Jan. 1, 1929. 1,696,924

C. RORABECK

INTERLOCKED EXCAVATOR TEETH

Filed Jan. 9, 1925

Fig. 1

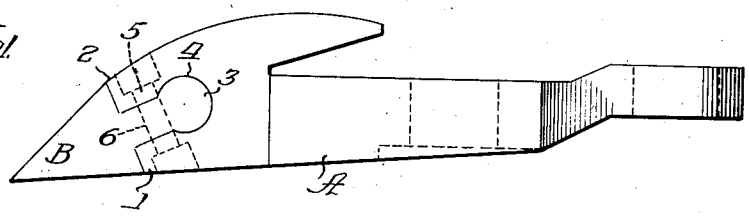


Fig. 2

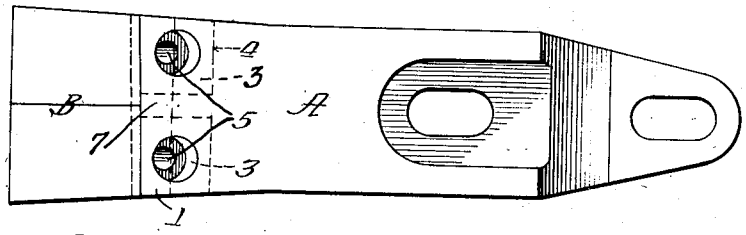


Fig. 3

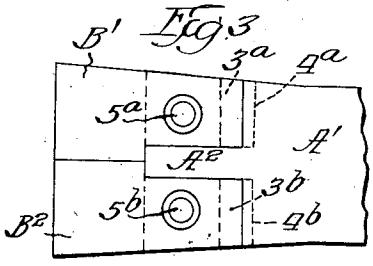


Fig. 4

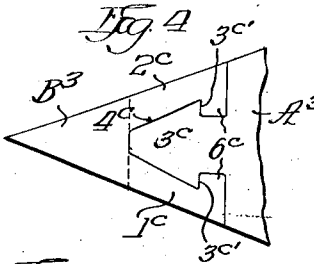


Fig. 5

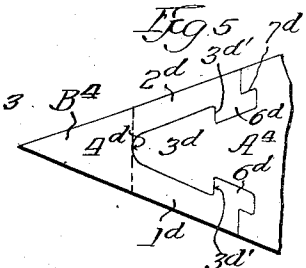


Fig. 6

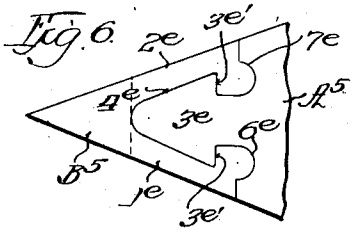


Fig. 7

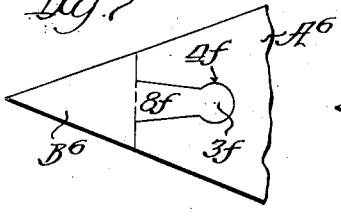


Fig. 8

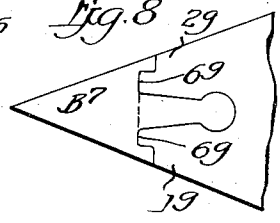


Fig. 9

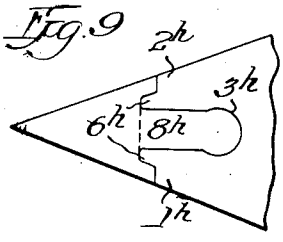


Fig. 10

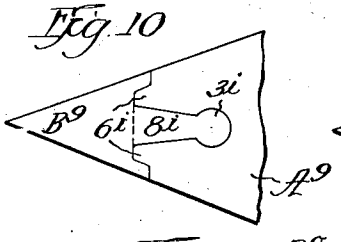


Fig. 11

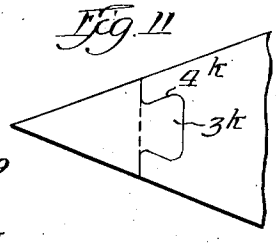


Fig. 12

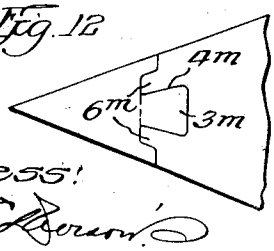
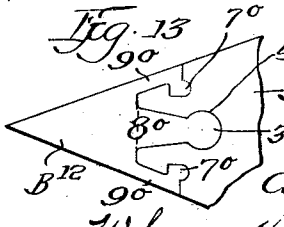


Fig. 13



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Attys.

Patented Jan. 1, 1929. 1,696,924

UNITED STATES PATENT OFFICE.

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INTERLOCKED EXCAVATOR TEETH.

Application filed January 9, 1925. Serial No. 1,334.

This invention relates to excavating implements having penetrating points or teeth separately formed and removably secured in place to render them readily replaceable as they become impaired in service, and particularly to that type of replaceable tooth implements in which the tooth member is assembled with the body member through means of a reentrant or forked portion formed on one member and a projection formed on the other member.

Objects of the present invention are to provide a new principle of assembly of tooth and body member in implements of the kind described, which will insure a more complete and reliable interlock between the members, particularly in the direction of resistance to stresses encountered in use, namely, in the direction of the longitudinal axis of the tooth and in the vertical direction; also to practically relieve the securing bolts, or other intersecting means which holds the tooth in position, from all stresses; also to provide a tooth assembly which will, by sliding one member relatively to another, effectively interlock the members against separation, not only longitudinally of the tooth but in any tipping direction transverse to its longitudinal axis; also to provide a tooth which is capable of assembly on the body member by a transverse sliding movement but which engages laterally a portion of the body member whereby lateral strains are not imparted to the securing bolts or other intersecting means which hold the tooth in position; also to permit the tooth, in its assembly, to develop a wedging fit upon the body member; and to accomplish all the foregoing objects in a tooth structure which is reversible in position in order to present the two sides of the tooth successively in the position of greater wear.

It has long been the practice, in assembling teeth with excavating implements, to apply the tooth either directly to the implement, or indirectly thereto, through the medium of a so-called base member which is riveted or otherwise secured to the implement; hence, in the following specification the term "body member" is to be understood as including not only the body of the implement itself but any member serving as a medium for mounting a tooth upon an implement.

The invention proceeds upon the principle of assembling a toothed member with a body member, through means of a projection on one member, and a fork on the other member receiving and closely fitting the projection, the meeting faces of the projection and fork being offset vertically to develop a longitudinal interlock so that the tooth can be disassembled only by lateral sliding movement in a direction transverse to both the direction of penetration and the direction of lifting; the invention likewise embodying the feature of interlocking the elements of the fork with the member that carries the projection in still another direction, namely, that which enables the fork elements to resist vertical tipping of the tooth on the body member by anchoring themselves against spreading; also the principle of having firm longitudinal abutment for the ends of the fork elements in addition to their anchoring elements, so that vertical transverse stresses which tend to tip the tooth relatively to the body member will be resisted in part by the longitudinal interlock between the members in part by the transverse anchorage of the ends of the fork elements and in part by the rearward abutment of a fork element at a distance sufficiently remote from the longitudinal interlock to largely relieve the latter of transverse strain. The invention preferably also includes the feature of having the opposite faces of all the structural elements made symmetrical so that the tooth may be reversed in position, and having the faces through which the two members meet in assembly converged in the direction of assembly, and therefore insuring a wedging fit. According to some embodiments of the invention, the member which carries the projection is provided with longitudinally extending portions which overlap the elements of the fork and assist in resisting spreading of the latter. In one preferred embodiment of my invention, I provide the body member with a centrally disposed fin or partitioning wall which divides the interlocking portion into two receiving openings in which the two parts of a two-part tooth are positioned and held. The advantages of this form are manifest when it is understood that teeth of this type in use are often subjected to lateral strains due to the engagement of the tooth with rocks or other hard objects on the side or at angu-

lar directions, and that this form of my invention will relieve the locking pin or other locking means from these lateral strains, the same being resisted by the fin which is strong enough to withstand such usage. This structure further makes for economy in that half a tooth may be replaced when only one edge is needed, which of course, is very much cheaper. By this arrangement, I accomplish a novel result in that I have provided a replaceable tooth structure which embodies all the advantages which are afforded by the interlocking through lateral movement and yet I further provide a means for relieving the pin or other retaining means from lateral strains.

In the accompanying drawings, Figures 1 and 2 are, respectively, a side elevation and a bottom plan view of a body member and a tooth applied thereto in accordance with one embodiment of the present invention; the securing bolts of both the tooth and the body member being omitted.

Figure 3 is a top plan view of the tooth and the adjacent portion of a body member in which the yoke portion of the interlock is formed on a tooth member, indicating by dotted lines a modification of the assembly surfaces.

Figures 4 to 13 inclusive, are views in side elevation of teeth and adjacent body portions embodying features of the present invention in as many different forms.

Referring to Figures 1 and 2, A represents a body member and B tooth members separately formed and adapted to be assembled with said body member. The body member A is to be regarded as typical of either the forward penetrating portion of a scraper, bucket, dipper or other like excavating implement, or the base separately formed and designed for attachment to such an implement. In these figures, one of the members, namely, the body member A, is constructed with fork elements 1 and 2 developing between them a recess, the walls of which digress or enlarge inwardly in a manner and to an extent to adapt the body member to interlock longitudinally with an enlargement 3 on a tooth member that is designed to fit the recess thus provided. In other words, the projection 3 on the tooth member B, as well as the inner end of the cavity 4 formed in the body member to receive said projection, are offset in a direction perpendicular to the longitudinal axis of the tooth and thus prevent displacement of the tooth from the body member in the forward direction and necessitates assembly and disassembly of the tooth with the body member by a sliding movement; and in order that the tooth may be sustained against sliding movement under lifting or vertical loads, the direction of sliding assembly is horizontal or transverse to both the longitudinal axis or direction of penetration, and the direction of lifting. The base member is provided with a fin or partitioning wall 7 which forms with the receiving recess, two recesses, one each for receiving the projection 3 of the two halves of the tooth member B, each of said recesses having a wall which will receive and resist lateral strains. To prevent unintended disassembly of the tooth member from the body member, said members are provided, respectively, with some form of opening extending through overlapped parts thereof, for instance, the aligned bolt holes 5 and 6.

As suggested in Figures 2 and 3, the offset and longitudinal interlocking recess in the forked member do not extend completely through said member in the direction of assembly, but are subdivided into two portions, 4^a and 4^b, as shown in Figure 3 separated by a fin or partitioning wall A^2 and thus adapt the body member A′ to receive two separately formed teeth or points B^1 and B^2, each of which has an enlarged or vertically offset projection 3^a or 3^b, as well as its own individual bolt hole 5^a or 5^b.

The structure disclosed in Figure 2 is one where the body member is provided with the yoke portion of the interlock, and the structure disclosed in Figure 3 is one where the yoke portion of the interlock is on the tooth member.

As suggested in Figures 4, 5 and 6, the forked structure may be formed upon the tooth member B^3, B^4, or B^5 instead of upon the body member A, as in Figures 1 and 2; and the projection may be on the body member A^3, A^4, or A^5, and may have its enlarged or offset portion in the form of an arrowhead 3^c, 3^d, or 3^e, developing abrupt or substantially vertical shoulders $3^{c\prime}$, $3^{d\prime}$, and $3^{e\prime}$, as shown in said figures, to resist longitudinal displacement of the tooth member from the body member in the direction of the axis of said members, as well as in any direction that might develop from forces tending to tip the tooth members upon the body members.

In the form of interlock shown in Figures 4, 5 and 6, the projections 3^c, 3^d, and 3^e are each developed with reentrant portions or recesses 4^c, 4^d, and 4^e in the vertical transverse direction while the teeth B^3, B^4, and B^5 carry on their forks 1^c, 2^c, 1^d, 2^d, and 1^e, 2^e, lugs 6^c, 6^d, and 6^e, constituting offsets in said direction. In Figures 5 and 6 the offset lugs likewise embody in their construction anchoring faces 7^d, 7^e, which constitute offsets from the vertical transverse axis, in the direction of the longitudinal axis of the tooth and body structures and in continuation of the direction of the forked elements, namely, rearwardly in these particular designs, and these anchoring faces serve the further function of resisting the

spreading of the fork elements under lifting loads and greatly resist stresses which tend to strip the securing bolts. It will be noted that the anchoring elements 6^d, 6^e are located inwardly from the abutting ends of the fork elements, and thus constitute distinct elements in addition to the latter.

This anchoring of the ends of the fork elements is particularly desirable in the vertical offset design of the longitudinal interlock of the present invention, and it is particularly appropriate in that it is established by the same lateral sliding assembly that establishes the longitudinal interlock.

As suggested in Figure 7, the body member A^6 and tooth member B^6 provided, respectively, with recess 4^f and projection 3^f, in principle like Figure 1, can be changed in design, for instance, to elongate the projection and recess and provide a tapering neck 8^f as distinguished from a neck with parallel sides, as in Figure 1. As shown in Figure 8, the forks 1^g, 2^g, may be provided with anchoring lugs 6^g located inwardly from the longitudinally abutting ends of the fork elements and entering corresponding recesses of the tooth B^7 to resist spreading of the fork members, as described with reference to the fork members on the tooth in Figures 5 and 6. The effect of the last described elements is to provide upon the member which carries the projection, longitudinal extensions which overlap the elements of the fork and resist straining of the latter.

In Figure 9, the neck or shank 8^h has parallel sides. The enlargement 3^h is of cylindrical form, as in Figures 1, 7 and 8, and the fork members 1^h, 2^h, have anchoring lugs 6^h.

In Figure 10, the lines which develop the shank 8^i and the enlargement 3^i of the tooth member B^9, as well as the corresponding lines of the body member A^9 are substantially identical with Figure 8, but the lines which develop the anchoring lugs 6^i are divergent with respect to the longitudinal axis of the structure instead of parallel therewith, and thus cause the lugs 6^i to develop a longitudinally wedging seat.

According to Figure 11, the projection 3^k and recess 4^k are made in the form of a dovetail.

In Figure 12 the projection 3^m and recess 4^m are similarly made in the form of a dovetail joint, and anchoring lugs 6^m are added to resist spreading of the fork.

In Figure 13 the body member A^{12} and tooth member B^{12} are both forked in construction; that is to say, the tooth member B^{12}, in addition to having fork elements 9^o with anchoring lugs 7^o embracing and entering recesses of the body member A^{12}, in principle like Figures 5 and 6, is likewise formed with a shank 8^o and enlargement 3^o that enter a recess 4^o of the body member, in principle identical with corresponding portions of Figures 7, 8 and 10.

As suggested by convergence of lines indicating the assembly faces between the tooth member and the body member in Figures 2 and 3, the interlocking portions of the members are preferably tapered so that the members go together with wedging fit, and it is to be understood that this condition can prevail in all the illustrated forms of the invention, but the wedging fit is not indispensable to the underlying features of the invention.

It will also be observed that the meeting faces of the two members in each form of the invention illustrated are symmetrical on opposite sides of the longitudinal axis of the member, so that in each instance the tooth may be made reversible in position. In Figure 3, where the tooth consists of a pair of separate elements assembled with the body member from opposite sides, the tooth members may be made reversible as well as tapered.

Attention is further called to the fact that in Figures 4 to 13 inclusive, I use a two part tooth, the fin or partitioning wall being shown in dotted lines whereby each of the unions between the tooth and body member will be provided with lateral support independent of the bolt whereby the bolt is relieved of lateral strains, as well as the various features of the interlock.

I claim:

1. In toothed excavator implements, a body member, and a toothed member, said body member having a transverse receiving opening with a longitudinal partition wall extending therethrough dividing said opening into two receiving pockets, said toothed member being formed in two parts, interlocked against longitudinal and tilting movement with said body member, one in each of said pockets, and abutting laterally said partition wall.

2. In toothed excavating implements, a body member and a tooth member constructed to be assembled by relative lateral movement, one of said members being constructed with longitudinally presented fork elements and the other with a projection fitting between said fork elements; the fork elements having end walls through which they abut longitudinally against the member which carries the projection, and having anchoring elements resisting spreading movement of the fork, which anchoring elements are located inwardly from the longitudinally abutting end walls; the anchoring elements also having longitudinal abutment against the member which carries the projection in a manner to resist longitudinal separation of said members.

3. In toothed excavating implements, a body member and a tooth member con-

structed to be assembled by relative lateral movement, one member being constructed with longitudinally presented fork elements and the other with a projection fitting between said fork elements, the fork elements having end walls through which they abut longitudinally against the member which carried the projection, and having anchoring elements resisting spreading movement of the fork, which anchoring elements are located inwardly from the longitudinally abutting end walls, the projection being longitudinally recessed or forked and the member which carries the fork elements being so provided with a longitudinal projection which enters the longitudinal recess of said first projection, the anchoring elements also having longitudinal abutment against the member which carries the projection in a manner to resist longitudinal separation of said members.

Signed at Chicago, Illinois, this 31st day of December, 1924.

CLAUDE RORABECK.