

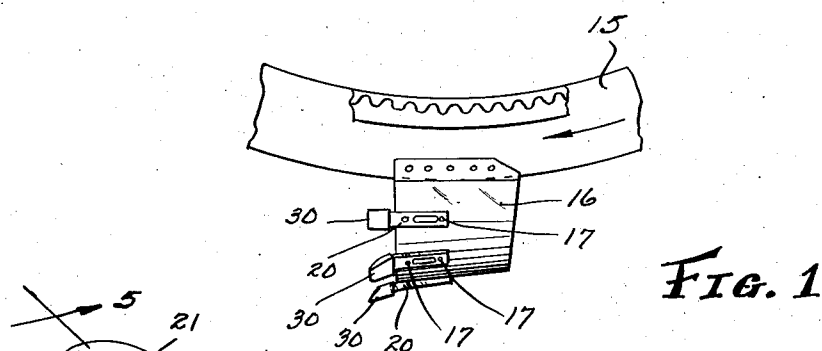
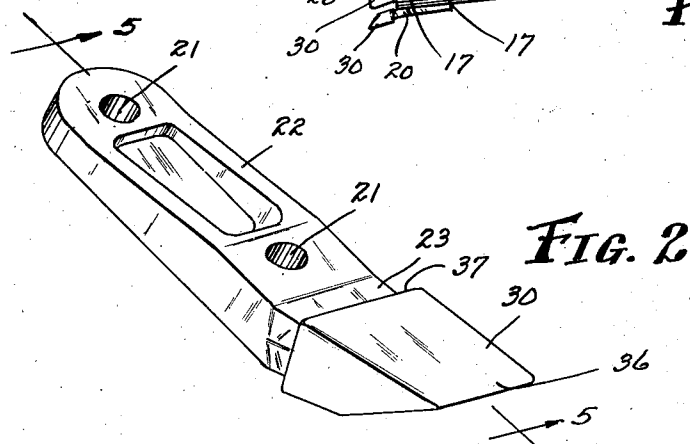
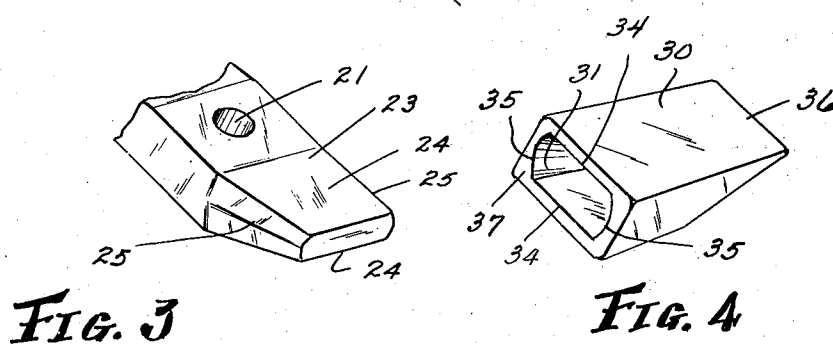
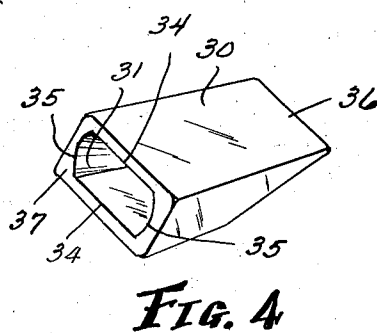
April 2, 1946.

A. R. ASKUE
ROOTER FOR EXCAVATORS

2,397,521

Filed Sept. 1, 1944

2 Sheets-Sheet 1



INVENTOR.
ALBERT R. ASKUE
BY
Bates & McLean

April 2, 1946.

A. R. ASKUE

2,397,521

ROOTER FOR EXCAVATORS

Filed Sept. 1, 1944

2 Sheets-Sheet 2

FIG. 5

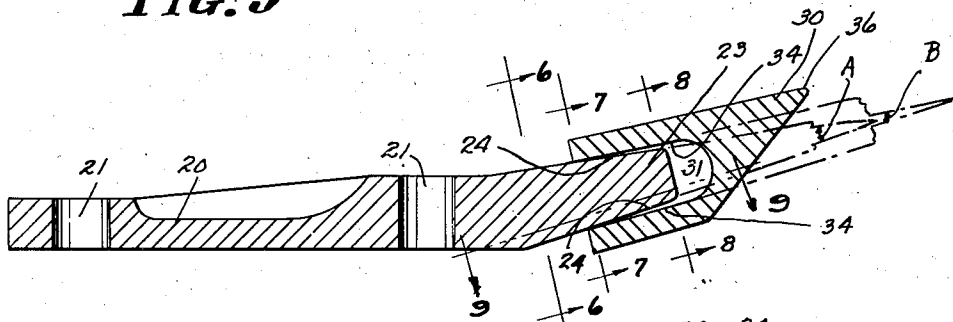
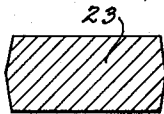


FIG. 6

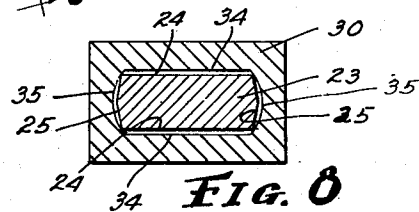


FIG. 8

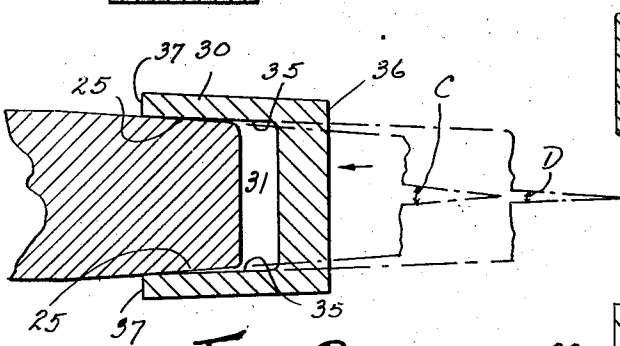


FIG. 9

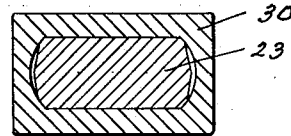


FIG. 7

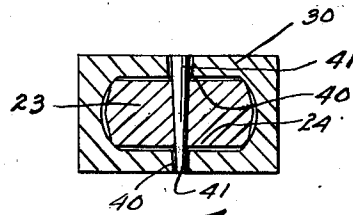


FIG. 11

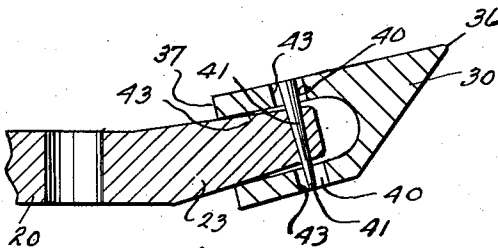


FIG. 10

INVENTOR.

ALBERT R. ASKUE

BY

Rates, Team, & McLean

ATTORNEYS

UNITED STATES PATENT OFFICE

2,397,521

ROOTER FOR EXCAVATORS

Albert R. Askue, Mentor, Ohio, assignor to The
Cleveland Trencher Company, Cleveland, Ohio,
a corporation of Ohio

Application September 1, 1944, Serial No. 552,314

3 Claims. (Cl. 37—142)

This invention relates to a digging or rooter tooth for an excavator and particularly to a digging tooth for use with the digging buckets of rotary excavator wheels or excavator chains of trenching machines. More particularly, the present invention relates to excavator teeth having removable tips or rooter members at their digging edges.

The cutter or rooter teeth of excavating machine buckets are subjected to severe usage, particularly when the machine is operated in stony soil or in areas where heavy roots are encountered. In the past suggestions have been made for the provision of teeth having removable or replaceable tips, and thus permit either the replacement of the tip or its removal to facilitate reforging to restore the tip to its original shape, rehardening of the wearing surface of the tip or building up of the tip by welding or forging operations. Generally it has been suggested that removable members be fastened to the tooth of the excavating buckets by bolts or the like. Generally such constructions included means such as bolts or the like to secure the tooth or tooth tip in place. The impacts to which the teeth are subjected to during excavating operations soon distort such securing means or the associated parts and thereby prevent removal of the teeth tips for replacement or sharpening.

The general object of the present invention is to provide a rooter tooth for an excavator or digging bucket, which tooth will have a replaceable digging surface capable of being removed despite the severe usage.

Another object of this invention is to provide an excavating tooth or rooter with a replaceable tip which will be removable throughout the life of the tooth, and which will be so carried by the tooth shank as to preserve the shank and facilitate replacement of the tip even though the tip is subjected to severe impacts over prolonged periods of time.

A further object of this invention is to provide an excavator tooth having a replaceable tip, and of such a character that the tip may be effectively and tightly secured to the tooth without the employment of bolts or other fastening devices such as might be subject to digging strains during digging operations.

Another object of this invention is to provide a replaceable rooter tooth tip, which during normal digging operations will be retained in position on the excavating tooth by frictional engagement between coacting surfaces of the tooth and tip, and which will be so arranged that the normal

digging operation will serve to tighten the engagement between the tip and the tooth, but wherein the tip may be readily removed from the tooth after prolonged periods of severe use, without damage to the tooth shank or tip.

The various objects and features of this invention will be more fully understood from the following detailed description of a typical form of the invention illustrated in the accompanying drawings. The essential features of the invention will be summarized in the claims.

In the drawings, Fig. 1 is a fragmentary view of a portion of an excavating wheel having an excavating bucket thereon provided with my improved rooter teeth; Fig. 2 is a perspective view of the excavating tooth; Fig. 3 is a perspective view of the forward or shank portion of the digging tooth; Fig. 4 is a perspective view of the tooth tip; Fig. 5 is a longitudinal section of the tooth as indicated by the line 5—5 on Fig. 2; Figs. 6, 7, 8 and 9 are sectional details of the tooth, the planes of the various sections being indicated by correspondingly numbered lines on Fig. 5; Fig. 10 is a fragmentary section taken in substantially the same plane as Fig. 5, and illustrates a modified form of the invention; Fig. 11 is a detailed transverse section, the plane of which is indicated by the line 11—11 on Fig. 10.

Referring now to the drawings, particularly to Fig. 1, I have indicated at 15 a portion of an excavating wheel provided with excavating buckets, one of which is indicated at 16. The machine itself may be of the type shown in Patent No. 2,280,004, issued April 14, 1942, and assigned to my assignee The Cleveland Trencher Company. Suitable mechanism, not shown, rotates the wheel in the direction of the arrow in Fig. 1, so that the forward edge of the excavating buckets will engage the material to be excavated.

My improved rooter or digger tooth 20 is shown as being applied to the bucket 16 by bolts or rivets 17 which pass through suitable openings 21 in the tooth base 22, and through the wall of the bucket. The tooth base has a forwardly extending shank portion 23 which enters a socket 31 formed in a tooth tip or wearing member 30.

The socket 31 of the tip 30, and the shank 23 of the tooth base, are so arranged and constructed that the tip is held in place on the shank solely by frictional engagement between the wall of the shank and the wall of the socket. As illustrated in the drawings and particularly in Figs. 3 and 5 the upper and lower walls, 24 of the shank 23, and 34 of the socket 31, are tapered. The taper of the shank is indicated in Fig. 5 by the angle

A, and that of the socket by the angle B. Likewise the side walls 25 of the shank and 35 of the socket are tapered as indicated in Fig. 9 by the angles C and D respectively. The tapers of the shank and of the socket are formed concentric with the center lines of the corresponding parts. The tip will be held securely on the shank solely by frictional engagement, and yet will be readily removed by a sharp blow, on its rear surface 37, if the angles of taper A and C of the shank are between 4° and 10° and, the angles of taper B and D of the socket are from ½° to 2° smaller than the corresponding angles of taper of the shank. Preferably the angles of taper A and C are identical, as are the angles of taper B and D.

I prefer to forge the shank and base of the tooth of a standard steel alloy as, for instance, one alloyed with chrome and vanadium, and the tip of a manganese steel of a type somewhat harder than the metal of the shank and capable of being flame hardened at its forward edge 36. When the parts are forged of such types of metals, the tip may be held in place by the wedging action of the tapered surfaces to the best advantage if the tapers of the shank are 8° and the tapers of the socket are 7°.

The differences in the tapers between the socket and the shank permits the use of forgings without need for machining or finishing the coacting surfaces of the tapers. The side walls of the shank are beveled or tapered from their longitudinal media lines inwardly and toward the upper and lower surfaces of the shank, as shown in Figs. 6 and 7, while the side walls of the socket are arcuate. The radius of the arcs of the side walls is such as to prevent contact between the central and major portions of the coating side walls and socket at all times. The width of the shank and socket are so related as to insure contact between all four corners of the shank and the walls of the socket prior to engagement of the top and bottom surfaces thereof. Thus the tip is held firmly against rocking movements on the shank. Further, this initial contact at the corners has another distinct advantage, namely, a small space or low pressure area exists between the faces of the shank and the faces of the walls of the socket, thus permitting swelling of the shank due to compression thereof caused by impact during the digging operation. The space between the side walls of the shank and socket is sufficiently great to permit swelling of the shank, caused by repeated impacts during the digging operations thereby insuring contact between the top and bottom walls prior to any contact between the side walls. The swelling action of the shank reacts against the weaker or wider face of the tip which, due to its width, may warp slightly to accommodate this swelling action. While the side walls of the socket are shown as arcuate it is obvious that they might be tapered as are the side walls of the shank, each taper, however, having a greater angle than that of the corresponding walls of the shank.

While I have indicated a preference as to metals to be used in the construction of my improved tooth, it is obvious other metals may be used. Under certain conditions and with certain

metals I find it advisable to provide a means to prevent inadvertent displacement of the tip should the digging wheel be inadvertently operated in a reverse direction. Such reversal of the wheel might impart a relatively sharp blow on the rear surface 37 of the tip and result in the removal of the tip. To guard against such inadvertent removal I may provide the upper surface of the tip with a longitudinally extending slot or slots 40 as shown in Fig. 10 and provide the shank with a pin 41, so arranged relative to the slots 40 as to be normally out of engagement with the walls thereof. The clearance between the end walls of the slots 40 and the pin 41 is such as to permit movement of the tip further onto the shank by impacts during the active digging operation. However, should the direction of rotation of the digging wheel be reversed and the tip subjected to an impact on its face 37, contact between the end wall 43 of the slot and the pin will prevent removal of the tip and when the wheel is again rotated in the digging direction the tip will immediately be driven into active position.

I claim:

1. A digging tooth for excavators, said tooth comprising a base member and a tip member, one of said members having a forwardly projecting shank provided by tapered walls and being substantially rectangular in cross section, the other of said members having a socket to receive said shank, said socket being substantially rectangular in cross section, the coacting regions of said members being so formed as to insure contact between the corners of the shank and the socket prior to engagement between the other surfaces thereof.

2. A digging tooth comprising a base member and a tip member, one of said members having a shank portion, and the other of said members having a socket to receive said shank, said tip and socket being substantially rectangular in cross section, one pair of oppositely facing walls of the socket being concave, and wherein the distance between such walls and the distance between the corresponding walls of the shank are such that the corners of the shank engage the concave walls of the socket prior to the engagement of other portions of the shank with the walls of the socket.

3. A digging tooth comprising a base member and a tip member, one of said members having a shank portion, and the other of said members having a socket to receive said shank, said tip and socket being substantially rectangular in cross section, one pair of oppositely facing walls of the socket being concave, and wherein the distance between such walls and the distance between the corresponding walls of the shank are such that the corners of the shank engage the concave walls of the socket prior to the engagement of other portions of the shank with the walls of the socket, a slotted opening in one of said members and a pin carried by the other member and entering said slot to prevent separation of said members but permit relative movement therebetween.

ALBERT R. ASKUE.