MEANS FOR FIXING A DIGGING TOOTH TO THE LEADING EDGE OF THE TOOL OF AN EARTH WORKING MACHINE

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ABSTRACT OF THE DISCLOSURE

A digging tooth attached to a support member on an earth working machine by a pivotal lock bar extending between the support member and engaging a recess in one side of the tooth. The lock bar has a securing bolt attached to the lock bar for pivoting the lock bar to bias same into a forceful locking relationship against said tooth.

The shovels, buckets or other tool of a mechanical excavator or like machine is provided at the front or leading edge with digging teeth. During use of such machines, the teeth of the shovel, bucket or like tool are subjected to violent impacts and stresses and for this reason are invariably made of cast steel with high resistance to wear. Hitherto the teeth or tines are fixed to the shovel, bucket or like tool by means of bolts in such a manner that the bolts were subjected directly to severe shearing and tensile stresses when the shovel, bucket or the like was in use.

The object of the present invention is to provide an improved arrangement for fixing the digging teeth to the shovel, bucket or other tool of a mechanical earth working machine by means of bolts in such a manner that the bolts are not subjected directly to shearing and tensile stresses, or at any rate not to such severe shearing and tensile stresses as in the known arrangements, and the teeth are better able to resist the violent shocks and stresses to which they are inevitably subjected, thereby reducing wear and tear and increasing the life of toothed shovels, buckets or like tools.

With this object in view the means for fixing the digging teeth to the shovel, bucket or other tool of a mechanical earth working machine comprises a support member into which the tooth is slidably fitted, a locking bar having one edge abutting a part of said support member and its opposite edge abutting a member integral with said tooth, a securing bolt passing through said locking bar and a part of said support member and being engaged, upon tightening, to cause said locking bar to be pressed tightly against said support member and the member integral with the tooth thereby to clamp said locking bar in position to securely fix said tooth to said support member.

In order that the invention may be more clearly understood, two particular embodiments thereof will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a part sectional view of a digging tooth fixed to the leading edge of a mechanical shovel in accordance with the present invention.

FIGURE 2 is a sectional view of FIGURE 1.

FIGURE 3 is a view similar to FIGURE 2 of another embodiment of the invention, and

FIGURE 4 is a part plan view and part section on the line IV—IV of FIGURE 3.

Referring now to FIGURES 1 and 2 a digging tooth 1 comprises two rearwardly projecting laterally spaced side web portions 2 symmetrical and parallel with each other and of substantially triangular shape in side elevation. The tooth is further provided, between the spaced web portions 2, with a rearwardly projecting bifurcated arm 5 having upwardly turned hook portions 9 at the free ends of the bifurcations. The tooth is securely fixed to the leading edge of, for example, a mechanical shovel, by means of a support member 4 welded to or integral with the leading edge of the shovel and into which the tooth is slidably fitted. When the tooth is placed in position in the support member 4, in the direction of arrow 13, the triangular web portions 2 of the tooth project into correspondingly shaped cavities 3 formed in the sides of the support member 4 and the rearwardly projecting bifurcated arm 5 projects into a central cavity 6 in said support member 4. By this means a correct and accurate centering of the tooth 1 relative to the support member 4 is ensured.

The tooth 1 is securely fixed in the support member 4 by means of a locking bar or lever 7 and a securing bolt 11. The bar or lever 7 is introduced into the support member through a transverse opening 8 in the upper part of the support member with one edge of said locking bar at lever 7 engaging in the or abutting hook portions 9 of the bifurcated arm 5 and its opposite edge engaging or abutting the wall surface 10 of the opening 8 in the support member. The bar or lever 7 is housed in the bolt 11 which passes through a hole in the bar or lever 7, between the bifurcations of the arm 5 and through a hole in the bottom part of the support member 4 and projects into a recess in the lower wall of said support member in which the nut 12 of the bolt is housed, a washer 13 being provided between the nut 11 and the support member 4.

It will be understood that when the bolt is tightened by screwing up the nut 12 the edges of the bar or lever 7 will be pressed tightly into the hook portions 9 of the bifurcated arms 5 on one side and tightly against the surface 10 on the other side, thus clamping the bar or lever therebetween so as securely to fix the tooth 1 in position in such a manner that violent impacts and stresses on the tooth 1, in the general direction of arrow 13, will not transmit shearing and tensile stresses directly on the shank of the bolt 11. It will also be understood that by means of the invention damaged or worn teeth 1 can be replaced quickly and easily by means of the single bolt 11.

Referring now to the embodiment illustrated in FIGURES 3 and 4 a tooth 1e is provided with a hollow out central cavity 22 open at 22a at its rear end. This embodiment also comprises two spaced parallel side web portions 2e' and 2e'2 of substantially triangular shape in side elevation and two further transverse web portions 23, 23e which are shorter than the web portions 2', 2a and connect the web portions 2', 2a together above and below in the neighborhood of the opening 22e, said opening being bordered on two opposite sides by the triangular web portions 2', 2a and on its other two opposite sides by the web portions 23, 23e.

At or near their free ends remote from the opening 22e triangular web portions 23 and 23e are connected by a cross-piece 24 provided along one longitudinal channel. As in the embodiment according to FIGURES 1 and 2 the support member 4' is provided with side cavities 3', 3e', of substantially the same shape as the web portions 2', 2a, in which said web portions project the support 4' is also provided with a transverse opening 8' in its upper part, for introduction of the bar or lever 7e, and a recess 25 in its lower part for housing the nut 11a and washer 12a of a securing bolt 11e. The upper part or wall of the support 4' is also provided internally with a transverse channel or recess 26 in which the locking bar or lever engages as hereinafter described.

The locking bar 7e is provided with a hole disposed in the cephalion of the securing bolt 11e and with an upwardly projecting hook-like tongue 7c on its upper side and a rib portion 7a on its lower side. In operation the locking
lever or bar 7b is placed in position, in the same manner as described with reference to the embodiment according to FIGURES 1 and 2, with the hook-like tongue 7c engaging in the channel or recess 26 of the support member 4 and the rib portion 7d engaging in the longitudinal channel in the cross-piece 24 as shown in FIGURE 3. It will be understood that with this construction the hook-like tongue 7c and the rib 7d will be forced into the channel or recess 26 of the support member and the longitudinal channel in the cross-piece 24 respectively upon tightening of the bolt 1I thus securely fixing the tooth 1a to its support 4.

It will be understood that the invention is not limited to the particular embodiments shown in the drawings but may be modified in various ways without departing from the scope of the invention as defined in the appended claims.

I claim:

1. Means for fixing a digging tooth to the edge of a tool of an earth working machine comprising: a support member attached to said leading edge and into which said tool tooth slidably engages, said tooth having side webs connected at top and bottom by transverse webs, a cross-piece connecting said side webs adjacent to their outer free ends and said cross-piece having a longitudinal channel along one edge and said support member having cavities for receiving said side webs and transverse webs and a transverse channel formed in its internal wall surface; a locking bar located between said tooth and support member and engaging with one of its sides in the longitudinal channel in said cross-piece and with its opposite side in the transverse channel in the wall of said support member; a securing bolt passing through said locking bar and a wall of said support member, said securing bolt upon tightening clamping said locking bar between said cross-piece and said support member to securely fix the tooth to said support member.

2. Means according to claim 1, wherein said locking bar is provided with a hooked tongue adapted to engage in the transverse channel in the support member and a rib portion adapted to engage in the longitudinal channel in said cross-piece.

3. Means for fixing a digging tooth to the leading edge of the tool of an earth working machine comprising: a support member into which the tooth is slidably fitted, a transverse opening formed on one side of said support member; a groove formed on said tooth facing said transverse opening; a locking bar having at least two edges, insertable through said opening and being disposed between said opening and said groove, one edge of said locking bar pivotally abuts the grooved portion formed in said tooth; a securing bolt having a threaded portion, passing through said locking bar and a part of said support member; and a nut arranged so that when it is threaded onto said bolt the locking bar is pivoted so as to press tightly against the interior part of the support member and into the grooved portion of the tooth to thereby clamp said locking bar in position to securely fix said tooth to said support member.

4. The invention of claim 3 wherein said tooth includes side webs and a central rearwardly projecting bifurcated arm wherein said groove is in the form of hooked portions at the ends of the bifurcations of said bifurcated arm and wherein said support member includes cavities for receiving the web portions and the bifurcated arm and wherein said securing bolt passes between said bifurcations of said bifurcated arm and a wall of said support member.

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