

April 5, 1938.

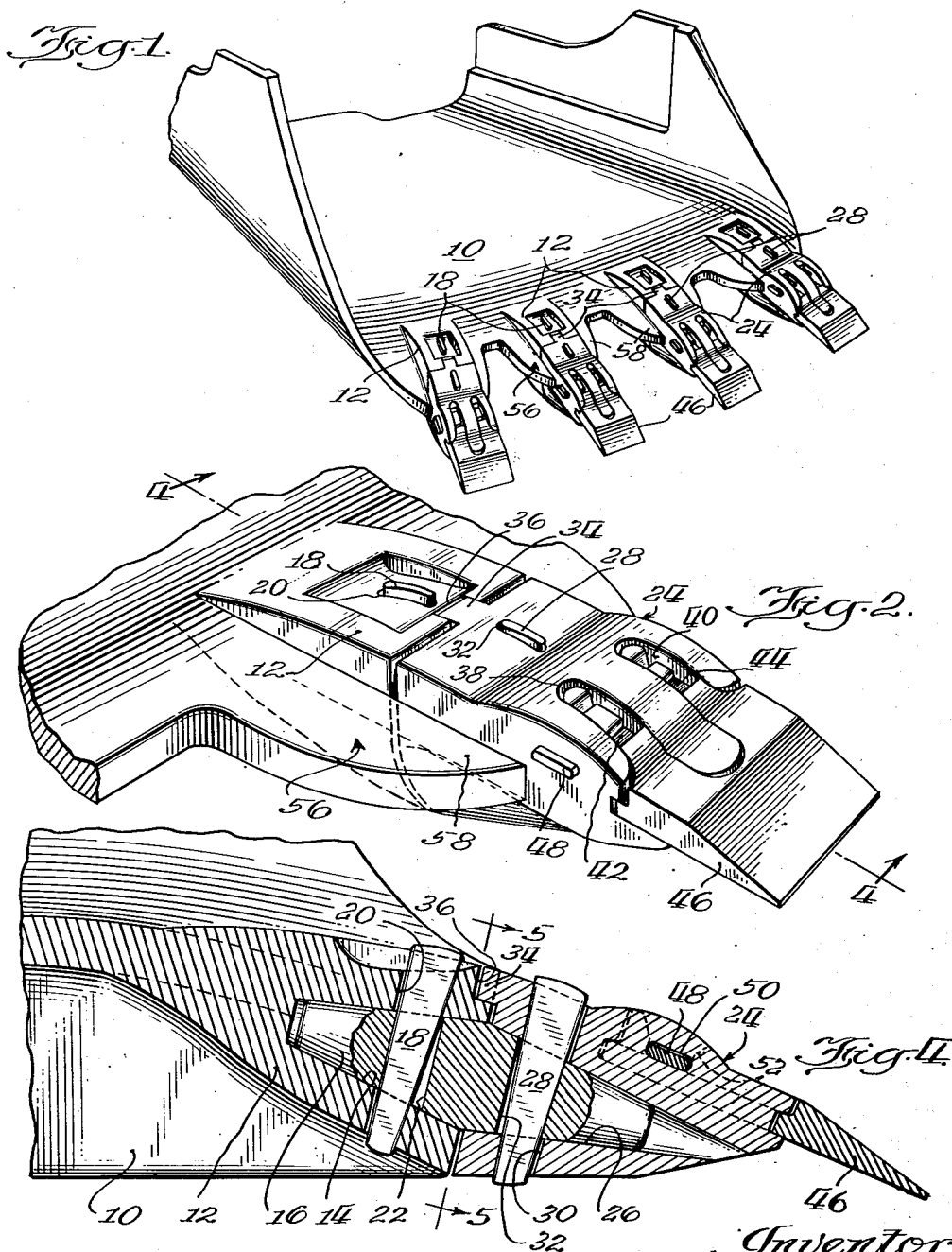
L. E. YOUNIE

2,113,420

EXCAVATING TOOTH

Filed July 10, 1937

3 Sheets-Sheet 1



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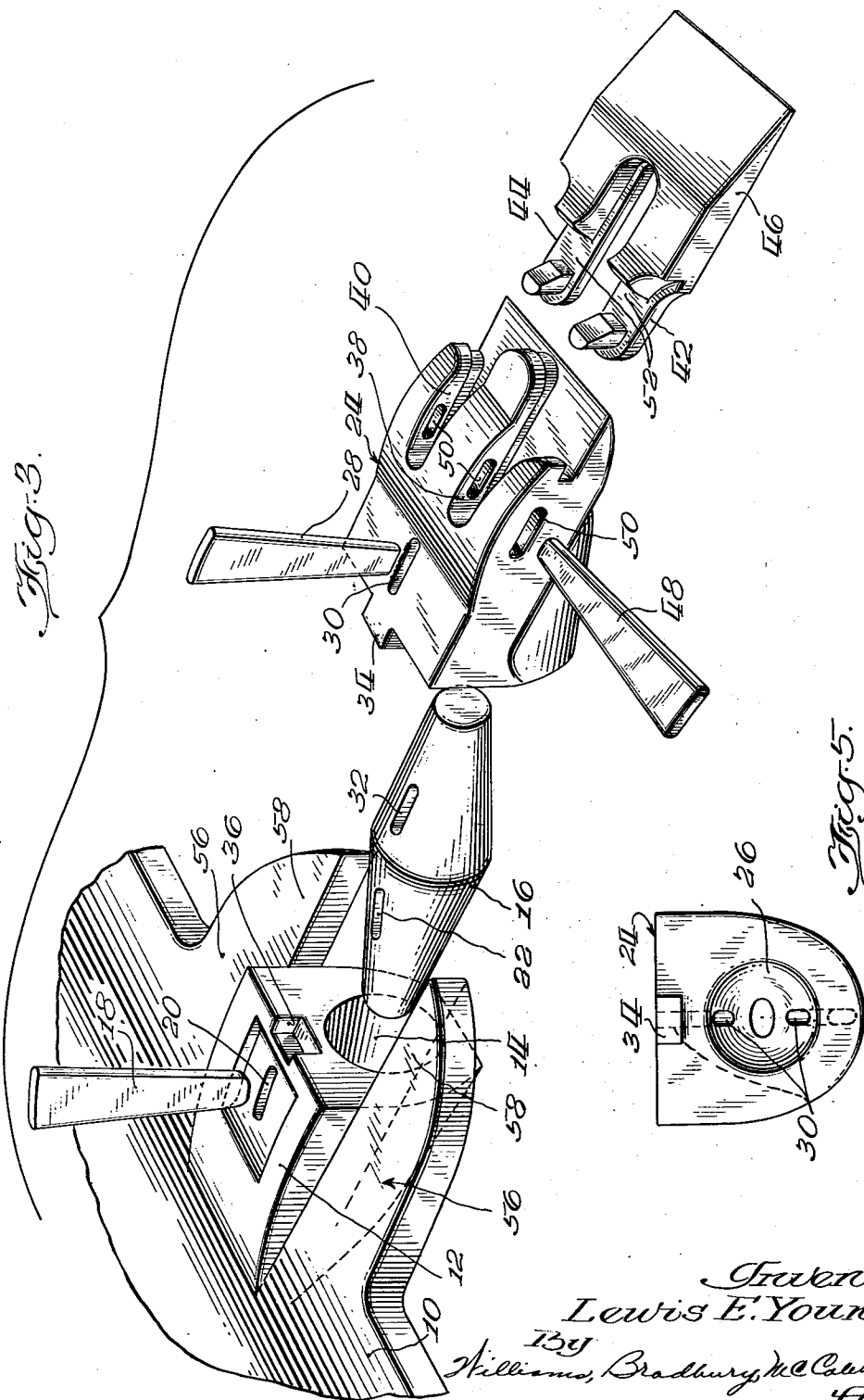
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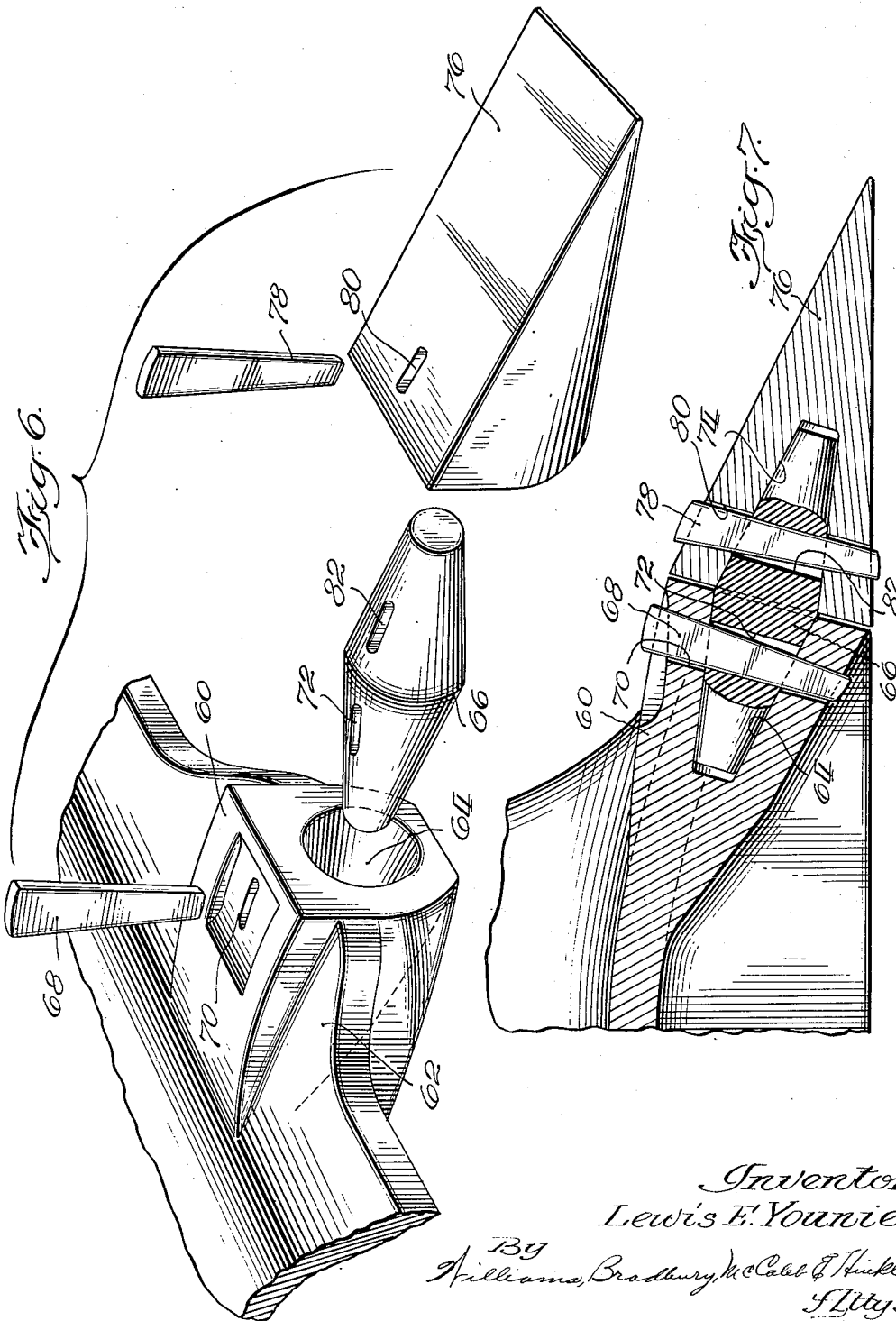
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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EXCAVATING TOOTH

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11 Claims. (Cl. 37—141)

This invention relates to excavating teeth provided at the mouth of an earth digging power shovel or drag line bucket, and is more particularly concerned with the provision of means for
5 removably connecting such teeth to the front of such a shovel or bucket.

Excavating teeth are subjected to heavy shocks, especially when operating in rocky soil. Occasionally the connecting means between a bucket
10 and one of these teeth becomes broken. It is, therefore, highly desirable to provide a connection between bucket and tooth such that the breakage may be easily repaired, on the job, with the least possible loss in material and time.

15 With the above in view, it is a salient object of my invention to provide a strong, rigid connection, between a tooth and an excavating bucket, that is inexpensive and easily and quickly replaceable if broken.

20 In the accompanying drawings, in which like numerals designate like parts throughout the same:

Fig. 1 is a right front perspective view of a dipper front embodying the invention;

25 Fig. 2 is a right front perspective view, of a fraction of the dipper front illustrated in Fig. 1, showing one of the teeth in greater detail.

Fig. 3 is an exploded view of the device shown assembled in Fig. 2.

30 Fig. 4 is a longitudinal vertical sectional view taken in the direction of the arrows along the line 4—4 of Fig. 2.

Fig. 5 is a view of the back of the tooth taken in the direction of the arrows along the line 5—5
35 of Fig. 4 with the double conical plug and key removed therefrom.

Fig. 6 is an exploded view showing a modified form of the tooth and dipper front.

40 Fig. 7 is a longitudinal vertical section through the tooth and dipper front shown in Fig. 6 when in assembled position.

Referring to Figs. 1, 2, 3, 4, and 5 of the drawings, a dipper front 10 is provided on its forward cutting edge with a plurality, in this instance
45 four, of thickened sections 12 containing forwardly opening conical sockets 14. Each socket 14 contains one end of a double frusto-conical plug 16 rigidly secured thereto by a tapered key 18 driven into aligned key slots 20 and 22 located
50 respectively in the thickened section 12 and the plug 16. A tooth base 24 is provided on its rear side with a conical socket 26, similar to the socket 14, which is slid over the exposed end of the plug 16 and secured in place by means of a
55 tapered key 28 driven into aligned key slots 30

and 32 in the tooth base 24 and the plug 16 respectively. In the above assembled position, a tang 34 extending rearwardly from the upper portion of the tooth base 24 is engaged in a notch 36 formed in the section 12 above the conical
5 socket 14.

It will thus be seen that the keys 18 and 28 wedge the section 12 in the dipper front 10 and the tooth base 24 tightly against the surface of the plug 16 with the tang 34 engaged in the notch 10 36, thereby forming a very solid structure.

The cooperating tang 34 and notch 36 prevent relative rotation between the parts 12, 16, and 24 and thus relieve the keys 18 and 28 of the shearing stresses that might otherwise cause a fail-
15 ure of these parts.

The tooth base 24 is provided with two forwardly opening slots 38 and 40 into which are slid two fingers 42 and 44 of a removable cutting bit 46 which is held in place by a tapered key 48
20 driven transversely through an aligned slot 50 and notches 52 formed in the tooth base 24 and fingers 42 and 44 respectively.

If it is desired to give added support to the thickened sections 12 and the tooth bases 24, the
25 front edge of the dipper front 10 may be provided with flanges 56, which extend forwardly along each side of the thickened sections 12 and somewhat therebeyond to form wings 58 which support the tooth base 24 against lateral move-
30 ment.

In the embodiment illustrated in Figs. 6 and 7, the dipper front is shown provided with a thickened section 60 which differs from the section 12 only in that no notch 36 is provided in
35 its forward face. This section 60 is laterally braced by flanges 62, similar to flanges 56 excepting that they do not extend beyond the forward face of the thickened section as do the flanges 56. A conical recess 64 in the section 60
40 secures one end of a double frusto-conical plug 66 by means of a tapered key 68 and aligned key slots 70 and 72 in the same manner that the plug 16 is secured in the recess 14. The projecting end of the plug 66 is fitted to a conical recess 74
45 in the rear of a wedge shaped cutting point 76 and the two are rigidly secured together by a tapered key 78 driven through aligned key slots 80 and 82 formed in the point 76 and plug 66 respectively.
50

Thus the device shown in Figs. 6 and 7 is much like that illustrated in Figs. 1, 2, 3, 4, and 5, excepting that the point 76 is a single piece instead of being a composite structure, no notch 36 and tang 34 connection is provided, and the webs or
55

flanges 62 do not extend alongside the point 76. This latter structure is simpler than the one first described and although not quite as strong, is still adequate to meet most needs. It has been found that most forces tending to cause relative rotation between the point 76 and section 60 also push the point 76 backwardly and wedge it more tightly on the plug 66, so that very little shearing stress is put upon the keys 68 and 78 even in the absence of the notch 36 and tang 34 shown in the previous embodiment.

It should be understood that a single piece wedge shaped point, such as point 76, may be provided with a tang, similar to tang 34, and used in conjunction with the first described dipper front, and that the extensions 66 on the webs 66 may be removed from the first described device or added to the embodiment illustrated in Figs. 6 and 7 without departing from this invention.

In any of the above embodiments of this invention the weakest part of the connection between the teeth 24 or 76 and the dipper front is the plug 16 or 66, or the keys 18 and 28 or 68 and 78. Thus, any unusual stress on the teeth 24 or 76 will break one of the above relatively simple parts which may be easily and inexpensively replaced.

The word "bucket" in the claims is used in its broad sense and is generic as to buckets, dipper 30 and shovels used on various types of power excavating machines.

While I have shown specific embodiments, it is to be understood that this invention may assume various forms, and that the scope of my invention is to be limited only by the following claims.

I claim:

1. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a conical socket therein, a double frusto-conical plug removably secured in said socket at one end, an excavating tooth having a conical socket to fit the other end of said plug, and means to removably secure the tooth to said other end of said plug.

2. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a conical socket therein, an excavating tooth having a conical socket therein, a double frusto-conical plug to fit both said conical sockets with its opposite ends, means to secure said tooth and said dipped front to said plug, and a tongue and notch connection between said tooth and said bucket to prevent relative rotation therebetween.

3. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a conical socket therein, an excavating tooth having a conical socket therein, a double frusto-conical plug to fit both said conical sockets with its opposite ends, and tapered keys to secure said tooth and said bucket to said plug.

4. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a conical socket there-

in, an excavating tooth having a conical socket therein, a double frusto-conical plug to fit both said conical sockets with its opposite ends, tapered keys to secure said tooth and said bucket to said plug, and tongue and notch means to prevent relative rotation between said dipper and said tooth.

5. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a tapered socket therein, an excavating tooth having a tapered socket therein, a double tapered plug to fit both said sockets with its opposite ends, and means to secure said plug to said tooth and said bucket.

6. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a tapered socket therein, an excavating tooth having a tapered socket therein, a double tapered plug to fit both said sockets with its opposite ends, and keys to secure said plug to said tooth and said bucket.

7. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a tapered socket therein, an excavating tooth having a tapered socket therein, a double tapered plug to fit both said sockets with its opposite ends, interlocking tongue and notch means to prevent relative rotation between the tooth and bucket, and means to secure said plug to said tooth and said bucket.

8. A connection for securing an excavating tooth to a bucket comprising in combination, a bucket cutting edge having a tapered socket therein, an excavating tooth having a tapered socket therein, a double tapered plug to fit both said sockets with its opposite ends, means to secure said plug to said tooth and said bucket, and webs extending from said bucket cutting edge to support the sides of said tooth.

9. A connection for securing an excavating tooth to a bucket comprising, in combination, a bucket cutting edge having a tapered socket therein, an excavating tooth having a tapered socket therein, a double tapered plug to fit both said sockets with its opposite ends, means to secure said plug to said tooth and said bucket, webs extending from said bucket cutting edge to support the sides of said tooth, and interlocking tongue and notch means to prevent relative rotation between the tooth and bucket.

10. A connection for securing an excavating tooth to a bucket comprising, in combination, a dipper front having a tapered socket therein, an excavating tooth having a socket therein, a plug to fit both said sockets with its opposite ends, and means to secure said plug to said tooth and said bucket.

11. A connection for securing an excavating tooth to a bucket comprising, in combination, a bucket cutting edge having a socket therein, an excavating tooth having a tapered socket therein, a plug to fit both said sockets with its opposite ends, and means to secure said plug to said tooth and said bucket.

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