

Fig. 1.

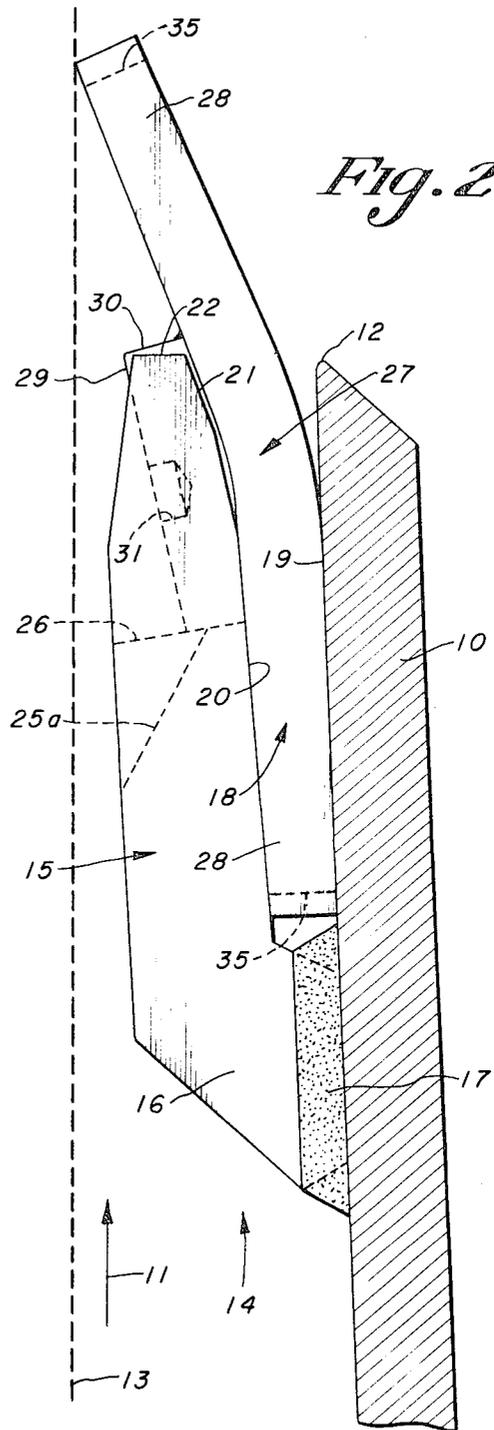


Fig. 2.

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# EARTH EXCAVATING CUTTING BIT AND MOUNT THEREFOR

## BACKGROUND OF THE INVENTION

Cutter bits incorporating dual opposed teeth for use in powered earth excavating equipment are quite old. One such bit is shown in Design U.S. Pat. No. 183,427 issued Aug. 26, 1958 to John F. Lindell. The bit shown in this patent includes two teeth united at their butts at an angle of approximately 150° and the individual teeth are tapered in outline and ornamentally chamfered to make scoop-shaped cutting edges. This patented bit has had wide use but requires an encircling rigid holder which is inadequately shielded by the bit thereby wearing excessively by soil contact under high pressure.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a narrow bit and a holder therefor including a narrow cantilever bracket welded at its rear end to a base plate and flush at its front end with the leading edge of said plate, the bit fitting forwardly diverging faces of a laterally and forwardly open bit holding slot provided between said plate and bracket and being mounted on said holder solely by frictional forces developed by driving said bit in a direction normal to said leading plate edge and into tightly wedged relation with said slot faces.

Another object is to provide such a bit and holder in which said bracket and bit are respectively provided with key means and key seat means which are disposed lengthwise of said bracket and bit and are caused to interlock by the driving of the bit into said slot, thereby locking said bit against displacement laterally from or rotation in said slot.

A further object is to provide such a bit and holder in which said bit is provided with oppositely extending identical teeth, each of which is shaped to fit into said slot when the other tooth is exposed for use.

A still further object of the invention is to provide such a combination wherein limit stop means is provided on the bit and holder which interengage to prevent further tightening telescopic movement between said bit and holder after said bit has been driven into wedged relationship with said holder to produce the requisite degree of tightness.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary elevational view of a preferred embodiment of the invention.

FIG. 2 is a section view taken on the line 2—2 of FIG. 1.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring specifically to the drawings, the invention embraces a base plate 10 which may be one of the sidewalls of a back hoe bucket or it may be a tooth-mounting plate chain fitting in a chain-actuated trencher or it may be an outer wall of one of a series of digging buckets mounted on a rotary trenching device. In a broad sense, the plate 10 may represent part of a digging element of any earth excavator the effectiveness of which is dependent upon its being provided with efficient earth-cutting bits along its leading edge. In the drawings, the plate 10 is illustrated in an attitude which is conventional in an earth-digging operation wherein the plate 10 travels in the direction of arrow 11 and the leading edge 12 of the plate is beveled outwardly towards a wall of earth 13 to be attacked, the surface of which is indicated in FIG. 2 by a broken line.

The present invention utilizes the plate 10 as one of the elements of a tooth holder 14 having a heavy metal bracket 15 which is uniform in width, as seen from the front in FIG. 1, and contoured in outline, as seen from one side in FIG. 2, to provide a cantilever bracket supporting base 16 which fits flat against the outer face of the plate 10 and is secured thereto by a rectangular ring of welding material 17. The portion of the bracket 15 adjacent the plate 10 is relieved to form an inwardly tapering slot 18 between the outer face 19 of plate 10 outwardly for a purpose to be made clear hereinafter.

The upper end 22 of bracket 15 is approximately flush with the leading edge 12 of plate 10 and the bracket 15, as shown in FIG. 1, is, in certain conventional applications, disposed at right angles with plate edge 12.

Extending downwardly from the upper end 22 of bracket 15 is a deep recess 25 with parallel walls and end face 26.

The invention also includes, in combination with holder 14, a reversible double-ended cutter bit 27 which includes two tapering earth-excavating teeth 28 which are identical and are joined together at their butt ends to form a single integral cutter bit 27 in which said teeth are angled relative to each other approximately at an included angle of 164°. The cutter bit 27 has an integral enlargement extending outwardly from said bit from within said included angle of the bit, said enlargement comprising a lug 29 which is relatively long and narrow as shown in FIG. 1 and has end faces 30 and a shallow central recess 31 the purpose of which will be made clear later.

The lug 29 is uniform in width and fits slideably into the notch 25 formed in the bracket 15 and the individual teeth 28, which are identical, are formed with such a taper between the inner and outer faces thereof that one of these teeth will just fit into the tapering slot 18 formed by the holder 14 when a punch is applied to the appropriate end face 30 or placed in the recess 31 and inclining downwardly and this punch is then struck with a hammer to drive the bit 27 into the holder 14 so that the lowermost tooth 28 of the bit is slideably wedged into the tapering slot 18 formed by the holder 14 as shown in FIG. 2.

The proportions of the parts of the invention are so engineered that the lower end 30 of the lug 29 may be driven into contact with the end face 26 of the slot 25 until the lower tooth 28 of the bit 27 has been tightly wedged into the tapered recess 18 in the holder 14. Slot end 26 has a narrow tool slot 25a provided therein for admitting a tool into endwise engagement with lug 29 for removing bit 27 from holder 14.

Because of the cantilever mounting of the bracket 15 relative to the plate 10 of the invention, a wedging of the bit 27 into the holder 14 as shown in FIG. 2 causes this bit to be gripped by a tremendous elastic pressure applied to the lowermost tooth 28 of the bit so as to secure the bit firmly in position on the plate 10 and retain the bit in this position throughout all ordinary working strains to which the bit 27 will be subjected by bearing the brunt of an earth-excavating operation performed by the earth-excavating tool equipped with the invention.

It should be noted that the attitude in which the invention is illustrated in FIG. 2 reflects perhaps the minimum angle between the plate 10 and a wall of earth 13 which the invention may be used to dig into. In the various earth-digging applications of the present invention the attitude of attack of the tooth and holder of the invention may vary considerably but preferably the attack is always at a sufficient angle that the projecting tooth 28 of the bit 27 of the invention shelters the bracket 15 by which this bit is supported on the plate 10 which is actuated by the power tool embodying said plate to bring the bit 27 into engagement with the earth 13.

It is to be noted in FIG. 1 that the bit 27 is slightly wider than the bracket 15 so that the bit always provides a clearance in the earth through which it passes through which the bracket 15 may follow without setting up a substantial abrasive friction between the dirt and the bracket.

The outer end of each tooth 28 is shown in the drawings as ground with a concave radius 35 but it is to be understood that these teeth may be provided with a wide variety of shapes and styles of cutting edges without departing from the spirit of the present invention or the scope of the appended claims.

The snugness of the sliding fit of the lug 29 in bracket slot 25 substantially prevents rotation of the bit 27 relative to holder 14 and about the axis of the recess 31. This factor, coupled with the tight gripping of the lower tooth of the bit 27 by the walls of the holder 14 result in the bit of the invention being securely locked in place, when once so installed, no matter how severe the excavating work may be to which the

invention is subject. In fact, pressure of the earth on bit 27 with each digging stroke of plate 10 merely assures that the bit 27 remains tightly mounted in holder 14. Removal of the bit may however be readily effected by the application of a punch to the recess 31 or to a lug face 30 and hammer blows applied to said bit in the opposite direction from that employed to incorporate the bit with the holder 14.

One of the great advantages of the present invention is the simplicity of the means by which the bit can be installed in its holder. Only a hammer and a punch are required either to install a bit 27 in the holder 14 or to remove the same therefrom. This greatly simplifies and reduces the cost of reversing the bits 27 on a piece of equipment so as to present fresh cutting edges or to replace these bits with other bits.

Another notable advantage of the invention is derived from the fact that the presence of lug 29 on the bit 27 permits the bit to be applied or removed with much greater facility by the application of a punch to any suitable part of said lug, because the angle of access needed for delivering the hammer blows is less critical than most other types of bits require and this speeds up either operation.

The outward flaring of upper end portion 21 of inner face 20 of holder bracket 15 is for the purpose of providing clearance between said bracket and the outwardly extending tooth 28 of the bit 27 so as not to interfere with the bit being anchored in the holder 14 entirely by engagement of the latter with the lower tooth 28 of the bit. The very narrow spacing between bracket portion 21 and upper tooth 28 when the bit is installed provides a reserve support for the bit should an excessive force applied in a digging operation deflect the upper tooth 28 into contact with the bracket portion 21.

I claim:

1. An earth-excavating bit and holder therefor, comprising: a base plate having a transverse leading edge; a rectangular heavy metal bracket, having its longest dimension approximately normal to said edge, said bracket being fused into integral union with said plate at the end

of the bracket remote from said transverse leading edge; and extending from said remote end in spaced relation with said plate and toward said leading edge to provide a rigid cantilever mounting of said bracket on said plate with opposed faces of said plate and said bracket diverging slightly from said base towards said plate leading edge to form a lengthwise tapered bit receiving slot;

an excavating cutter bit shaped to be received inwardly from said plate leading edge, between said plate and said bracket, into tightly wedged interfitting frictional relation with said slot faces;

a cutting tooth on the end of said bit, extending from said slot, said tooth having a dimension parallel to said plate leading edge which is at least equal to the dimension of said bracket parallel to said plate leading edge; and

one of said bit and said bracket having a keyway, and the other of said bit and said bracket having a key positioned to be received in said keyway, said key and keyway being driven into interlocking relation with each other when said bit is driven into said slot, to prevent said bit swinging out of substantial alignment with said bracket and preventing said bit shifting laterally in said slot in response to earth-working forces to which said bit tooth is subjected in use, the net result of said forces being to drive said bit more tightly into said slot.

2. An earth-excavating excavating bit and holder therefor as recited in claim 1 wherein

said bit has a cutting tooth at each of its ends, said slot being shaped to accommodate one of said teeth in said slot when said key is positioned in said keyway.

3. An earth-excavating bit and holder therefor as recited in claim 2 wherein

said key is a rectangular lug formed lengthwise, centrally on said bit; and wherein

said key way is a recess with parallel walls bifurcating the leading end portion of said bracket, said recess slideably receiving said lug when said bit is driven into said slot.

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