

[54] **TOOTH FOR THE BUCKET OF A DIGGING MACHINE**

1,202,806 10/1916 Clark 37/142 R

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[57] **ABSTRACT**

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[58] Field of Search **37/142 R, 142 A**

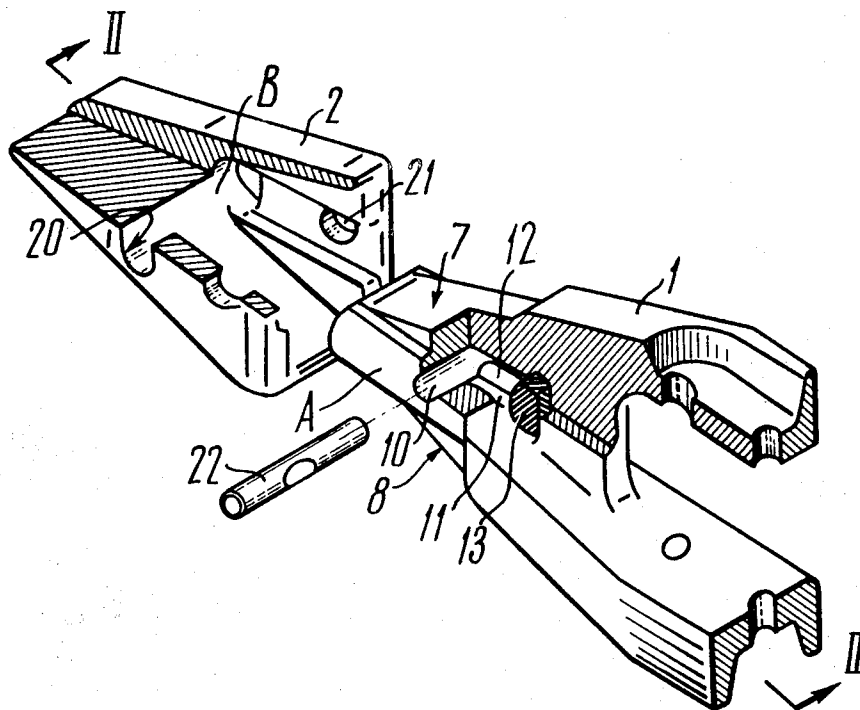
A tooth of the bucket of a digging machine characterized in that the support side edges of the lug of the tooth base have one and the same thickness along their whole length which is such that in the course of operation the end face of the lug thrusts against the bottom of the mortise of the changeable cap to resist the action of the force of cutting.

[56] **References Cited**

UNITED STATES PATENTS

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1 Claim, 3 Drawing Figures



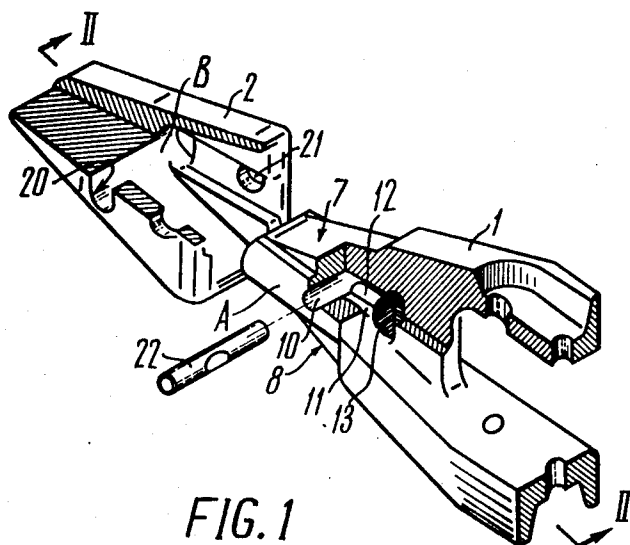


FIG. 1

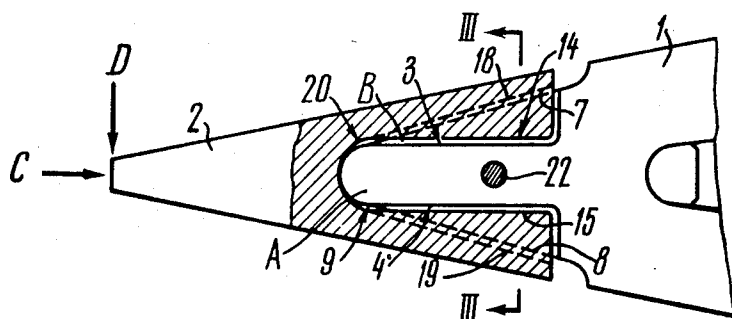


FIG. 2

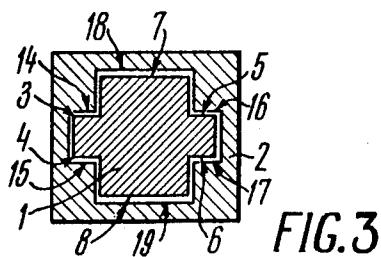


FIG.3

TOOTH FOR THE BUCKET OF A DIGGING MACHINE

The present invention relates to excavators and, more particularly, to teeth of the buckets of digging machines.

There is known a tooth of the bucket of a digging machine, comprising a base with a lug, a changeable cap with a mortise to be fitted onto the lug of the base and a locking device to fixedly secure the cap to the base. In this tooth, in the course of operation, the changeable cap transmits to the tooth base the action of the total force including the lifting and pressure forces and the weight forces, whose components are essentially the lateral force and the force of cutting. The action of the lateral force is received by the opposite faces of the support side edges of the lug and by the mortise faces mated with the former.

In the known design of the tooth the opposite faces of the support side edges of the lug and the mortise faces mated with the former are made inclined relative to the longitudinal axis of the tooth. When fitting the changeable cap onto the lug of the base, a wedge joint is formed. During the tooth operation the changeable cap undergoes the action of a number of forces: lift and pressure forces, weight forces, etc. The total action of these forces is always directed at an angle with respect to the axis of the tooth and consists of two components: force of cutting acting along the longitudinal axis of the tooth, and lateral force which is normal to the force of cutting.

The action of both components of the forces is received by the inclined faces of the support side edges of the lug and by the mortise faces mated with the former. The lateral force acting at a right angle relative to the longitudinal axis of the tooth is divided into two components, while being received by the inclined faces. One component acts along the inclined face, whereas the other one acts along the normal relative to the first one. The component of the lateral force, acting along the inclined face, strives to throw the changeable cap off the lug of the base, which necessitates use of powerful locking devices to fixedly secure the changeable cap to the lug of the base.

This constitutes a substantial disadvantage of the known design of the tooth.

The present invention has as its task the provision of a tooth of the bucket of a digging machine, in which the faces of the support edges of the lug and the mortise faces mated with the former would be made in such a manner as to preclude, while receiving the lateral force, the appearance of its component striving to throw the changeable cap off the lug of the base.

In accordance with the present invention this task is accomplished by that the support side edges of the lug have one and the same thickness along the whole length of the lug which thickness is such that in the course of operation the end face of the lug thrusts against the bottom of the mortise of the cap, thereby resisting the action of the force of cutting.

During the operation of the tooth of the bucket of a digging machine, in which in accordance with the present invention the support faces of the lug of the base and the mortise faces mated with the former are disposed parallel to the tooth axis, the lateral force acts at a right angle with respect to the support faces and these arises no component of the lateral force, striving to

throw the changeable cap off the lug of the base, and, consequently, it is unnecessary to use powerful locking devices for holding the changeable cap on the lug of the base.

The following description of an exemplary embodiment of the present invention is given with reference to the accompanying drawings, in which:

FIG. 1 shows an axonometric view of the tooth of the bucket of a digging machine, according to the present invention (in the disassembled state and with a partial extraction);

FIG. 2 is a section taken along line II—II of FIG. 1 (in the assembled state);

FIG. 3 is a section taken along line III—III of FIG. 2. The tooth of the bucket of a digging machine comprises a base 1 (FIG. 1) and a changeable cap 2. Provided on the base 1 is a lug A which is cross-shaped in its cross section. Opposite faces 3, 4 (FIG. 2) and 5, 6 (FIG. 3) of the support side edges of the lug of the base 1 are made parallel with respect to the longitudinal axis of the tooth along the whole length of the lug, i.e., in accordance with the invention, the edges have one and the same thickness along their whole length. Faces 7 and 8 of the upper and lower edges of the lug are made inclined and converge at the top of the lug. The top of the lug A is formed by a cylindrical end face 9. The lug A of the base 1 has a through opening 10 and a hole 11 accommodating a slide block 12 and an elastic member 13.

The changeable cap 2 is essentially a tool whose outer vaults are of a wedge-like shape. Made inside the changeable cap 2 is a mortise B (FIG. 3) which is cross-shaped in its cross section. Faces 14, 15, 16 and 17 of the mortise B are mated with the faces 3, 4, 5, 6, respectively, of the lug A, whereas faces 18 and 19 of the mortise mate the faces 7 and 8 of the lug. The bottom of the mortise B is formed by a cylindrical face 20 (FIG. 2) mated with the end face 9 of the lug A. In accordance with the invention the length of the lug is such that in the course of operation the end face 9 of the lug thrusts against the face 20 of the mortise. The radius of curvature of the face 20 is chosen to be somewhat greater than the radius of curvature of the face 9, which ensures a guaranteed contact between these faces. The value of the total gap between the faces 3, 14 and 4, 15, as well as between the faces 5, 16 and 6, 17 is smaller than the value of the total gap between the faces 7, 18 and 8, 19.

Made in the changeable cap 2 coaxially to the opening 10 (in the assembled tooth) is a through opening 21. Inserted into the coaxial openings 10 and 21 is a pin 22 fixing the position of the changeable cap 2 on the lug of the base 1. The pin 22 is locked by the slide block 12 pressed by the elastic member 13.

During the operation of the tooth the lateral force D acting upon the changeable cap is received by the front edges of the faces 3, 14, 5, 16 and the rear edges of the faces 4, 15 and 6, 17 which are essentially support ones. Since the total gap between the faces 7, 18 and 8, 19 is greater than the total gap between the faces 3, 14 and 4, 15 or 5, 16 and 6, 17, the faces 7, 18, 8, 19 do not undergo the action of the lateral force, and, consequently, no component of the latter, striving to throw the changeable cap 2 off the base 1 of the tooth arises. With the changeable cap mated with the base of the tooth along the cylindrical faces 20 and 9, the cap can somewhat displace, i.e., oscillate freely, relative to the

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base, which precludes the possibility of the lug wedging. The value of these displacements is limited by the total gap between the faces 3, 14 and 4, 15, or 5, 16 and 6, 17. With the cutting force C acting upon the changeable cap, the respective cylindrical faces 20 and 9 of the cap and the base of the tooth get in contact and, thereby, resist completely the action of the force.

The design of the tooth, made in accordance with the present invention, possesses a number of advantages: it makes it possible to reliably hold the cap on the base of the tooth, since no component striving to throw the cap off the base arises on the parallel surfaces of the side edges resisting the action of the lateral force. The simplicity of the design and the minimum number of faces mated allow to manufacture the tooth without any mechanical working of the faces of the base and the cap.

What we claim is:

1. A tooth for a bucket of a digging machine taking

up the force of cutting and lateral force forming essentially components of the total force of digging, comprising: a base having a lug of cross-shaped section throughout its length forming side and vertical ribs, the side ribs of the lug having equal thicknesses and extending parallel to the axis of the tooth, the vertical ribs having upper and lower faces converging towards a lug apex, said apex having a radially curved surface; a changeable cap having a mortise formed therein for fitting said cap to said lug, said mortise surrounding said lug and having a shape corresponding with the size and shape of the lug, said changeable cap being fitted on opposite faces of the side ribs to enable the latter to take up the lateral force component, the length of the lug being in excess of the depth of the mortise to enable the end face of the lug to take up the cutting force component.

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