

Aug. 16, 1932.

W. LEHMAN

1,872,307

COMBINED DIGGING LIP AND DIPPER TOOTH

Filed Feb. 19, 1930

3 Sheets-Sheet 1

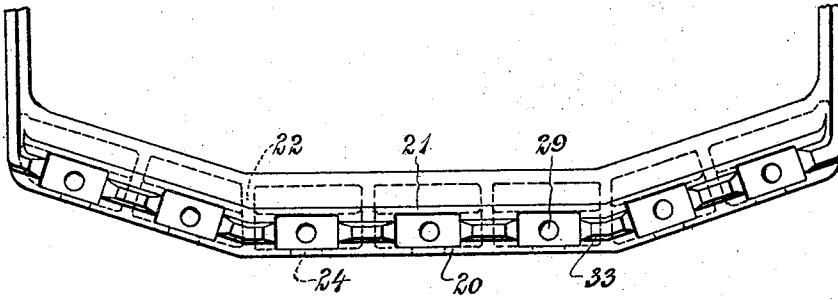


Fig. 1.

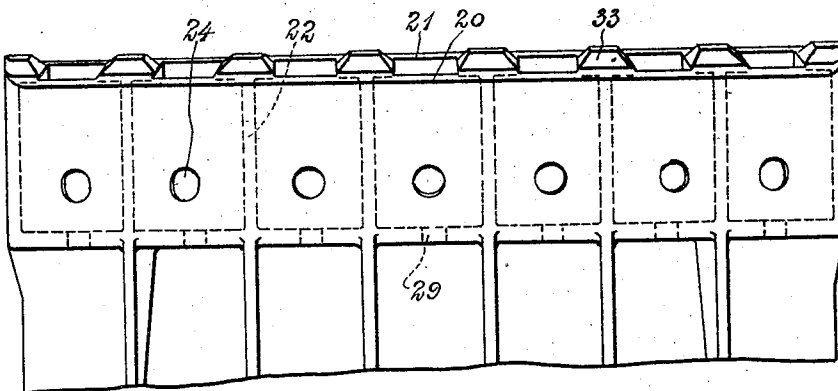


Fig. 2.

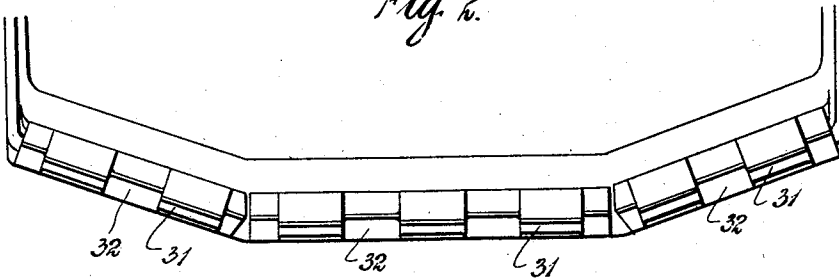


Fig. 3.

Werner Lehman,
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BY *Howe, Ruliff & Arnold*
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3 Sheets-Sheet 2

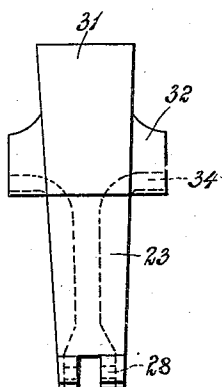


Fig. 4.

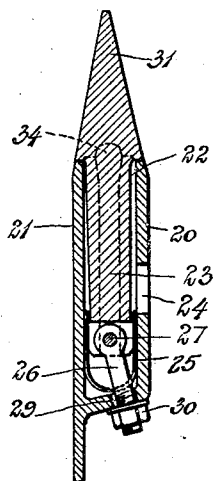


Fig. 5.

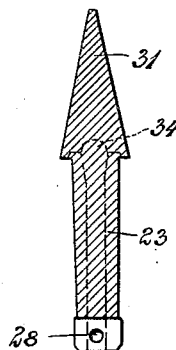


Fig. 6.

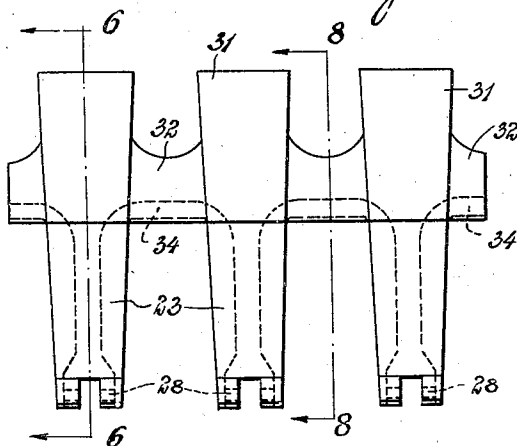


Fig. 7.

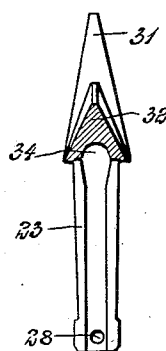


Fig. 8.

Werner Lehman.
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W. LEHMAN

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3 Sheets-Sheet 3

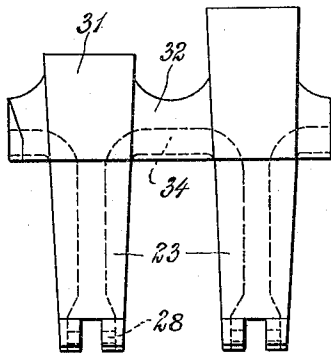


Fig. 9

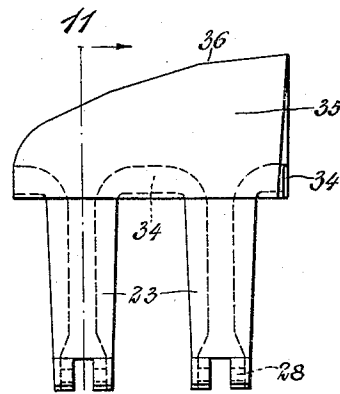


Fig. 10.

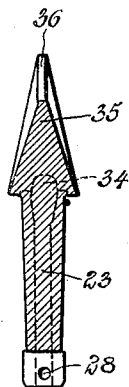


Fig. 11.

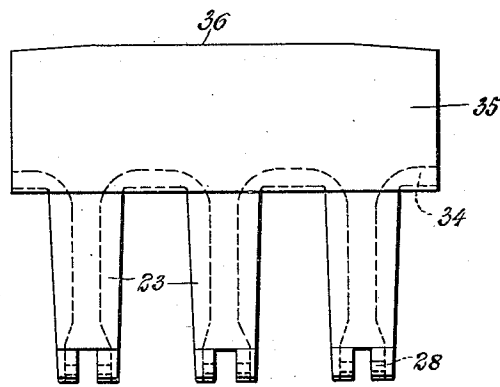


Fig. 12.

Werner Lehman,
INVENTOR.

BY Hoar, Ruckloff & Arnaud
ATTORNEYS.

UNITED STATES PATENT OFFICE

WERNER LEHMAN, OF SOUTH MILWAUKEE, WISCONSIN, ASSIGNOR TO BUCYRUS-ERIE COMPANY, OF SOUTH MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

COMBINED DIGGING LIP AND DIPPER TOOTH

Application filed February 19, 1930. Serial No. 429,627.

My invention relates to new and useful improvements in combined digging lips and dipper teeth.

Power shovels are well known in the excavating art. They carry a digging dipper or bucket, with which the material to be excavated is loosened and in which it is carried. This function imposes upon the digging edge of the dipper or bucket a great deal more wear than is imposed elsewhere. Accordingly, for many years, it has been the practice in the art to have the dipper or bucket carry removable teeth, and sometimes even removable lip-sections between the teeth. These teeth sometimes straddled the edge of the dipper or bucket, and sometimes have been inserted in appropriate sockets cast in such edge.

The object of the present invention is to build one or more removable teeth integral with one or more sections of lip. This does not constitute a mere making integral two parts which formerly were built separately, without thereby adding any additional functions not previously performed by the parts in their prior separate state; for, in my invention, the lip-sections serve to convert any sidewise thrust on the teeth into a downward thrust on the front edge of the dipper, which is a new function for lip-sections to perform, and the teeth serve to hold the lip-sections in place, which is a new function for teeth to perform.

Furthermore my invention enables me to add to the construction of U. S. Patent No. 1,642,191, to Bager, Ruhloff and myself, the advantage of removable lip-sections between the removable teeth, without thereby weakening the front as it is weakened for this purpose in U. S. Patent No. 1,540,314 to Clark.

Further objects and advantages will be evident as the description progresses.

My invention consists in the novel parts and in the combinations and arrangements thereof, which are defined in the appended claims; and of which several embodiments are exemplified in the attached drawings, which are hereinafter particularly described and explained.

Figure 1 is a plan view of the socket-type dipper front of my invention.

Figure 2 is an elevation of the same dipper front.

Figure 3 is a plan view of the same dipper front, with the teeth-lip sections of Figures 7 and 9 inserted.

Figure 4 is a front elevation of a single tooth with two integral lip-sections.

Figure 5 is a vertical cross-section of a tooth, as in Figure 6, but here shown inserted in the dipper front, which is shown in section.

Figure 6 is a vertical cross-section of one of the teeth of either Figure 4 or Figure 7 or Figure 9. It may be regarded as taken along the line 6—6 of Figure 7.

Figure 7 is a front elevation of three teeth and four lip-sections combined. The particular combination there shown is used by me in the center of the front of the digging dipper, in conjunction with two side sections such as shown in Figure 9.

Figure 8 is a view taken along the line 8—8 of Figure 7, being in section with respect to the lip and in side elevation with respect to the tooth therein shown. The same view might have been taken from the side of either Figure 4 or Figure 9.

Figure 9 is a front elevation of two teeth and three lip-sections combined. The particular combination there shown is used by me at the two sides of the front of the digging dipper, as is indicated by the fact that the outer of the two teeth is shorter than the inner, this being a common practice at the sides of the front of a dipper.

Figure 10 is a front elevation of a lip-section without teeth, which is used by me for digging clay, two of Figure 10 being used by me in combination with one of Figure 7 for this purpose. The lower end of this lip section occurs at one extreme side of the front of the dipper.

Figure 11 is a vertical section taken along the line 11—11 in Figure 10.

Figure 12 is a front elevation of a center lip-section without teeth, used by me in digging mud, in connection with two side sections such as shown in Figure 10.

It is believed that the figures themselves, with the foregoing explanation, are sufficient to enable anyone skilled in the art to duplicate my invention, with the possible exception of Figure 5, which will now be described, with some assistance from Figures 2, 4 and 6.

The front wall 20 and rear wall 21 of a tooth socket as shown in Figure 2, are cast as smoothly as possible on their inside faces, no such care however being given to the side walls 22.

The shank 23 of the tooth is inserted in the socket, to determine its fit by trial, its clearance being ascertained through hole 24. The tooth is then removed, and a shim 25, of sheet metal of appropriate thickness to take up the clearance thus ascertained, is bent around the lower end of the shank 23. An eye-bolt 26 is secured to the shank 23, by means of a pin 27 inserted through a hole 28. The shank is driven into the socket, so that the bolt protrudes through the hole 29 in the bottom of the socket. A nut 30 is then screwed in place, thus securing the tooth.

The tooth proper 31 carries the lip-sections 32, which rest on the bosses 33 on the dipper front. These bosses serve to reenforce the dipper front, as well as to support the lip-sections. The bosses protrude into the cavities 34 on the under side of the lip-sections. It will be seen that shim 25 constitutes means, adjacent the lower end of the tooth, for preventing motion of said lower end in a direction perpendicular to the dipper front; and that the bearing of the lip-section 32 upon the bosses 33 of the dipper front constitutes widely laterally spaced means adjacent the upper end of the tooth, for preventing motion of said tooth in the plane of the dipper front.

In the variant shown in Figures 10, 11 and 12, there is a continuous lip section 35 without teeth, having instead a digging edge 36.

It is thus seen that I have provided an easily replaceable combined tooth and lip of sturdy construction for insertion in a dipper front of like sturdy construction.

If desired, my teeth can be built as tooth-bases for the reception of renewable tooth-points, an expedient well known in the art.

I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts hereinbefore described, except with respect to any claim which imposes such limitations.

I claim:

1. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls thereof, having a hole in the bottom and a hole in one wall of each socket; a plurality of combined tooth-and-lip sections, having shanks insertable in the sockets; a U-shaped shim for each shank, to wedge its lower end against the walls of its socket, and having a hole for the passage of the bolt hereinafter

referred to; an eyebolt for each shank, the eye being insertable in a recess in the lower end of the shank; a pin for each eye, for securing the eye to the shank; and a nut, to secure each bolt in the hole in the bottom of its socket.

2. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls thereof, having a hole in the bottom of each socket; bosses between the mouths of the sockets, for stiffening the digging edge of the face of the dipper, and for supporting its digging lip; a plurality of combined tooth-and-lip sections, having shanks insertable in the sockets; an eye-bolt for each shank, the eye being insertable in a recess in the lower end of the shank; a pin for each eye, for securing the eye to the shank; and a nut, to secure each bolt in the hole in the bottom of its socket.

3. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls thereof, having a hole in one wall of each socket; bosses between the mouths of the sockets, for stiffening the digging edge of the face of the dipper, and for supporting its digging lip; a plurality of combined tooth-and-lip sections, having shanks insertable in the sockets; and a shim for each shank, to wedge its lower end against the walls of its socket.

4. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls thereof, having a hole in one wall of each socket; bosses between the mouths of the sockets, for stiffening the digging edge of the face of the dipper, and for supporting its digging lip; a plurality of combined tooth-and-lip sections, having shanks insertable in the sockets; a shim for each shank, to wedge its lower end against the walls of its socket; and means for securing said shanks in said sockets.

5. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls thereof having a hole in one wall of each socket; bosses between the mouths of the sockets, for stiffening the digging edge of the face of the dipper, and for supporting its digging lip; a plurality of combined tooth-and-lip sections, having shanks insertable in the sockets; and a means for each shank, to wedge its lower end against the walls of its socket.

6. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls thereof, having a hole in the bottom of each socket, and a hole in one wall of each socket; bosses between the mouths of the

sockets, for stiffening the digging edge of the face of the dipper, and for supporting its digging lip; a plurality of combined tooth-and-lip sections, having shanks insert-
5 able in the sockets; a shim for each shank, to wedge its lower end against the walls of its socket; an eye-bolt for each shank, the eye being insertable in a recess in the lower end of the shank; a pin for each eye, for securing
10 the eye to the shank; and a nut, to secure each bolt in the hole in the bottom of its socket.

7. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the walls
15 thereof, having a hole in the bottom and a hole in one wall of each socket; a plurality of combined tooth-and-lip sections, having shanks insertable in the sockets; a U-shaped shim for each shank, to wedge its lower end
20 against the walls of its socket; and means for securing said shanks in said sockets.

8. In a digging dipper, or similar implement, the combination of: a double-walled digging face; tooth sockets between the
25 walls thereof, having a hole in one wall of each socket; bosses between the mouths of the sockets, for stiffening the digging edge of the face of the dipper, and for supporting its digging lip; a plurality of combined
30 tooth-and-lip sections, having shanks insertable in the sockets; means for each shank, to wedge its lower end against the walls of its socket; and means for securing said shanks in said sockets.

35 In testimony whereof I affix my signature.
WERNER LEHMAN.

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