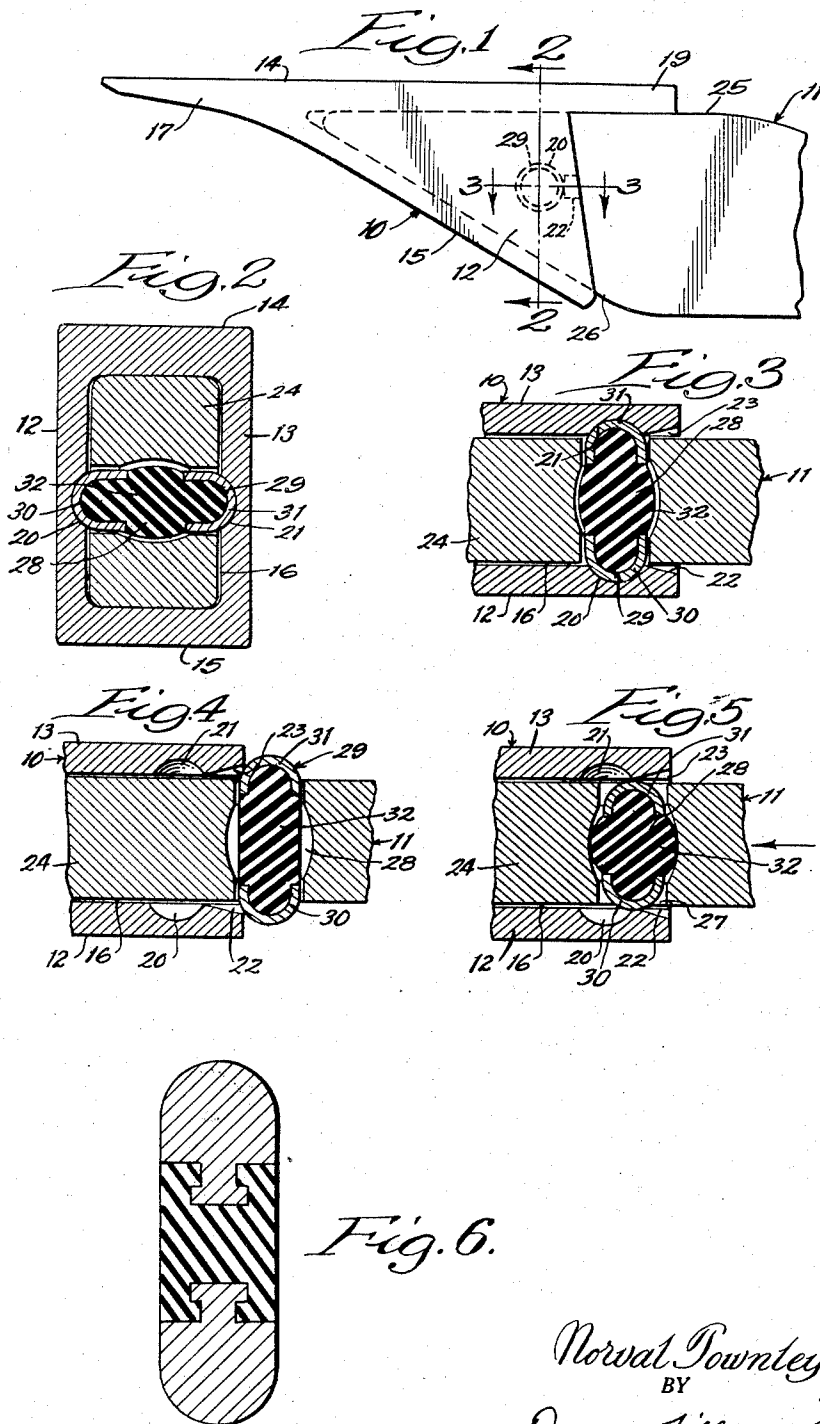
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DIGGER POINT AND LOCKING MECHANISM THEREFOR

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DIGGER POINT AND LOCKING MECHANISM THEREFOR

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This invention relates to a tooth structure and mounting means therefor useful in digging and earth handling equipment and more particularly to a digger or box point and locking mechanism therefor adapted for use, for example, in trenchers and like equipment.

As is well known, trenchers and similar earth moving equipment are generally provided with teeth or points so that the teeth can be removed for reconditioning and replacement as they become worn or broken, etc. from use. Numerous tooth structures have been provided and many are now in use that afford removability of the tooth from the base or nose. These known tooth structures provide a relatively stable mounting for the tooth upon the base therefor. Such structures, however, do not provide complete solutions to the problems that confront tooth designs for equipment of this character.

It is accordingly, an object of this invention to provide a tooth structure and locking mechanism therefor, useful in trenchers and the like, that will overcome a number of the shortcomings in prior art structures of this character, some of the advantages being the elimination of unnecessary dead weight in the locking mechanism, the provision of a locking mechanism that permits the tooth or point to be mounted upon the base quickly and easily and with a minimum of effort and the provision of a locking mechanism that positively locks and accurately seats the point upon the base.

Another object is to provide a tooth having a central chamber that receives therein the nose or base member, pin means being arranged in a cooperative relationship with the nose and point to position and lock the same together. Still another object is to provide a point adapted for use in trenchers having a base adapted to receive the tooth thereon, the base having a transverse passage therethrough carrying a compressible pin and the point providing recesses alignable with the pin in one position of the point upon the base.

Yet another object is in the provision of a digger tooth having a central chamber equipped with aligned recesses therein, a base receivable within the chamber and having a bore therethrough enlarged centrally and alignable with the recesses and a resilient pin carried within the bore, compressible therethrough and with end portions that snap into the recesses to lock the base and tooth together. Additional objects and advantages will appear as the specification proceeds.

An embodiment in the invention is illustrated in the accompanying drawing, in which—

Figure 1 is a side view in elevation of a tooth in position upon its base; Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a broken transverse sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a broken sectional view similar to that of Fig. 3, but showing the tooth released from the locking mechanism; Fig. 5 is a broken sectional view similar to that of Figs. 3 and 4, but showing the tooth in an intermediate position during the seating thereof upon its base; and

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Fig. 6 is an enlarged cross-sectional view of a modified form of the pin presented in Fig. 4.

In the drawing the tooth or point is designated with the numeral 10 and the base or nose member is designated with the numeral 11. The point or tooth 10 as shown best in Figs. 1 and 2, has side walls 12 and 13, a top wall 14 and a bottom wall 15. All of the walls are rigidly secured together and may be formed integrally in a casting operation. The side walls 12 and 13 are spaced apart and define therebetween a cavity or chamber 16. The top wall 14 is relatively flat, while the bottom wall 15 is inclined upwardly and forwardly toward the tip 17 of the tooth. Thus, the top and bottom walls of the chamber 16 converge toward the tip 17 of the tooth. The top wall 14 is elongated and provides a shroud or flange 19 that extends rearwardly and over the top of the base member 11.

The spaced-apart side walls 12 and 13 of the tooth are equipped with aligned recesses or notches 20 and 21 and beveled channels 22 and 23, also formed in the walls 12 and 13 of the tooth, communicate at their inner ends with the recesses 20 and 21, respectively, and from there diverge outwardly and rearwardly to the rear edges of the walls 12 and 13.

The base 11 has a forward end portion 24 that is adapted to be received within the cavity or chamber 16. The forward portion 24 has parallel side walls which are spaced slightly from the walls 12 and 13 of the tooth when the tooth is set upon the base, while the top wall 25 and bottom wall 26 of the nose provide a matching taper that is complementary with and corresponds to the taper provided between the walls 14 and 15 of the tooth. Thus, as is clear from Fig. 1, the tooth 10 is adapted to set firmly upon the forward end portion 24 of the base.

The base 11 and more especially the forward end portion 24 thereof, is provided with a bore or passage 27 extending transversely therethrough and which is alignable with the recesses 20 and 21 of the tooth in one position of the tooth upon the base. The bore 27 intermediate the ends thereof and at substantially the midpoint, is enlarged to provide the central enlargement 28.

To lock the tooth in position upon the base, a resilient plug or pin 29 is provided which is adapted to be received within and carried within the bore 27 with its end portions 30 and 31 extending outwardly from the bore. The pin 29 is both resilient and compressible so that it can be compressed longitudinally to move the end portions 30 and 31 thereof substantially into the bore 27. The pin, however, must have the property of expanding freely when compressive forces are released from the ends thereof so that the end portions of the pin can expand into the recesses 20 and 21, as shown most clearly in Figs. 2 and 3. It has been found that molded rubber provides a suitable material for the pin 31.

Preferably, the end portions 30 and 31 of the pin have bonded thereto metal sheaths that enclose the ends of the pin, or if desired, the end portions may be metal and the metal ends bonded to the rubber central portion 32 of the pin.

In operation of the structure the tooth 10 is provided, as has been described, with a chamber 16 having aligned recesses 20 and 21 in spaced-apart wall portions thereof. The base member 11 is also provided, as indicated, with a bore 27 therethrough. The pin 29 is inserted into the bore 27 with the end portions 30 and 31 extending outwardly therefrom. The tooth 10 is then moved toward the base 11 and the forward end portion 24 of the base is received within the chamber 16 of the tooth, as shown in Fig. 4.

As the tooth 10 is pushed further rearwardly toward seating relation upon the base 11, the end portions 30

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and 31 of the resilient pin engage the inclined channel members 22 and 23 and the pin 29 is compressed, as shown in Fig. 5. Free compression of the pin is afforded because of the central enlargement 28 of the bore 27. This enlargement permits the central portion 32 of the pin to expand diametrically while the length thereof is decreased through the axial compressive forces applied to the ends of the pin. The minimum point of compression is illustrated in Fig. 5.

When the tooth 10 is urged rearwardly and onto the base 11 and past the point of maximum compression of the pin 29, as shown in Fig. 5, the pin expands and the end portions 30 and 31 thereof snap into the recesses 20 and 21 of the tooth, as shown in Figs. 2 and 3. In this position the tooth is properly seated upon the base 11 and the base and tooth are firmly locked together by the pin 29.

Substantially no play is permitted between the tooth 10 and base 11 for the end portions of the passage 27 are not enlarged and substantially engage the walls of the pin 29; yet the enlarged central portion 28 of the passage 27 permits free expansion of the pin diametrically when the axial length thereof is reduced. This one-piece locking mechanism permits ready assembly of the tooth and base and it is only necessary to push the tooth rearwardly and onto the base 11 and in such operation the pin is first compressed and then snaps into locking position to securely anchor the tooth upon the base when the tooth is properly seated thereon. The shroud 19, which extends along the top wall 25 of the base, thereby protects the area of the base which is normally subject to the greatest amount of wear. It also adds to the rigidity of the tooth mounting upon the base by providing a greater bearing area.

While in the foregoing specification an embodiment of the invention has been set out in considerable detail, for purposes of illustration, it will be apparent to those skilled in the art that numerous changes may be made in these details without departing from the principles and the spirit of the invention.

I claim:

1. In a structure of the character described, a tooth having a cavity therein and a base member having a portion receivable within the cavity, the walls of said cavity having aligned recesses therein and said portion receivable within the cavity having a bore therethrough alignable with said recesses; and an elongated resilient pin receivable within said bore and having end portions extending outwardly therefrom and being receivable within said recesses when said portion is within said cavity, said pin being longitudinally compressible to afford movement of said portion into said cavity and longitudinally resilient to lock said tooth and base together.

2. The structure of claim 1, in which said pin is an integral member having metallic end portions whereby said pin possesses substantial resistance to transverse shear.

3. In a tooth structure and locking mechanism therefor, a tooth having a central chamber therein defined in part by spaced-apart side walls, said side walls having aligned recesses therein, a base member equipped with a forward end portion receivable within said chamber and being provided with a transversely extending bore therethrough alignable between said recesses, said bore being enlarged throughout the central portion thereof and an integral, elongated resilient pin carried within said bore and having end portions extending outwardly therefrom, said pin being axially compressible to permit movement of the forward end portion of said base into said chamber and thereafter expansible so that the end portions thereof snap into said recesses to lock said tooth and base together, said integral pin having substantial strength in transverse directions to withstand shearing forces thereon.

4. The structure of claim 3 wherein said side walls adjacent said recesses are provided with diverging channels

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operative to facilitate axial compression of said pin during the mounting of said tooth upon said base.

5. The structure of claim 3 in which said pin is rubber and the end portions thereof are enclosed by metal sheaths.

6. The structure of claim 3 in which said tooth is equipped along the top wall thereof with a rearwardly extending flange that provides a shroud for protection of said base.

7. In a digger tooth and locking mechanism structure substantially as described, a tooth having an enlarged rear end portion providing a central chamber therein, at least one of the walls defining said chamber being inclined to provide a tapering chamber, two of the walls of said chamber which are in facing relation being provided with aligned recesses therein, the wall portions adjacent said recesses being equipped with channels which diverge laterally and rearwardly from the recesses and toward the rear end portion of said chamber, a base member having a tapered forward end receivable within said chamber and being provided with a bore therethrough alignable with said recesses, a compressible, resilient pin carried in said bore and having end portions normally extending outwardly therefrom, said bore having an enlarged central portion to permit cross-sectional expansion of said pin during axial compression thereof, the end portions of said pin being adapted to ride within said channels during the mounting of said tooth upon said base whereby the pin is compressed axially between inclined walls of said channels and thereafter expands into said recesses to lock the tooth and base together, said pin having relatively high shear strength.

8. The structure of claim 7 in which said tooth along the top wall thereof is equipped with a rearwardly extending flange that extends over said base when said tooth is mounted thereon.

9. The structure of claim 8 in which said pin is molded rubber and has metallic end portions.

10. In a structure of the character described, a tooth and a base member, one having a chamber therein defined in part by facing walls having spaced-apart portions, said spaced-apart portions each having a recess therein, the other providing at least a portion thereof receivable within said chamber and having a bore therethrough alignable between said recesses, and a longitudinally compressible, resilient pin receivable within said bore and having end portions extending outwardly therefrom, the end portions thereof being receivable within said recesses to lock said base and tooth together, said pin being an integral member having substantial resistance to transverse shear, said bore being enlarged centrally to accommodate expansion of said pin therein during axial compression thereof.

11. In a structure of the character described, a tooth and a base member, one having a chamber therein defined in part by facing walls having spaced-apart portions, said spaced-apart portions each having a recess therein, the other providing at least a portion thereof receivable within said chamber and having a bore therethrough alignable between said recesses, and a longitudinally compressible, resilient pin receivable within said bore and having end portions extending outwardly therefrom, the end portions thereof being receivable within said recesses to lock said base and tooth together, said pin being an integral member having substantial resistance to transverse shear, the wall portions of said chamber adjacent said recesses being provided with inclined channels diverging outwardly and rearwardly from said recesses to progressively compress said pin axially when said portion is moved into said chamber.

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