Aug. 1, 1933. L. E. MacFADYEN 1,920,873

EXCAVATING APPARATUS

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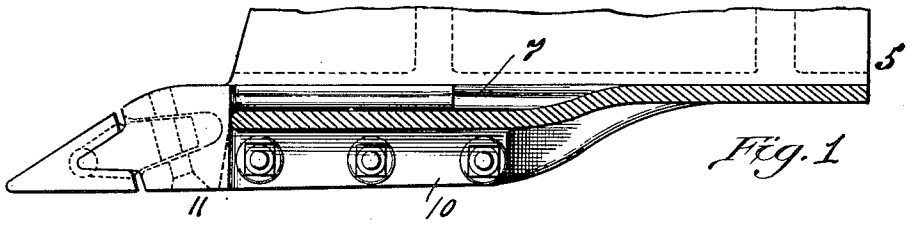


Fig. 1

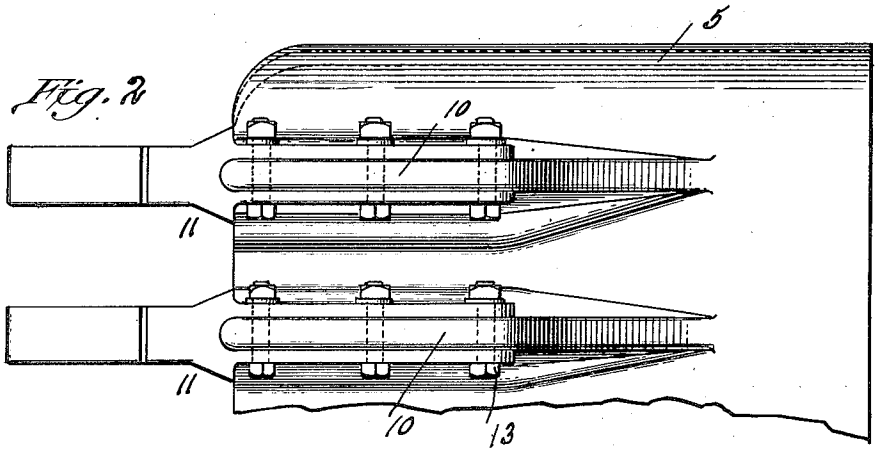


Fig. 2

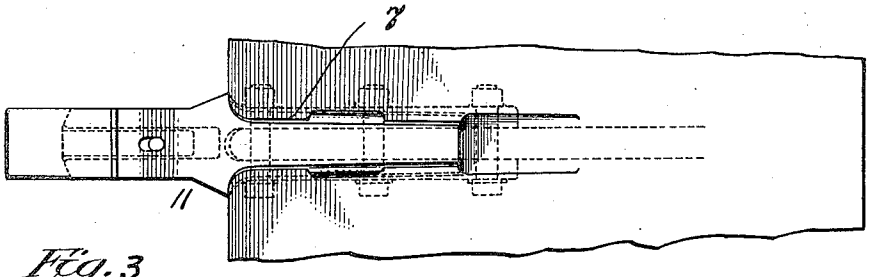


Fig. 3

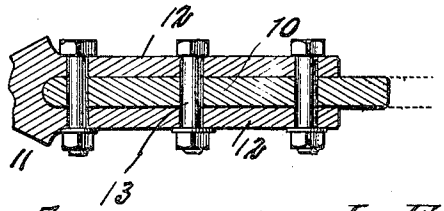


Fig. 4

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EXCAVATING APPARATUS

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Fig. 5

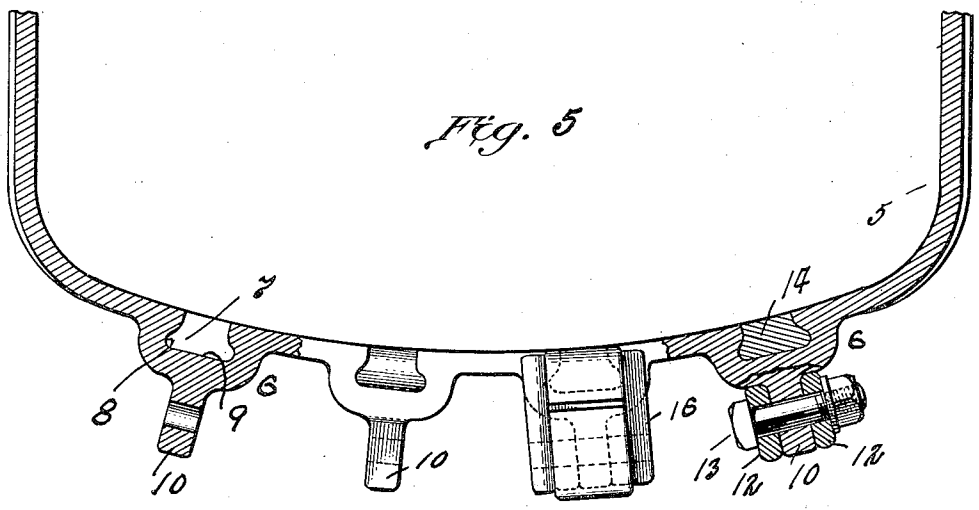
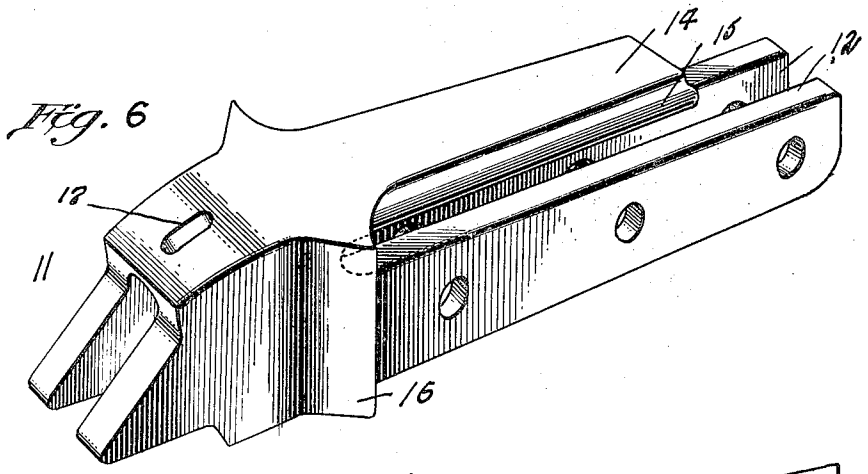


Fig. 6



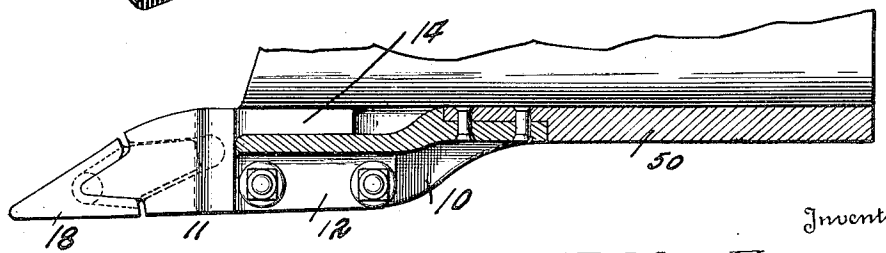


Fig. 7

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Patented Aug. 1, 1933 1,920,873

UNITED STATES PATENT OFFICE

1,920,873

EXCAVATING APPARATUS

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Application February 11, 1932. Serial No. 592,356

13 Claims. (Cl. 37—141)

The invention relates more particularly to the mounting of digging teeth on dippers, drag buckets, trenching machines and other excavating and grading apparatus and was devised to overcome certain disadvantages attendant on the use of the conventional types of mountings and mainly the tendency to shearing action on the rivets or other fastenings that secure the bases of the teeth.

Principal objects are to correct the faults of the old practice and to provide a mounting of maximum strength in which the metal is so ordered and distributed that under operating conditions it will be under compression and there will be no shearing strain on the fastening; and to provide fronts or lips adapted and arranged for the support and carriage of digging teeth or their bases, in such way that the inside of the front or lip is substantially flush or free from projections thereby increasing the capacity of the bucket, or its equivalent, and facilitating the discharge thereof.

The nature, characteristic features and scope of the invention more readily will be understood from the following description taken in connection with the accompanying drawings forming a part hereof, wherein

Figure 1 is a sectional elevational view of a tooth and front assembly embodying features of the invention.

Fig. 2 is a bottom plan view thereof.

Fig. 3 is a top plan view of one of the mountings.

Fig. 4 is a longitudinal sectional detail of the outside or bolted connection.

Fig. 5 is a sectional front elevational view showing the compound bolted and dovetail connection and also the flush characteristic of the front.

Fig. 6 is a perspective view of the improved base and

Fig. 7 is a sectional elevational view showing the improvements applied to a lip.

In practicing the invention, the dipper tooth base supporting element may be a front 5 formed as an integral or sectional part of a dipper or other excavating appliance, or it may be a lip 50 riveted or otherwise attached to a front, or its equivalent, as in Fig. 7.

The front or lip, as the case may be, by preference is a heat treated unit casting of alloy steel of tough hardness, such as manganese steel, but otherwise, and aside from the particulars hereinafter specified, there may be variations in the general detailed construction of the front, or lip, in its relation to the dipper or other machine or appliance of which it forms a component part.

The cast body, whether front or lip, is formed, according to the number of teeth to be carried, with coordinate concavo-convex elements, generally indicated at 6, in spaced order of arrangement, and ranging fore and aft, beginning at the forward edge and vanishing in the body of the casting. Otherwise stated, elements 6 are manifested by top depressions, pockets or slots 7 having their maximum development at the edge of and vanishing in the body. It will be apparent by reference to Figs. 1, 5 and 7, that the slots 7 are within the plane of the top of the casting. Their side walls are undercut as at 8 and their bottoms 9 have depending offset members or lugs 10. As will be noted in Fig. 5 the described construction provides for substantial uniformity of metal section which is very desirable in the heat treatment of alloy steel such as manganese steel.

The office of the concavo-convex elements 6 detailed as above, is that of receptive and carriage members for digging teeth, especially the sectional type embodying separate points and bases.

In Fig. 6 is represented a form of base designed for cooperation with the front or lip in a manner so to distribute the thrusts under digging stress as generally to prolong the useful life of the structure. The base generally is indicated at 11 and it is a unit casting having longitudinal shanks of which a pair, as 12, properly are spaced to flank the depending lugs 9 of the front and to be secured thereto as by bolts 13. Another shank, as 14, above and at right angles to the pair 12 slidably fits the slot 7 and by reason of its beveled side walls 15 provides a dovetail connection as best shown in Fig. 5. Shank 14 is shown somewhat shorter than the underslung shanks 12. 16 are side lugs or abutments on the body of the base which bear against the nosing of the front or lip and serve to balance the thrust. 17 is an opening for the usual taper pin or bolt for securing the detachable point 18.

Having described the invention, I claim—

1. The combination of a base supporting member having concavo-convex portions within the plane of its top, defined, respectively, as dovetail slots in the top of the member and lugs in the bottom of the member and alined with the slots, and digging teeth whereof each is equipped with a shank that fits a dovetail slot and with paired shanks between which a lug is received and tied, whereby the parts are under compression under operating conditions.

2. The combination of a base supporting member having concavo-convex portions, and a tooth

carrying base having shanks whereof two engage the convex portion and whereof another fits the concave portion.

3. The combination of a base supporting member having concavo-convex portions below the plane of its top and formed by depressed slots in the top and by lugs depending from the bottom depressions, and a base having a fork to accommodate a lug and a shank to engage a complement slot.

4. The combination of a base supporting member having coordinate concavo-convex portions defined, respectively, as slots in the top of the member and as lugs depending from the bottom thereof, and the base having shanks whereof two flank the lugs and are secured thereto, as by bolts, and whereof another slidably fits the slot.

5. The combination of a base supporting member having coordinate concavo-convex portions defined, respectively, as undercut slots in the top of the member and as lugs depending from the bottom thereof, and a base having shanks whereof two engage the lugs for attachment purposes and whereof another forms a dovetail connection with a slot.

6. The combination of a base supporting member having coordinate concavo-convex portions defined by undercut slots in the top of the member and lugs depending from the bottom thereof and alined with the slots, and bases having shanks springing therefrom for interlocking fit with the slots and lugs.

7. The combination of a base supporting member having concavo-convex portions below the plane of the top thereof, bases having shanks socketed in the concave portion and forked elements tied to the concave portions and having side lugs which engage the front edge of the member and serve to distribute the thrust.

8. A front or lip having spaced fore and aft ranging concavo-convex portions below the plane of the top and formed by depressed sockets to receive tooth elements which fill the sockets and make the top substantially flush, and by bottom lugs alined with the sockets and effective as an anchorage for other elements of the same tooth.

9. A digging tooth whereof the base has shanks springing therefrom, two of which constitute a lower fork and have openings to receive fastening devices and whereof one is formed as a tenon.

10. A digging tooth whereof the base has a pair of underslung shanks having registered openings for securing the base to a support and having another shank overhanging them and effective as an element of a dovetailed connection.

11. A digging tooth whereof the base has a plurality of shanks to engage a support, one of said shanks being formed as a socket engaging member and two of the shanks being paired to form a fork-like tying member, the base having forwardly of the shanks side lugs effective to distribute the thrust under operating conditions.

12. An excavator having sets of sockets formed by continuously open depressions and having bottom lugs alined with the sockets, combined with digging teeth having tenons to engage the sockets and forks to straddle the lugs.

13. An excavator having a substantially flush interior and having sets of alined sockets and lugs extending fore and aft and vanishing in the body thereof, combined with digging teeth each having integral shanks of which one is constructed slidably to engage the socket and of which others are adapted to be secured to the lugs.

LOUDON E. MacFADYEN.