July 21, 1931. O. W. ANDERSEN 1,815,819

DIPPER TOOTH

Filed June 14, 1928

Fig. 1.

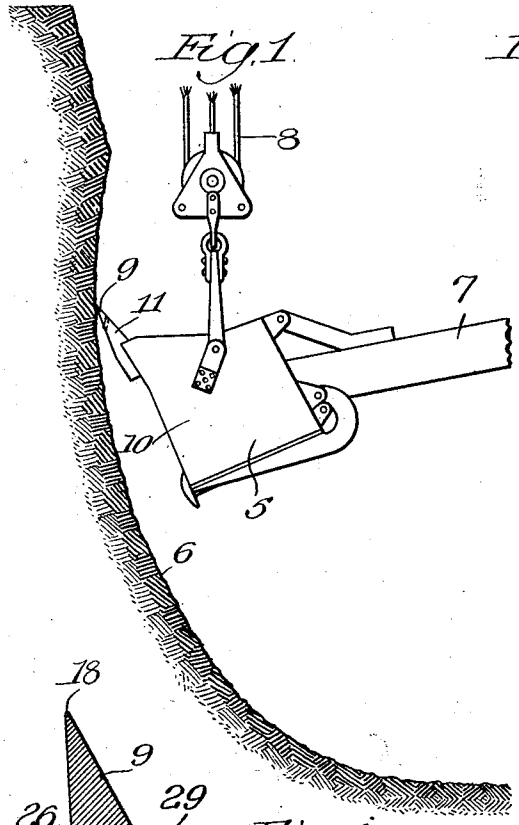


Fig. 2.

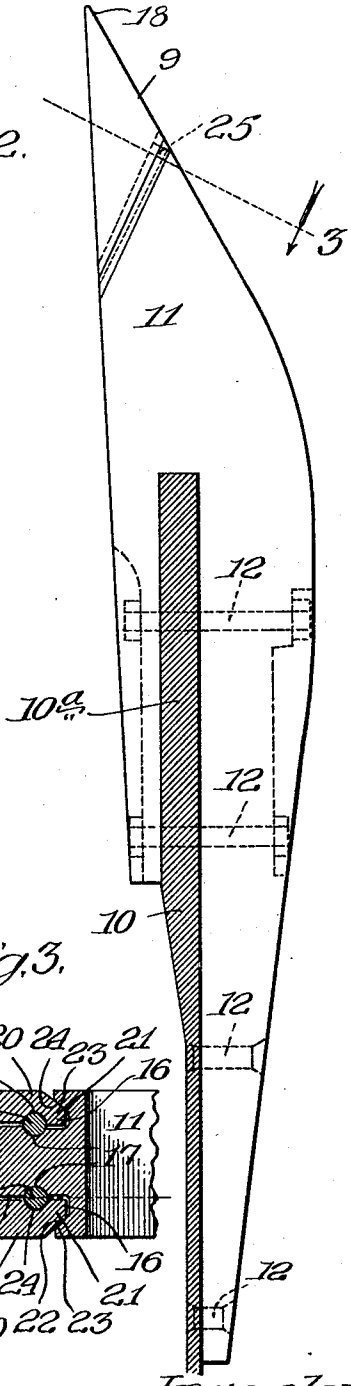


Fig. 4.

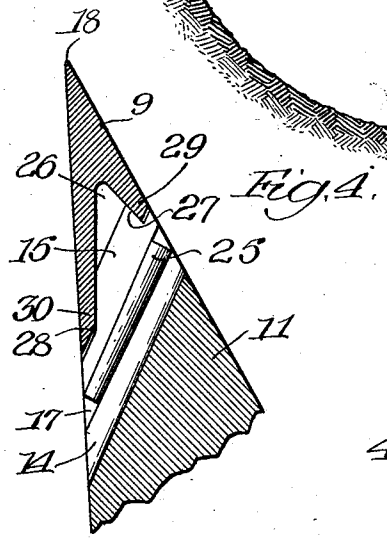


Fig. 3.

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UNITED STATES PATENT OFFICE

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DIPPER TOOTH

Application filed June 14, 1928. Serial No. 285,394.

My invention relates to teeth for dippers such as are used for excavating, dredging, transferring loose material or for other similar work, and to the means for securing such teeth in place on the dipper.

Certain of my objects in devising my improvements are as follows:

To provide a construction of dipper tooth which shall be of exceedingly light weight and will not require for economical use reversal thereof on the dipper as wear thereof progresses, with the disadvantage resulting from the continued use of a partly worn, blunt, tooth of low operating efficiency.

To provide a construction of tooth which will be of such form that the metal thereof is disposed practically only where wear occurs, so that when the tooth is worn out a relatively small body only of metal remains, thereby greatly minimizing waste.

To provide a construction of tooth and securing means therefor which shall be inexpensive of manufacture as compared with the expensive locking means as commonly provided and involving relatively great cost in removal, reversal and reattachment of the same to the dippers.

To provide simple and inexpensive means for securing the tooth in place without requiring the aid of a wrench.

To provide securing means for the tooth which may be readily applied to position and without interference from adjacent teeth as in the case of means which are insertible from the sides of the teeth.

To provide securing means comprising pins which shall be highly effective to resist the shearing stresses to which they are subjected in digging, the pins to this end being so disposed as to resist shear in a direction longitudinally of the pins, instead of crosswise thereof as is commonly the case, with the manifest advantage.

To provide a construction of tooth which will be of substantially uniform section, which is highly conducive to the making of perfect castings even when annealed as in the case of castings of manganese steel.

To provide a construction of tooth the surfaces of which required to be ground for conditioning it for attachment and use on a dipper, shall be readily accessible for such operation thereon; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:—

Figure 1 is a view in elevation of a portion of excavating apparatus comprising a dipper embodying my invention, the dipper being shown as associated with a bank of material against which it is operating.

Figure 2 is an enlarged view of the upper edge of the dipper front showing it equipped with my improved tooth.

Figure 3 is a sectional view taken at the line 3 on Fig. 2 and viewed in the direction of the arrow; and

Figure 4, a broken sectional view taken at the line 4 on Fig. 3 and viewed in the direction of the arrow.

In Fig. 1 I have illustrated the relation borne by the dipper, represented at 5, to a bank, represented at 6, from which the material is to be removed, the dipper being carried by a boom 7 and connected with elevating means 8 in accordance with common practice, the arrangement of the parts being such that the teeth (one only of which is shown at 9) carried by the front section 10 of the dipper are subjected, in digging, to forces tending to tilt them on their support to the left in Fig. 1 which exerts shearing stresses at the connection between the tooth and its support, and it is therefore necessary to provide securing means for the tooth so disposed as to adequately resist these shearing stresses.

In the particular illustrated embodiment of my invention, the bases, one only of which is shown at 11 and forming seats for the teeth, are of a common form except at their upper seat-forming portions, these bases being formed separate from the front-section 10 of the dipper and overlapping the lip 10^a thereof in which position they are secured, as by the fastening devices represented at 12.

The upper terminal surface of the base 11 is preferably inclined downwardly from the rear of the base toward its front side and preferably at the angle shown, this terminal

surface being recessed at opposite lateral sides, as represented at 14 thereby presenting a rib 15, with the bases of these recesses grooved at opposite sides of the rib 15, as represented at 16, and the lateral faces of the rib grooved as represented at 17, the bases of the recesses 14 and the grooves 17 being substantially parallel with the above-referred-to inclined terminal face of the base.

The tooth 9 tapers at its upper end to form a cutting edge portion represented at 18, its lower end portion, at which it connects with the base 11 inclining downwardly and forwardly at substantially the same angle to its front face as in the case of the terminal upper surface of the base 11, as illustrated, this inclined lower face of the tooth containing a groove 19 at which the tooth straddles the rib 15 of the base.

The side portions of the tooth and represented at 20 extend, at their lower portions represented at 21, into the grooves 16, the tooth 9 preferably seating against the base at inclined surfaces 22 on the portions 20 and bearing against similarly inclined surfaces 23 on the inner surfaces of the outer walls of the grooves 17 whereby as the tooth 9 is drawn downwardly into tight engagement with the base 11, as hereinafter described, the tooth will become tightly wedged in the grooves 17 and held therein against lateral displacement.

The inner surfaces of the side portions 20 of the tooth contain grooves 24 which extend parallel with and directly oppose the grooves 17, these complementary grooves being provided to receive wedging pins 25 which, upon being introduced into these grooves by inserting the smaller end of the pins into the upper portions of the grooves and driving them to place, force the tooth 9 into clamping engagement with the walls of the grooves 16 and form an effective interlock between the tooth and the base for holding the tooth in position on the latter.

As shown in Figs. 3 and 4 the tooth 9 is cored out as represented at 26 to form a socket therein, whereby the tooth is caused to be of substantially uniform section throughout its extent which, as above stated, is desirable not only in connection with the molding of the tooth, especially when made of manganese steel, but also in the annealing thereof.

The cored portion 26 extends upwardly beyond the rib portion 15 of the base the latter being notched at its opposite ends, as represented at 27 and 28, to receive, and interfit with, the portions 29 and 30, respectively, of the tooth.

It will be understood from the foregoing that by positioning the locking pins in accordance with my invention the shearing stresses are exerted laterally against the pins along planes coincident with the longitudinal axes of the pins rather than against a comparatively small transverse area thereof, whereby pins of a given cross section which would be too small to resist the shearing stresses if the latter were exerted against them in a crosswise direction but which adequately resist the shearing stresses when exerted against them in accordance with my invention, may be used.

While I have shown my invention as incorporated in a dipper, the front portion of which comprises a base formed separate from the dipper-front plate and provided to support a tooth (it being understood that where such bases are provided they would be arranged in spaced relation along the lip portion of the dipper front) my improvements may be incorporated in a dipper in which the bases are formed integrally with the dipper front.

Furthermore, by the references in the specification and the appended claims to a tooth, I do not wish to be understood as intending to limit the invention to a one-piece tooth as it is equally applicable to a so-called tooth having a separate tip constructed, and secured to the base portion of the tooth, in accordance with my invention.

What I claim as new, and desire to secure by Letters Patent, is:

1. A dipper having a front portion containing grooves presenting surfaces inclining downwardly toward the front surface of said front portion, a tooth on said front portion having surfaces which incline downwardly toward the front surface of said front portion and at which surfaces said tooth bears against said surfaces of said grooves to form an interlock resisting lateral displacement of said tooth, and means for securing said tooth to said front portion comprising a pin extending between a portion of said tooth and said front portion between said grooves and interlocking therewith and so disposed that the shearing stresses exerted against the pin, in digging, are in a direction lengthwise of the pin.

2. A dipper having a front portion containing grooves presenting surfaces inclining downwardly toward the front surface of said front portion, a tooth on said front portion having surfaces which incline downwardly toward the front surface of said front section and at which surfaces said tooth bears against said surfaces of said grooves to form an interlock resisting lateral displacement of said tooth, and means for securing said tooth to said front portion comprising a pin extending between a portion of said tooth and said front portion between said grooves and interlocking therewith and inclining downwardly toward the front surface of said front section.

3. A dipper having a front portion presenting a rib with grooves in said front portion at opposite sides of said rib, adjacent the

base of the latter, a tooth containing a groove at which it straddles said rib, rear portions of said tooth extending into said grooves in said front portion, and means for securing said tooth to said front portion at said rib comprising pins located between said rib, at opposite sides thereof, and the side portions of said tooth and interlocked with said tooth and rib and inclining downwardly toward the front surface of said front section.

4. A dipper having a front portion containing grooves, a tooth on said front portion and having portions at its rear extending into said grooves to form an interlock resisting lateral displacement of said tooth, and means for securing said tooth to said front portion comprising pins interlocked with said tooth and said front portion between said grooves, said pins being so disposed that the shearing stresses exerted against the pins, in digging, are in a direction lengthwise of the pins.

5. A dipper having a front portion, a tooth thereon, and means for securing said tooth to said front portion comprising a pin interlocked with said front portion and tooth and so disposed that the shearing stresses exerted against the pin, in digging, are in a direction lengthwise of the pin, the longitudinal axis of the pin inclining relative to a plane bisecting the tooth downwardly toward the front face of the tooth and substantially parallel with the plane in which the terminal face of the tooth extends following wear thereof.

6. A dipper having a front portion presenting a rib with grooves in said front portion at opposite sides of said rib adjacent the base of the latter, a tooth containing a groove at which it straddles said rib, rear portions of said tooth extending into said grooves in said front portion, and means for securing said tooth to said front portion at said rib comprising a pin located between said rib and a side of said tooth and interlocked with said tooth and front portion and so disposed that the shearing stresses exerted against the pin, in digging, are in a direction lengthwise of the pin.

7. A dipper having a front portion containing grooves, a tooth on said front portion and having portions at its rear extending into said grooves to form an interlock resisting lateral displacement of said tooth, and means for securing said tooth to said front portion comprising a pin interlocked with said tooth and said front portion between said grooves, said pin being so disposed that the shearing stresses exerted against the pin, in digging, are in a direction lengthwise of the pin.

8. A dipper having a front portion presenting a rib with grooves in said front portion at opposite sides of said rib adjacent the base of the latter, a tooth containing a groove at which it straddles said rib, rear portions of said tooth extending into said grooves in said front portion, and means for securing said tooth to said front portion at said rib comprising a pin located between said rib and a side portion of said tooth and interlocked with said tooth and rib and so disposed that the shearing stresses exerted against the pin, in digging, are in a direction lengthwise of the pin.

9. A dipper having a front portion containing grooves, a tooth on said front portion extending into said grooves to form an interlock resisting lateral displacement of said tooth, and means for securing said tooth to said front portion comprising a pin extending in front of said grooves between a portion of said tooth and said front portion and interlocked therewith and so disposed that the shearing stresses exerted against the pins, in digging, are in a direction lengthwise of the pin.

10. A dipper having a front portion, a tooth straddling said front portion, opposed side portions of said tooth and said front portion containing opposed pin-receiving grooves, said tooth containing a socket and said front portion having a part which extends into said socket and between upper and lower walls of said socket to interlock said tooth with said front portion, the upper and lower walls of said socket reaching short of the groove in said tooth, and a pin extending into said opposed grooves and interlocking said tooth with said front portion and so disposed that the shearing stresses exerted against the pin, in digging, are in a direction lengthwise of the pin.

11. A dipper having a front portion and a tooth portion, one of said portions containing a groove into which the other of said portions extends, said groove being open at its opposite ends, means for securing said tooth portion to said front portion comprising a pin located between, and interlocked with, said portions at said groove, and means for preventing displacement of said tooth portion on said front portion in the direction of the length of said pin toward either end thereof.

12. A dipper having a front portion and a tooth portion, one of said portions containing a groove into which the other of said portions extends, said groove being open at its opposite ends, and means for securing said tooth portion to said front portion comprising a pin located between, and interlocked with, said portions at said groove, the one of said portions containing said groove containing a socket beyond said groove and the other of said portions having a projecting portion which extends into said socket for preventing displacement of said tooth portion on said front portion in the direction of the length of said pin.

13. A dipper having a front portion and a tooth portion, said tooth portion containing a groove into which said front portion extends, said groove being open at its opposite

ends, and means for securing said tooth portion to said front portion comprising a pin located between, and interlocked with, said portions at said groove, said tooth portion containing a socket beyond said groove and said front portion having a projecting portion which extends into said socket for preventing displacement of said tooth portion on said front portion in the direction of the length of said pin.

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