Aug. 8, 1933. L. W. VAN BUSKIRK 1,921,491

POWER SHOVEL DIPPER

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FIG. 1.

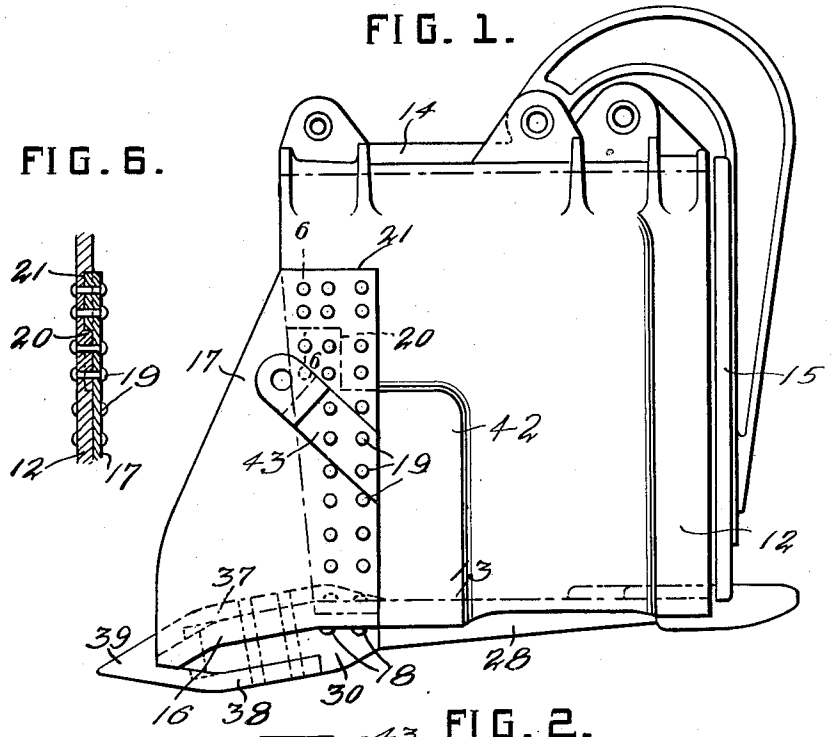


FIG. 6.

FIG. 2.

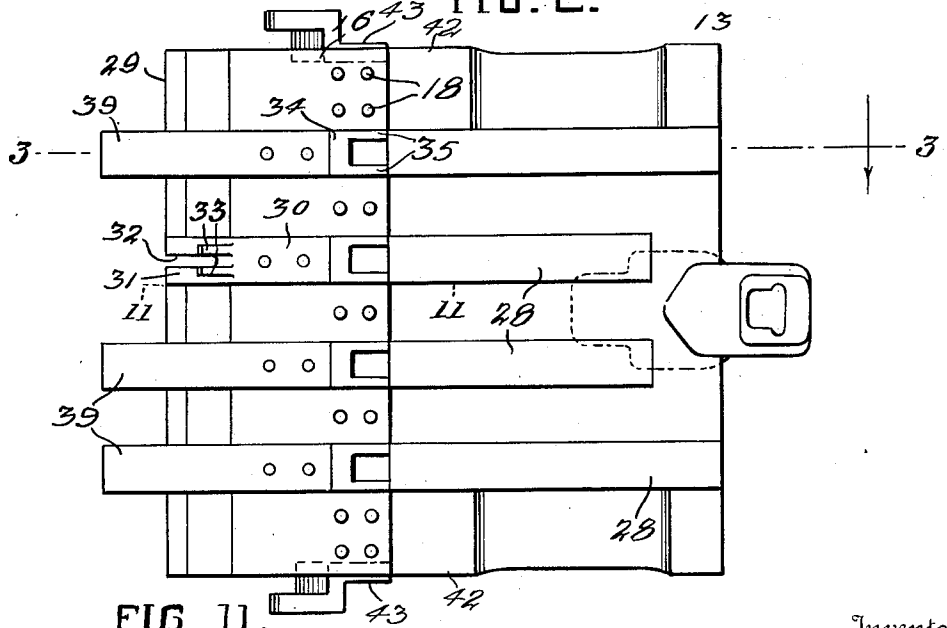
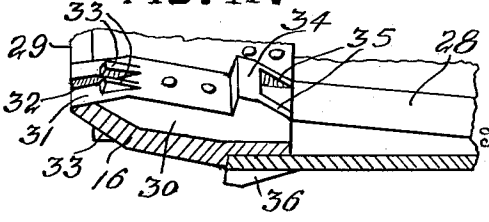


FIG. 11.



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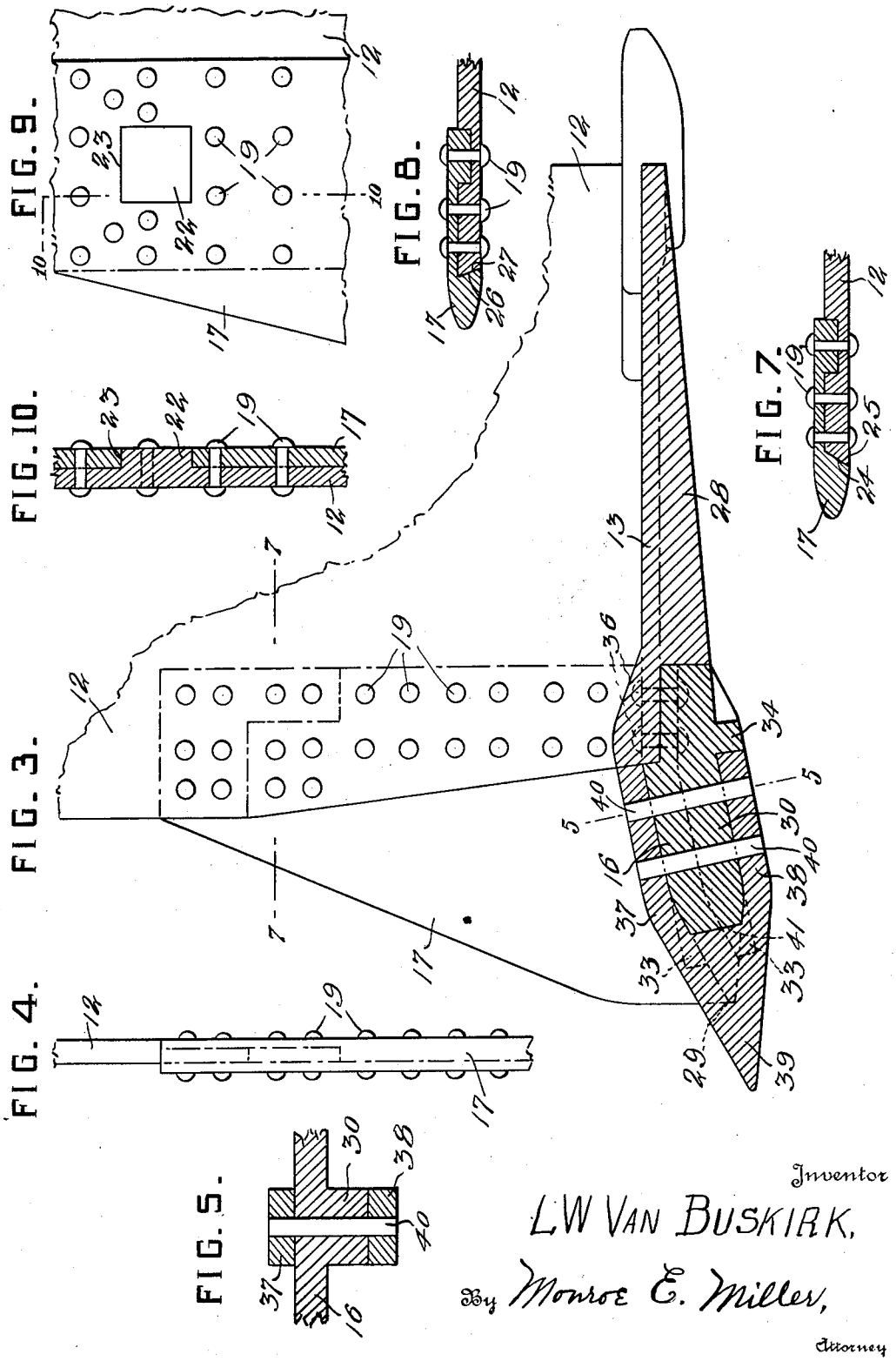
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Aug. 8, 1933. L. W. VAN BUSKIRK 1,921,491

POWER SHOVEL DIPPER

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1,921,491

POWER SHOVEL DIPPER

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9 Claims. (Cl. 37—141)

The present invention relates to improvements in power shovel dippers and has for an object to provide an improved shovel dipper of greatly increased strength resistant to the strains of digging and having a renewable lip, by the replacement of which from time to time the life of the dipper may be greatly prolonged at small cost.

In power shovel dippers of all sizes, as previously constructed, the assembly is generally made up of a number of parts, such as a back, sides and front riveted together and fastened to the front are separate bases that carry the points which do the digging. The expense of this construction is apparent due to fitting, riveting and attendant assembling necessary to insure good fitting of various parts with each other.

It is another object of the present invention to provide a cast construction of the back, sides and main portion of the front in one solid piece, which reduces cost and presents a solid unit to take the strains that open up the riveted joints in the built-up type.

A further object of the invention is to provide an improved dipper in which the dipper teeth are constructed and mounted in a novel manner to cooperate with the solid unriveted construction throughout with its accompanied freedom from trouble.

With the foregoing and other objects in view the invention will be more fully described hereinafter and more particularly pointed out in the appended claims.

In the drawings, in which like reference symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a side elevation of an improved power shovel dipper constructed according to the present invention.

Fig. 2 is a bottom plan view of the same with one of the toothpoints removed.

Fig. 3 is a longitudinal section taken on the line 3—3 in Fig. 2 on an enlarged scale and with parts broken away.

Fig. 4 is a front edge view, with parts broken away, showing the side wall and lip construction.

Fig. 5 is a cross section taken on the line 5—5 in Fig. 3.

Fig. 6 is a fragmentary vertical section taken on the line 6—6 in Fig. 1.

Fig. 7 is a fragmentary horizontal section taken on the line 7—7 in Fig. 3.

Fig. 8 is a view similar to Fig. 7 but showing a slight modification.

Fig. 9 is a fragmentary side view of the dipper body and lip showing a modified arrangement.

Fig. 10 is a sectional view taken on the line 10—10 in Fig. 9, and

Fig. 11 is a fragmentary perspective view taken on the line 11—11 in Fig. 2.

Referring more particularly to the drawings, 12 designates the sides of the dipper body, 13 the front wall thereof and 14 its back wall; these parts being cast in one piece to insure a strong and rigid construction and one devoid of rivets or other fastenings apt to loosen when subjected to digging strains. The drop bottom or door is indicated at 15; the top portion being open to receive the material, and being provided with a renewable lip composed of front and side portions 16 and 17 respectively which project out beyond the body of the dipper, encounter the material in the act of digging and receive the main thrust.

In order to avoid these thrusts devolving on the rivets 18 and 19, which hold the lip to the front wall 13 and the side walls 12 of the dipper body, I provide in such side walls 12 inverted L-shaped grooves 20 and correspondingly shaped bosses or enlargements 21 upon the adjacent faces of the lip sides 17. The rivets 19 will function to retain these enlargements 21 in the grooves 20, or vice versa, and the transverse and longitudinal strains incident to the digging operation will be removed from the rivets 18 and 19 by the cooperation of the bosses with the side walls of the grooves 20.

A modified stress joint is illustrated in Figs. 9 and 10, in which the side walls 12 of the dipper body are formed with square or other bosses or enlargements 22 received through similarly formed openings 23 in the lip sides 17.

In accordance with Fig. 7 the edges of the lip sides 17 which take against the top edges of the side walls 12 of the dipper body are provided with bevel faces 24 adapted to seat against bevel faces 25 on the edges of said side walls 12. This construction will insure a proper fitting of the two parts.

According to Fig. 8, this construction is reversed, the bevel face 26 being inclined oppositely on the lip side 17; while the bevel face 27 is correspondingly inclined on the side walls 12 of the dipper body to seat flat against the face 26.

As shown in Figs. 1, 2 and 3, the front wall 13 of the dipper body is provided with cast integral ribs 28. These rear ribs 28 reinforce and strengthen the front wall 13, and incidentally the remainder of the cast body of the shovel dipper,

and they also serve as additional protection against wear on the outside of the non-replaceable front 13. It is necessary to continue the cast rib forward from the integral body front casting to the digging front edge 29 of the renewable lip 16; and this is accomplished by casting on to the bottom of the renewable lip 16 ribs or tooth bases 30 forming continuations of the rear ribs 28 of the front wall 13. At the front sloping or inclined edges 31 of the lip 16, are formed slots 32. Wings 33 extend up and down at substantially right angles to the sloping surfaces 31 on opposite sides of the slots 32. Flanges 34 project downwardly from the rear portions of the tooth bases 30 and reinforcing ribs 35 may project rearwardly from the flanges 34.

Similar flanges or enlargements 36 are formed upon the front wall 13 at its upper side in alignment with the tooth bases 30. The upper and lower legs 37 and 38 of the tooth points 39 are adapted to bear against the shoulders provided by the flanges 36 and 34 respectively. These legs 37 and 38 straddle the lip portion 16 and the tooth bases 30, and rivets 40 or other fastenings secure these parts together as indicated in Fig. 3. The forward portions of the tooth points 39 are received into the slot 32 as illustrated in Fig. 3; the side portions of the tooth points coming against the wings 33.

These wings 33 take practically all the side thrusts of the tooth points 39, and moreover they increase the section of the integral base portions 30 where the metal is removed in the point fitting surface of the integral base; and they remove from the bolts or fastenings 40 most of the digging strains. Moreover, the flanges 34 and 36 assist in removing strains from the fastenings 40.

Due to the crowding scraping action of the material around the digging end of the dipper as it passes through the material, the dipper body, immediately back of the lip, should be of increased section to insure uniform wear of this portion of the dipper with the balance, hence, increased cross section or pad 42 extends around underneath on each side of the first cast integral rib 28.

This pad or increase of the cross section also has a further important function of abutting the rear edge of the lip; removing shearing strains from the rivets incident to digging.

Where a bail connection is required, other than on the back casting, bail bracket connections 43 are set in to the lip or interlocked therewith to take shear or strains off rivets.

It will be appreciated from the foregoing that all of the advantages of an integral cast body construction are secured with a renewable lip securely fastened against strain on the rivets thereof and an improved toothed construction of a renewable character highly resistant to strain.

Having thus described the invention, what is claimed as new is:

1. An improved dipper comprising a dipper body having a wall with downwardly and forwardly tapering ribs cast on the exterior thereof, a renewable lip secured to said body and having tooth bases in continuation of said ribs, said lip and tooth bases having inclined outer edges with slots therein, and tooth points received in said slots and having legs.

2. An improved dipper comprising a dipper body having a wall with downwardly and forwardly extending tapering ribs cast on the exterior thereof, a renewable lip secured to the outside of said body and having tooth bases in continuation of said ribs, said lip and tooth bases having inclined outer edges, and tooth points carried by said bases.

3. An improved dipper comprising a solid cast body, the wall of said body which engages the ground during the digging operation having cast upon its bottom surface forwardly extending rib portions, a renewable lip having side wall portions, the side wall portions of said lip and body having interfitting boss and socket portions,—each of which portions has a prolongation extending in the direction of said ground engaging wall, and tooth bases carried by said lip and having their rear ends engaging said respective ribs and forming prolongations of the latter.

4. An improved dipper comprising a solid cast body, a renewable lip having side wall portions, and the side wall portions of said lip and body having interfitting boss and socket portions having prolongations extending in the direction of the dipper wall which engages the ground during the digging operation.

5. In an improved dipper construction, a dipper body formed with a wall having ribs on the exterior thereof, and a renewable lip secured to the outside of said body and having integral tooth bases in substantial continuation of and abutting said ribs whereby digging stress is transmitted to the ribs.

6. An improved dipper comprising a dipper body having a wall with ribs cast on the exterior thereof, a renewable lip secured to the outside of said body having integral tooth bases in substantial continuation of and abutting said ribs whereby digging stress is transmitted to the ribs, said tooth bases having tooth seating outer portions, and tooth points carried by said bases.

7. An improved dipper comprising a dipper body having a wall with ribs carried on the exterior thereof, a renewable lip secured to the outside of said body, having tooth bases in continuation of said ribs, and said renewable lip and dipper body having interfitting boss and socket portions at opposite sides of the dipper and spaced from said ribs and tooth bases whereby to cooperate with the latter in providing a two region stress absorbing construction.

8. An improved dipper comprising a body having a front wall with forwardly extending ribs formed on the exterior thereof, a renewable lip secured to the forward portion of said body and having tooth bases formed integrally therewith, said tooth bases being in substantial continuation of and abutting said ribs whereby digging strain is transmitted to the ribs.

9. An improved dipper comprising a body having a front wall with forwardly extending ribs formed on the exterior thereof, a renewable lip secured to the forward portion of said body and having tooth bases formed integrally therewith, said tooth bases being in substantial alinement with and in substantial continuation of said ribs, and said renewable lip and dipper body having interfitting boss and socket portions at opposite sides of the dipper.

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