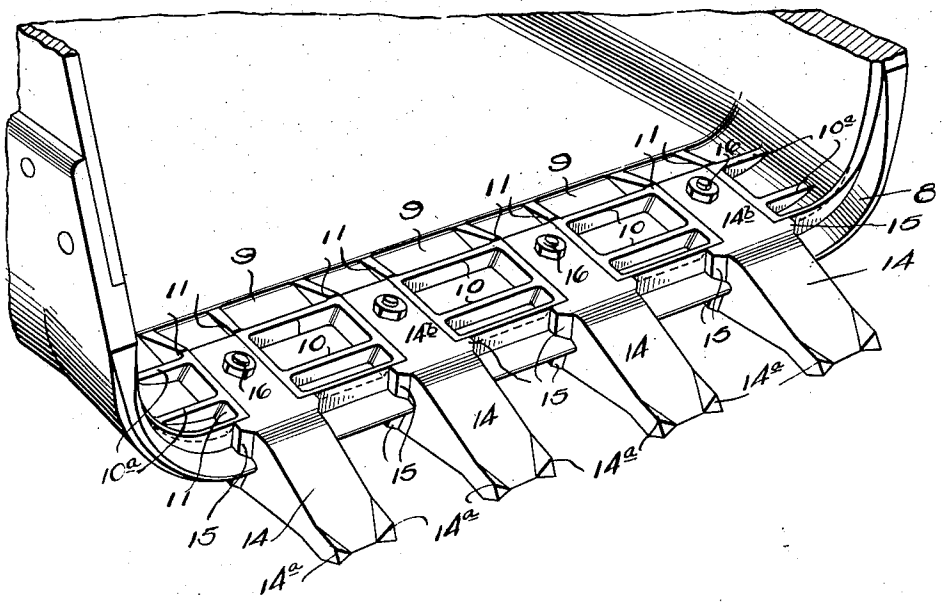
May 22, 1934. L. W. VAN BUSKIRK 1,959,847

DIPPER CONSTRUCTION AND THE LIKE

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Fig. 1.



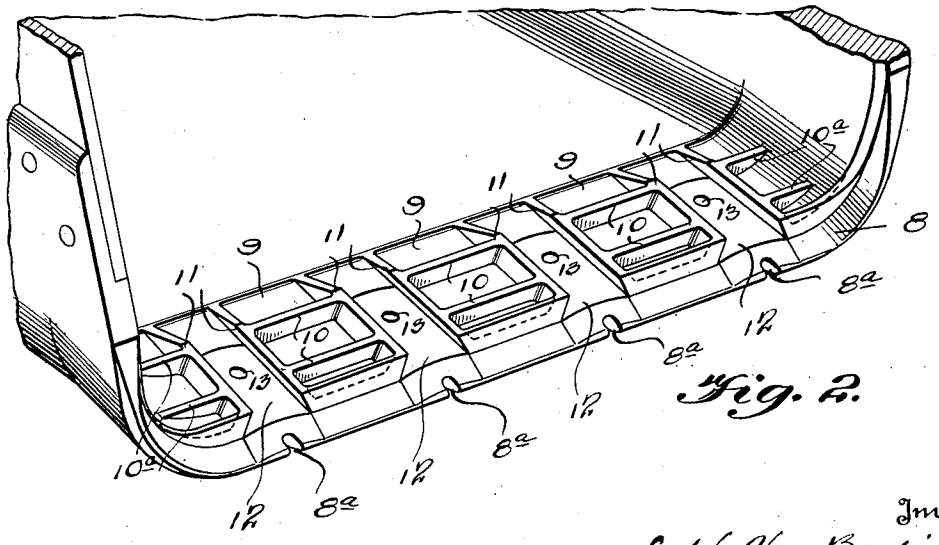


Fig. 2.

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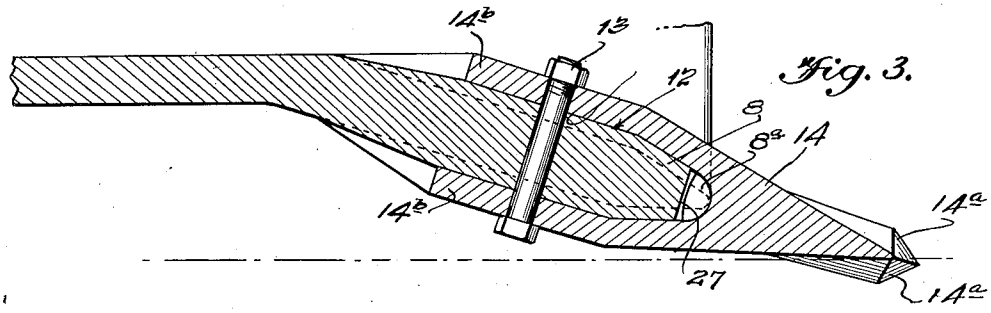


Fig. 3.

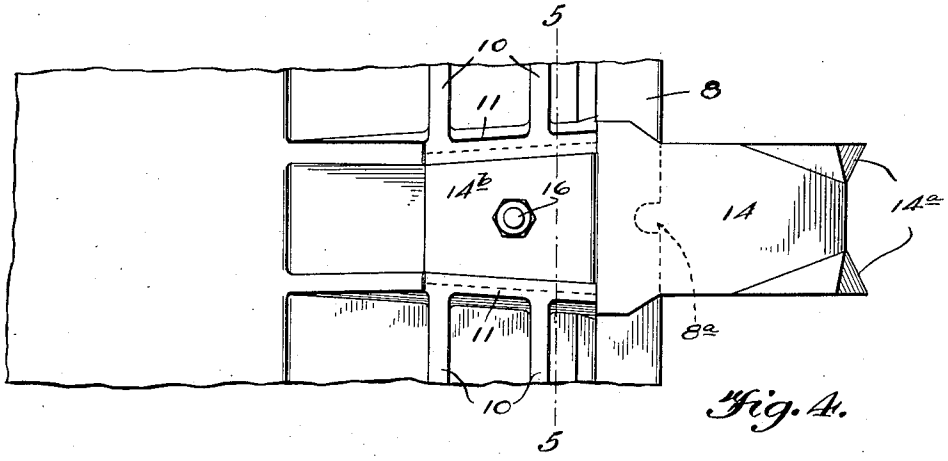
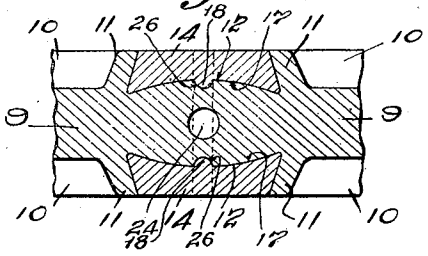


Fig. 4.

Fig. 5.



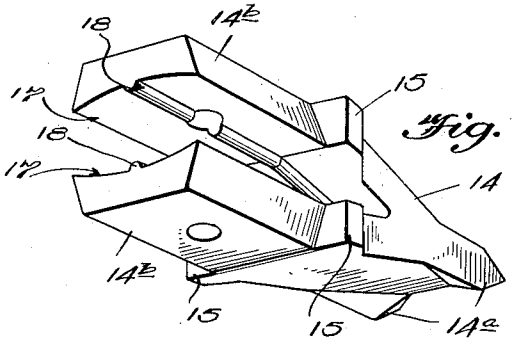


Fig. 7.

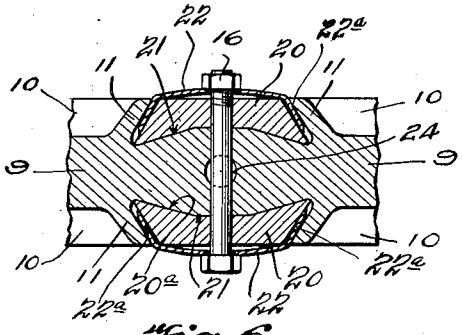


Fig. 6.

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UNITED STATES PATENT OFFICE

1,959,847

DIPPER CONSTRUCTION AND THE LIKE

Lesher W. Van Buskirk, Easton, Pa.

Application July 31, 1931, Serial No. 554,322

14 Claims. (Cl. 37—141)

My invention relates to improvements in power shovel dippers, and particularly to the digging portion, or "front", as it is known in the art,—having particular reference to the teeth with which said front is armed and to the seating means therefor.

It is a well known fact to those skilled in the art, that the fronts of power dippers are subjected to great stress, particularly at the site of the several teeth. To meet this situation, it has been the practice to increase the cross section of the fronts at such points, but even so considerable loss is incurred through splitting or cracking from the forward edge of the front in the direction of its depth. This hazard obtains whether the tooth seats, or bases, are integral with the front or simply bolted thereto.

It is, therefore, one of the primary objects of my invention to overcome this objectional cracking or splitting of the dipper fronts,—and I accomplish this by effecting a distribution of the digging stresses throughout the entire area of the contiguous surfaces of the rear, mounting portions of the teeth and their seats.

Another important object of the invention is to provide in a dipper front, a series of tooth seats having marginal undercut ribs or wings reinforced in novel fashion in a transverse direction so as to effect an economy of metal without a sacrifice of stress-resisting qualities to a noticeable degree.

A still further object of the invention resides in the provision of a dipper front having undercut confining wings for the margins of the tooth seats, and wherein the teeth have deflecting portions in the nature of wings adapted to abut, or substantially abut, the forward ends of said confining wings, so as to protect the latter against chipping or wear from the material being dug,—and which would otherwise come into contact therewith.

Still another object of the present invention is to furnish, in a dipper front tooth and seat construction, novel means for effectively taking up any looseness that may occur between the tooth and seat, either as a result of initial imperfection of the fit, or as a result of subsequent wear,—and which enables a better wedging fit of the parts than has been heretofore possible.

The invention also resides in certain novel features of construction, combination and arrangement of the various parts, and in methods of use, modes of operation, etc.,—all or which will be readily apparent to those skilled in the art as the description proceeds.

In the accompanying drawings, wherein the same reference characters have been used to designate the same parts throughout the several views,—

Figure 1 is a perspective view illustrating a dipper front and tooth construction embodying my invention;

Figure 2 is a similar view, but showing the front with the digging teeth removed;

Figure 3 is a longitudinal sectional view through a tooth seat of the front and showing the seated tooth in section;

Figure 4 is a top plan view of the seated tooth of Figure 3;

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a cross sectional view similar to Figure 5 but showing a modified form of tooth and seating portion,—and further illustrating the use of a novel clamp element in association therewith, and

Figure 7 is a perspective view of one of the dipper teeth removed.

Referring to the drawings by reference characters, numeral 8 denotes the dipper front of a conventional steam shovel dipper, having a digging lip whose normal cross-sectional thickness is designated at 9 (Figs. 1 and 5), intermediate the seats, or bases 12, whose margins are defined by the undercut wings 11 which converge toward one another or are parallel to each other in the direction of the depth of the front.

Particular attention is directed to the fact that the undercut wings 11 of adjacent seats are reinforced in a transverse direction by the supporting ribs 10 rising from the thickened area 9 of the front. This arrangement affords adequate transverse stress support for the wings against the digging strain to which they are subjected from the rear seating ends of the teeth 14 when the forward digging ends are forced into the material being dug. The teeth 14 have upper and lower rearwardly extending seating arms 14^b having seat-engaging surfaces 17 and shoulders 15, as best shown in Figures 5, 6 and 7, and as will be noted from Figure 5 the seats 12 are duplicated at both top and bottom of the front. Since the seats at the top and bottom are identical, as disclosed herein (although this is not necessarily so),—a description of one will suffice for all.

As has been emphasized in the introductory portion of this specification, I avoid splitting of the seat and/or front, by distribution of the digging stress throughout the entire area of the contiguous surfaces of the arms and seats 17, 12,

respectively. This is effected by giving such surfaces an elliptical transverse section as shown in Figure 5,—or by making said contiguous tooth and arm surfaces with substantially flat intermediate areas and outwardly sloping side areas as shown 20ª, 21 in the modified form shown in Figure 6, wherein the rear tooth portions or arms are indicated as at 20. The elements 9, 10, 11 of Figure 6 are the same as those of the other figures, as will be evident. It will be noted that the lip at the central portions of the tooth seats 12 and 20, that is at the point of minimum depth of the seats, is thicker than the remainder of the front portion 9 of the lip.

The drawings abundantly demonstrate, and anyone skilled in the art will readily appreciate, that the elliptical form of the seats 12, 21 (Figures 5, 6 and 7, respectively) and the respective mating tooth portion surfaces 17, 20ª,—will positively distribute the transverse stresses inwardly along radial lines toward the axis of the tooth and seat. The maximum diameters of the contiguous tooth and seat surfaces (which is to say, the outwardly bulged mid-portion) tend to flatten out, under pressure while the device is in use, thus wedging the bevelled sides of the teeth 14 (or 20) against the undercut wings 11, which are, of course supported by the thickened front portion 9 and the transverse reinforcing ribs 10.

I may use other formations than the elliptical, but, as stated, these are preferable for obvious reasons.

Bolts 16 extending transversely through the rear arms or mounting portions 14ᵇ of the teeth and holes 13 in the seats 12 serve to secure the teeth in place and may be depressed to reduce wear.

As shown in Figure 6, I have availed of the novel wedge member 22 of spring metal for taking up looseness between the teeth and seats. These wedge members 22 are substantially U-shaped and their angular ends are wedged into the space, if any, between the beveled sides of the rear tooth portions and the undercut wings 11 by means of the tie bolts 16 previously described. The member 22 being under compression, it is believed to be obvious that the angularly disposed ends 22ª will be wedged inwardly automatically, if, as and when looseness shall occur between the undercut wings 11 and the beveled sides of the rear tooth portions or arms 14ᵇ.

Particular attention is directed to the fact that the disposition of the marginal undercut wings of the respective seats is such that the seats are wedge shaped in the direction of their depth as clearly seen in Figure 4. Thus the digging operation tends to wedge the rear arm portions 14ᵇ more tightly in the seats 12 and in this way accentuates the binding action of the undercut ribs 11.

The teeth 14 naturally tend to wear away more rapidly at the corners or sides of the digging points. Thus, in order to get the maximum service from same, I increase the cross section of the teeth at such points as indicated at 14ª in Figure 7, and as a result retard a more rapid wear at the corners than will take place at the intermediate portion of the cutting edge.

The forward edges of the tooth seats, or front at the site of said seats may be provided with the usual slots 8ª as shown; also the seats may be cored as at 24 in the direction of their depth to provide a relief area as a continuation of said slots 8ª. Furthermore the arms 14ᵇ of the teeth are preferably each provided with an under surface lineally extending bead 18 adapted to engage in the corresponding groove 26 of the seat 12 (Figure 5) or 21 (Figure 7).

The rear seating arms 14ᵇ of the teeth are shown as connected by a web 27, which increases in height in the direction of the rear ends of arms 14ᵇ and terminates in the bead 18,—it being observed that web 27 is adapted to be received in the slots 8ª as shown in Figure 3. There it is seen that the slot 8ª also increases in depth or height in a rearward direction.

This construction provides for a most sturdy mounting of the teeth as will be obvious. It might also be mentioned that the surfaces 17 of the tooth arms 14ᵇ and the seat surfaces may be of a very flat arcual form in cross-section instead of elliptical.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a power shovel dipper or the like, a front having a lip or digging portion providing a tooth seat of varying depths in the direction of its width, and the thickness of said lip at the minimum depth of said tooth seat being greater than the normal thickness of said lip adjacent said tooth seat.

2. In a power shovel dipper or the like, a front having a lip or digging portion providing a tooth seat of varying depths in the direction of its width, and the thickness of said lip at the minimum depth of said tooth seat being greater than the normal thickness of said lip and having a relief area adjacent said tooth seat.

3. In a power shovel dipper or the like, a front having a lip or digging portion providing a tooth seat, said seat increasing in depth adjacent each side, undercut wings overlying the marginal side portions of said seat, and the undercut wings being adapted to contiguously engage and seat a dipper tooth.

4. The combination set forth in claim 3, and the thickness of said lip at the minimum depth of said tooth seat being greater than the thickness of said lip adjacent said seat.

5. The combination set forth in claim 3, and said undercut wings converging toward one another in the direction of their inner ends.

6. The combination set forth in claim 3, and the maximum thickness of said lip at the site of said seat being greater than the thickness of said lip adjacent said seat, and having a relief area therein.

7. A digging lip for power shovel fronts or the like comprising a body providing elongated tooth seats, the maximum thickness of said body through said seats being greater than the normal thickness of the remaining area of said lip, and undercut wings extending partly over said tooth seats, and the forward ends of said seats having slots increasing in depth in a rearward direction.

8. In a digging lip for power shovel fronts or the like comprising a body providing elongated tooth seats, the maximum thickness of said body through said seats being greater than the normal thickness of the remaining area of said lip, undercut wings extending partly over said tooth seats, the forward ends of said seats having slots increasing in depth in a rearward direction, and transverse ribs connecting said wings of adjacent seats to reinforce the same.

9. In a digging tooth and seat construction for power shovels or the like, a tooth having mounting portions of relatively greater transverse section at the edges than at other points, said seat

providing undercut tooth-engaging wings, and a spring plate wedge entering between the undercut walls and tooth surfaces.

10. In a digging tooth and seat construction for power shovels or the like, a tooth having mounting portions of relatively greater transverse section at the edges than at other points, said seat providing undercut tooth-engaging wings and a rearwardly extending seating notch, said tooth providing a portion adapted to seat in said notch, said seat and one of said mounting portions providing a rearwardly extending interfitting bead and groove, and said tooth providing laterally extending shoulders adapted to overlie and protect the forward ends of said wings.

11. In a digging tooth and seat construction for power shovels or the like, a tooth having mounting portions of relatively greater transverse section at the edges than at other points, said seat providing undercut tooth-engaging wings and a rearwardly extending seating notch, said tooth providing a portion adapted to seat in said notch, said seat and one of said mounting portions providing a rearwardly extending interfitting bead and groove, and said tooth providing individual laterally extending shoulders adapted to overlie and protect the forward ends of said respective wings.

12. In a toothed digging front construction for power dippers and the like, digging teeth, said front having seats for said digging teeth, undercut wings defining the margins of said seats and adapted to partially overlie the same, said teeth having protecting shoulders adapted to abut the forward ends of said undercut wings, and said seats comprising a plurality of adjacent surfaces disposed in transversely intersecting planes whereby to distribute stresses throughout the transverse area of said seats.

13. In a toothed digging front construction for power dippers and the like, digging teeth, said front having seats for said digging teeth, undercut wings defining the margins of said seats and adapted to partially overlie the same, said teeth having protecting shoulders adapted to abut the forward ends of said undercut wings, and said seats comprising a plurality of adjacent surfaces disposed in transversely intersecting planes whereby to distribute stresses throughout the transverse area of said seats, and said front having reinforcing ribs extending transversely between adjacent ones of said wings between said seats.

14. In a toothed digging front construction for power dippers and the like, digging teeth having opposed rearwardly extending arms, said front having exterior seats in its top and bottom surfaces for said digging teeth arms, the surface of said seats sloping from a central portion inwardly to either side thereof, and the inner surfaces of said arms conforming to said seats.

LESHER W. VAN BUSKIRK.