Jan. 8, 1935. J. D. RAUCH 1,986,853

DRAGLINE BUCKET

Filed June 3, 1932 2 Sheets-Sheet 1

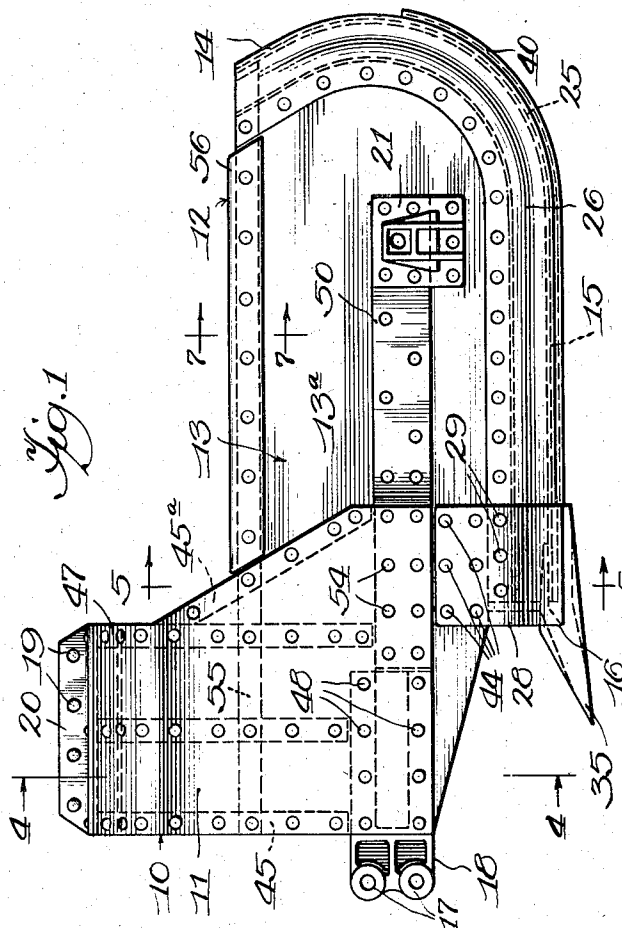


Fig. 1

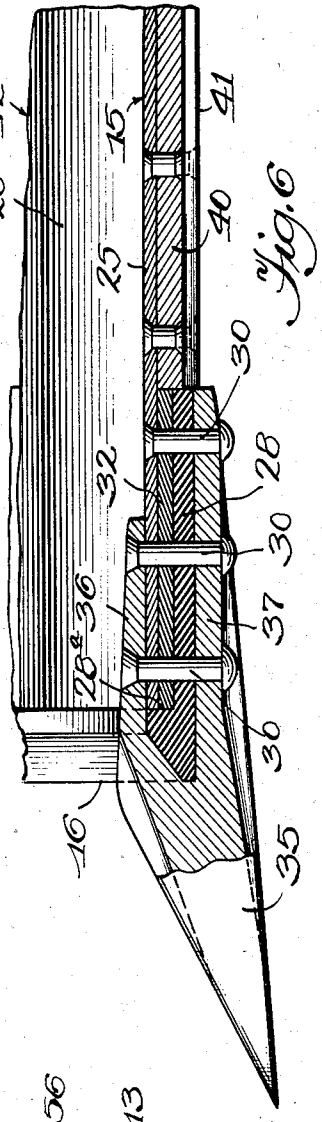


Fig. 6

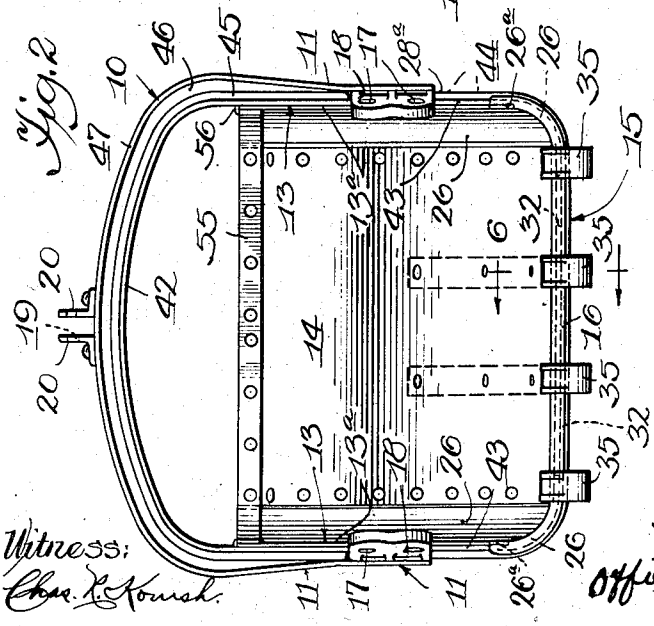


Fig. 2

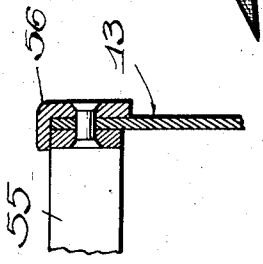


Fig. 7

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DRAGLINE BUCKET

Filed June 3, 1932 2 Sheets-Sheet 2

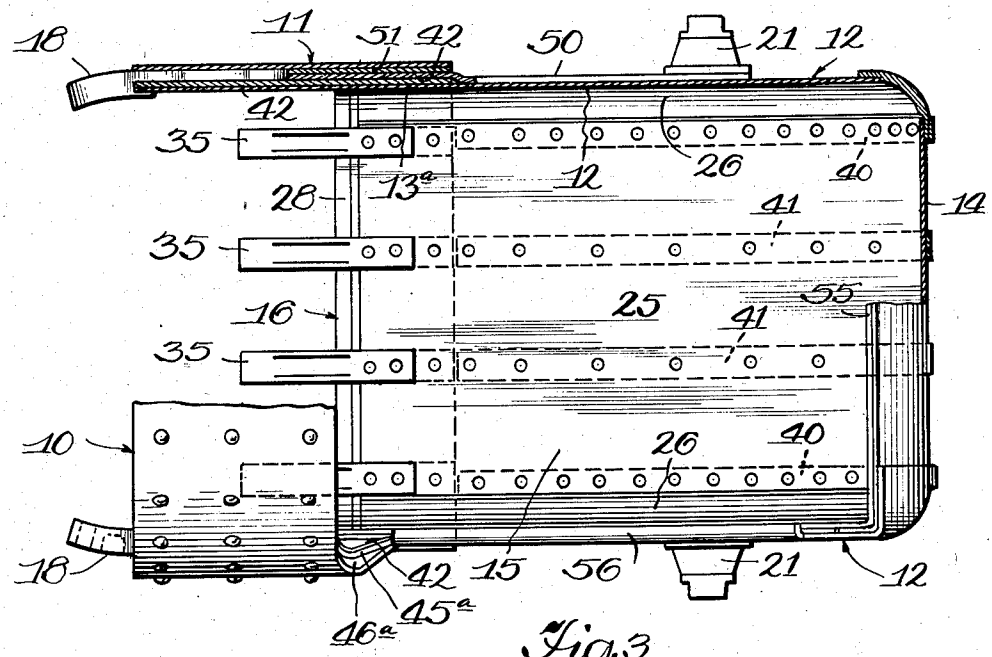


Fig. 3

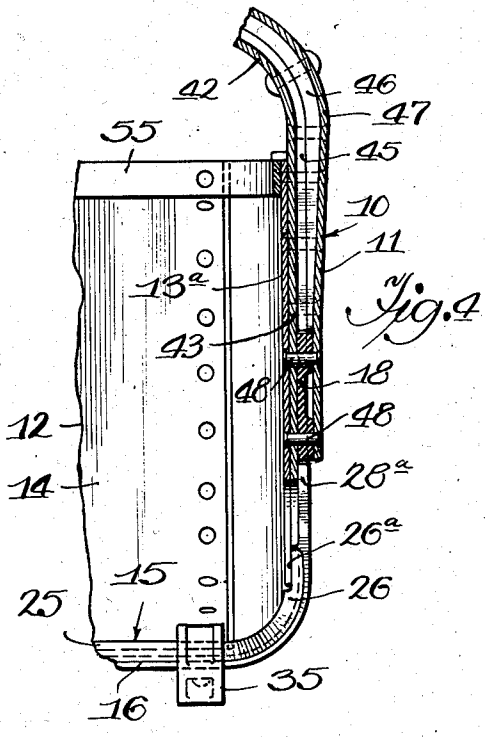


Fig. 4

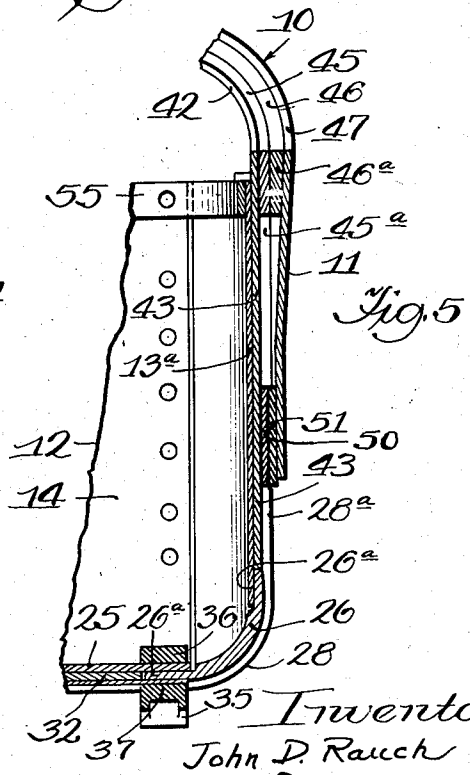


Fig. 5

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UNITED STATES PATENT OFFICE

1,986,853

DRAGLINE BUCKET

John D. Rauch, Lima, Ohio, assignor to The Ohio Power Shovel Company, a corporation of Ohio

Application June 3, 1932, Serial No. 615,135

7 Claims. (Cl. 37—135)

This invention relates to improvements in dragline conveyor buckets, and has for its principal object to provide an especially light weight device of the character described, wherein most of the parts, including a reinforced main frame, are made of aluminum or similarly light metal, while the principal wear-resisting parts are made of relatively stronger metal such as steel.

A bucket constructed in accordance with my invention is much lighter than all-steel buckets such as heretofore employed, requiring less power for operation, and greatly increasing the life of the cables due to its light weight when returning empty. Further, by reason of its special design wherein the principal wearing and load-carrying parts are formed by steel and supported by a reinforced framework, the bucket is more substantial than customary all-steel buckets. As a further feature, the aluminum surfaces of the bucket have the distinct advantage in that they shed mud and clear themselves much better than steel. Other features and advantages of the invention will appear from time to time as the following description proceeds.

The invention may best be understood by reference to the accompanying drawings, in which

Figure 1 is a side view of a dragline bucket constructed in accordance with my invention.

Figure 2 is a front view of the bucket illustrated in Figure 1.

Figure 3 is a plan view of the bucket, with parts broken away to show a portion of the side and rear walls in horizontal section.

Figure 4 is a detail section taken on line 4—4 of Figure 1.

Figure 5 is a detail section taken on line 5—5 of Figure 1.

Figure 6 is an enlarged detail section of the cutting lip and associated parts, taken on line 6—6 of Figure 2.

Figure 7 is a detail section taken on line 7—7 of Figure 1, showing the reinforcing strips on the upper edges of the side plates.

Referring to the general shape and arrangement of the embodiment of my invention disclosed in the drawings, the same comprises an arch structure 10 over the front end of the bucket, having side walls or cheeks 11, 11, and a rear body portion 12 having its side walls 13, 13 forming an extension of the cheeks 11, 11 of the arch structure. The rear body portion has a rear wall 14 and bottom 15 forming a load-carrying compartment which is open to the front beneath the arch portion 10, and is also open at the top to the rear of said arch portion. It will also be noted that the front or cutting lip 16 of the bottom wall is offset rearwardly from the front end of the arch, while the cheeks 11, 11 of said arch structure are disposed at a substantial distance above said cutting lip.

The usual cable line connections are provided for the bucket, the dragline connection being made with the eyes 17 of brackets 18 at the front ends of the cheeks 11, 11, and a hoist line connection being made in one of a series of holes 19, 19 formed through a pair of longitudinally extending members 20, 20 mounted on the top of the arch so as to permit longitudinal adjustment of the hoist rope connection. Dump line connections are also provided to a pair of trunnion supports 21, 21 mounted on the outer faces of the side walls 12, 12 adjacent the rear of the bucket. As already suggested, the general shape and arrangement of the bucket together with its drag, hoist and dump line connections are substantially the same as previously utilized in dragline buckets, so that the several rope connections mentioned have been omitted from the drawings.

Referring now more specifically to the structural features which differentiate my invention from dragline buckets heretofore constructed, it will be observed that the rear wall 14 and bottom wall 15 are formed of sheet metal, herein consisting of a single continuous plate 25 made of aluminum or similar relatively light metal, the forward portion of said plate being substantially flat to form the bottom wall 15 and the rearward portion being curved upwardly and rearwardly in a continuous arc to form the rear wall 14. In the form shown, the rear arcuate portion of said plate is curved with a substantially semi-cylindrical surface, but it will be understood, of course, that the shape of the rear end of the bucket is not necessarily limited to the exact curvature shown.

Connected to opposite margins of the plate 25 and forming a continuous lower and rear corner portion of the bucket are a pair of members 26, 26 which are also curved in cross section throughout their length, as is clearly shown in Figures 1 and 3. These corner pieces are substantially thicker than the curved bottom and rear plate 25, and are preferably made of relatively heavy aluminum castings, so as to form in effect a part of the main framework of the shovel.

The walls 13 are formed of sheet metal plates 13^a, 13^a which are connected to the upward and forward extending margins of the corner pieces 26, 26, respectively, said side plates being also formed of aluminum or similar light metal. The

margins of the corner piece castings 26 are preferably rabbeted at 26a, 26a so as to receive the meeting edges of the bottom, rear and side plates, as shown in Figure 5. The meeting edges of said parts are suitably secured together as by riveting.

Surrounding the front edge of the bucket below the cheeks 11, 11, I provide a mouthpiece or cutting lip 28 formed of a plate of relatively high abrasive-resisting qualities, preferably steel, said plate being over and connected to the corner pieces 26, 26 and side walls 13 by rivets 29, 29, and also being connected to the bottom wall 15 by rivets 30, 30. It will be observed, in Figure 6, that the upper surface of the mouthpiece plate is rabbeted with a rearward facing shoulder 28a so as to receive the forward margin of the bottom plate 25 with the upper surfaces of both plates flush.

A filler plate 32 is interposed below the bottom plate and within the rabbeted portion of the mouthpiece plate, said filler plate extending transversely between the inner opposed edges of the corner pieces 26, 26 as is best shown in Figures 5 and 6.

A plurality of forwardly projecting dipper teeth 35, 35 are mounted along the cutting lip of the bucket, in the form shown said dipper teeth each having a base formed of upper and lower forked legs 36, 37, respectively, fitting over the front edge of the mouthpiece plate 28. The two intermediate teeth, one of which is shown in enlarged detail in Figure 6, each have their upper leg 36 overlying the front margin of the bottom plate 25, and their connecting rivets 30, 30 extend through said upper margin of the bottom plate, the filler plate 32, the mouthpiece plate 28, and the lower leg 37 of the tooth. The outer pair of teeth are similarly secured by rivets, excepting that said teeth preferably register with and are riveted to the lower rabbeted margins 26a of the corner pieces 26, as shown in Figure 5.

I also provide a plurality of skids 40, 41 extending longitudinally along the bottom and part way up the rear wall, said skids being preferably connected in longitudinal alignment with each of the teeth 35, 35 and the outermost pair of skids 40, 40 being riveted at the adjacent overlapping joints of the bottom plate 25 and corner piece 26, while the two central skids 41, 41 are riveted directly to the curved bottom plate 25.

The arch structure 10 is made up of a plurality of plates and reinforcing strips which will now be described in detail.

Overlying the outer sides of the side plates 13a at the cheek portions 11, 11 of the bucket, is an inner arch plate 42. (See Figs. 2 and 3.) The upright lower portions 43, 43 of said inner arch plate extend downwardly and rearwardly from the front of the bucket so as to lap the upper margins 28a of the mouthpiece plate 28, and are connected thereto by a plurality of rivets 44, 44 which also pass through the side plates 13a, 13a as shown in Figures 1, 2 and 5. The side or cheek portions 43 of said inner arch plate which overlap the side plates 13a are therefore wider longitudinally of the bucket than the upper transversely curved portion of the arch structure, as is best seen in Figure 1.

A plurality of reinforcing strips or bars are carried upwardly and across the arch structure just outside of the inner arch plate 42, in the form shown three rows of such reinforcing strips being employed, each row consisting of a flat bar 45 of uniform thickness throughout its length, and a superimposed bar 46 which is substantially thicker over the top of the arch structure and tapered downwardly along the sides of said structure as clearly shown in Figure 4. Another similar set of reinforcing bars 45a, 46a is disposed along each rear margin of the inner arch plate where it joins the side plates 13a, as is best seen in Figures 1 and 5.

An outer arch plate 47 extends over the top of the arch structure in direct engagement with the tapered reinforcing strips 46 and 46a. This outer arch plate is of substantially the same pattern as the inner arch plate 42, excepting that the upright lower portions thereof extend downwardly only to, but not lapping the mouthpiece plate 28, as is clearly shown in Figures 1, 2 and 5.

Incorporated also in this arch structure are the dragline connecting brackets 18, 18 at the front of each cheek portion 11. These brackets are interposed longitudinally between the outer and inner arch plates 42 and 47, and are securely connected thereto by a plurality of through rivets 48, which rivets also extend through the adjacent portions of the side plates as is best seen in Figure 2. With this construction it will be observed that the brackets are fully housed between the arch plates so that the connecting rivets are in double shear, thus providing an extremely rigid and secure connection at these points.

It will be seen also in Figure 1 that a reinforcing plate 50 extends forwardly and horizontally from each of the trunnion supports 21, 21 along its respective side plate 13a, and each reinforcing plate is offset outwardly at its forward end so as to overlie the adjacent inner arch plate 42 and with its forward end abutting the adjacent dragline bracket 18. A filler plate 51 is interposed between the outer arch plate 47 and the horizontal reinforcing plate 50, as is also shown in Figure 5. All of the parts just mentioned are secured together by a plurality of through rivets 54, which also extend through the side plates 13a.

The upper margins of the side and rear walls 12 and 14 are also reinforced by strips 55 which may also be of aluminum, riveted along the inner edge thereof. As an added protection against abrasion and wear of the dump line connections, I also provide a pair of inverted L-shaped angle steel strips 56 along the outer and top edge of the side plates, as shown in Figure 7.

From the above description, it will now be seen that when riveted together, the dragline bracket 18, the inner and outer arch plates 42 and 47, and the upper margins 28a of the mouthpiece plate 28 are all secured to each other and to the adjacent side plates 13a of the bucket, thus making an extremely rigid and strongly reinforced framework, which framework is further extended downwardly to include the corner pieces 26, 26 through the mouthpiece plate 28, and is also extended rearwardly to the trunnion supports 21 through the horizontal reinforcing plates 50.

With the construction above described, it is possible to form the side plates 13a and the bottom and rear plate 25 of sheet metal which is considerably thinner than heretofore employed in buckets of the character described, whereby the entire bucket is lighter in weight, and yet so reinforced by the heavier framework members described that it is more substantial than buckets of the usual type having relatively thick and heavy sectioned walls throughout its structure.

More especially I find it possible to construct

the major portion of my improved form of bucket out of aluminum or a similar relatively light metal, so that the bucket is considerably lighter than steel buckets heretofore employed. In addition to its lightness the strength due to the reinforced structure makes it even more substantial than the customary bucket built of steel. Its lightness makes it possible to increase the capacity of the bucket for a given load-pulling capacity of the operating mechanism, thereby greatly increasing the possible output of the dragline apparatus.

As a further practical advantage, the lightness of the bucket greatly increases the life of the operating cables, due to the lightness of the bucket when it is being carried back empty, and the fact that the aluminum carrying surfaces have a marked tendency to shed mud and dirt, and discharge the load therefrom much more rapidly and completely than is the case with ordinary all-steel buckets.

Although I have illustrated and described one particular embodiment of my invention, it will be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of my invention.

I claim:

1. A dragline bucket having bottom, rear and side walls formed of sheet metal, and a reinforcing framework including continuous corner pieces extending along the lower and rear corners of said bucket and connecting said side walls with said bottom and rear walls throughout their length, and a mouthpiece plate connected between said corner pieces and extending transversely across the front margin of said bottom wall to form the cutting lip of said bucket.

2. A dragline bucket having side walls formed of sheet metal, a continuous sheet metal plate forming the bottom and rear walls of said bucket, and a reinforcing framework including continuous corner pieces connecting each of said side walls with said continuous sheet metal plate throughout its length, said corner pieces being substantially thicker than said side walls and continuous sheet metal plate, and a mouthpiece plate connected between said corner pieces and extending transversely across the front margin of said bottom wall to form the cutting lip of said bucket.

3. A bucket of the class described, having sheet metal plates forming the side, bottom and rear walls, and a reinforcing framework including a pair of continuous corner pieces extending along the lower side corners and upwardly along the rear of the bucket to form the bottom and rear corners thereof, a mouthpiece plate connected between said corner pieces and transversely across the front margin of said bottom wall to form the cutting lip of said bucket, said last named plate extending upwardly along the sides of said bucket, a fabricated arch structure extending upwardly above said mouthpiece plate comprising a plurality of continuous sheet metal plates, said arch structure including a plate lapped with and connected to said mouthpiece plate at the sides of said bucket, the sheet metal plates forming the side walls extending forwardly in lapped relation with the lapped portions of said arch structure and said mouthpiece plate.

4. A bucket of the class described, having sheet metal side, bottom and rear walls, and a reinforcing framework comprising a pair of continuous corner pieces extending along the lower side corners and upwardly along the rear of the bucket to form the bottom and rear corners thereof, a mouthpiece plate connected between said corner pieces and transversely across the front margin of said bottom wall to form the cutting lip of said bucket, said last named plate extending upwardly along the sides of said bucket, a fabricated arch structure extending upwardly above said mouthpiece plate, said arch structure consisting of a plurality of sheet metal plates arched over the front end of said bucket and including a plate lapped with and connected to said mouthpiece plate at the sides of said bucket, dragline connecting brackets at the front lower corners of said arch structure, a hoist line connecting bracket at the top of said arch structure, trunnion bearing supports for the dump line mounted on the side plates adjacent the rear of said bucket, and a reinforcing plate extending forwardly from each of said trunnion bearing supports into lapped engagement with said arch structure.

5. A fabricated bucket of the character described, comprising sheet aluminum side, rear and bottom walls, and a reinforcing framework comprising continuous corner pieces extending along the bottom corners and upwardly along the rear corners of said bucket, a steel cutting lip connected to said corner pieces and extending along the lower front edge of said bucket and upwardly along the side walls thereof, and an arch structure connected to said cutting lip, and formed of a plurality of sheet metal aluminum plates.

6. A bucket of the class described, having sheet metal side, bottom and rear walls and reinforcing framework comprising a pair of continuous corner pieces extending along the lower side corners and upwardly along the rear of the bucket to form the bottom and rear corners thereof, a mouthpiece plate connected to and extending between the front ends of said corner pieces to form the cutting lip of said bucket, said mouthpiece plate being rabbeted at its rear edge to receive the front margins of said sheet metal bottom plate, and a plurality of dipper teeth mounted on said cutting lip, said dipper teeth having slotted shanks fitting over said cutting lip and common securing means extending through said mouthpiece plate, corner pieces, and the front margin of said bottom plate.

7. A bucket of the class described having sheet metal side plates, a reinforcing framework including an arch member consisting of a plurality of arch plates lapped at their lower ends with said sheet metal side plates, dragline brackets each having a relatively flat rearwardly extending shank interposed between two of said plates at the front end of said bucket, trunnion bearing supports mounted on each of said side plates, horizontally extending reinforcing strips extending forwardly from said bearing supports and between said inner and outer arch plates in substantially horizontal alignment with the adjacent dragline connecting bracket, and means securing the lower margins of said inner and outer arch plates, side plate, dragline connecting bracket and reinforcing strip together.

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