May 16, 1933. E. S. BLACK 1,908,883

DIPPER

Filed June 20, 1932 3 Sheets-Sheet 1

Fig. 1.

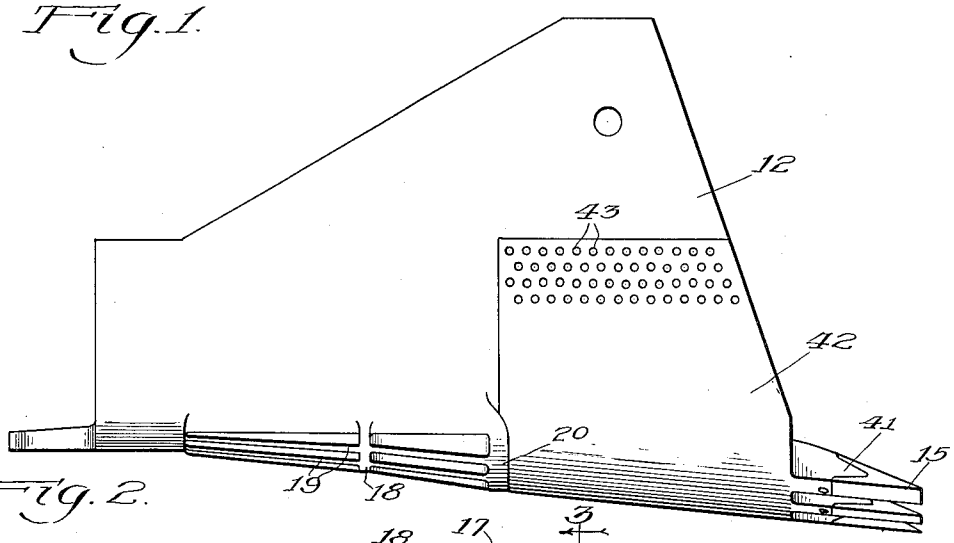
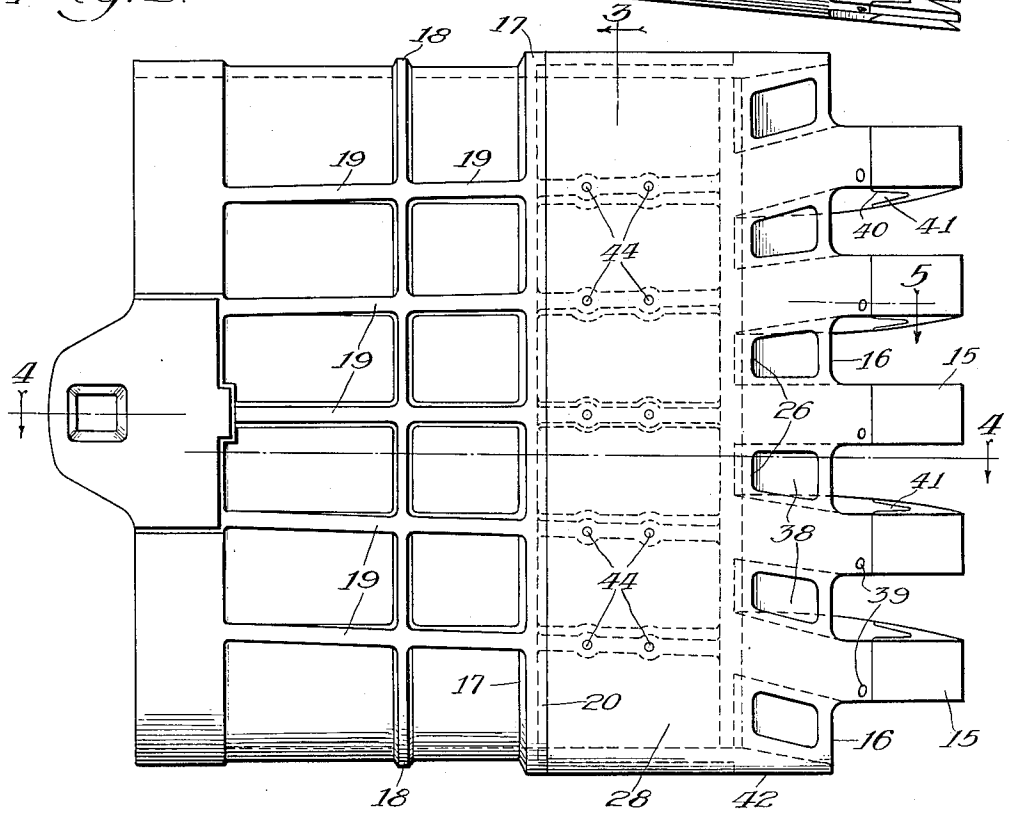


Fig. 2.



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DIPPER

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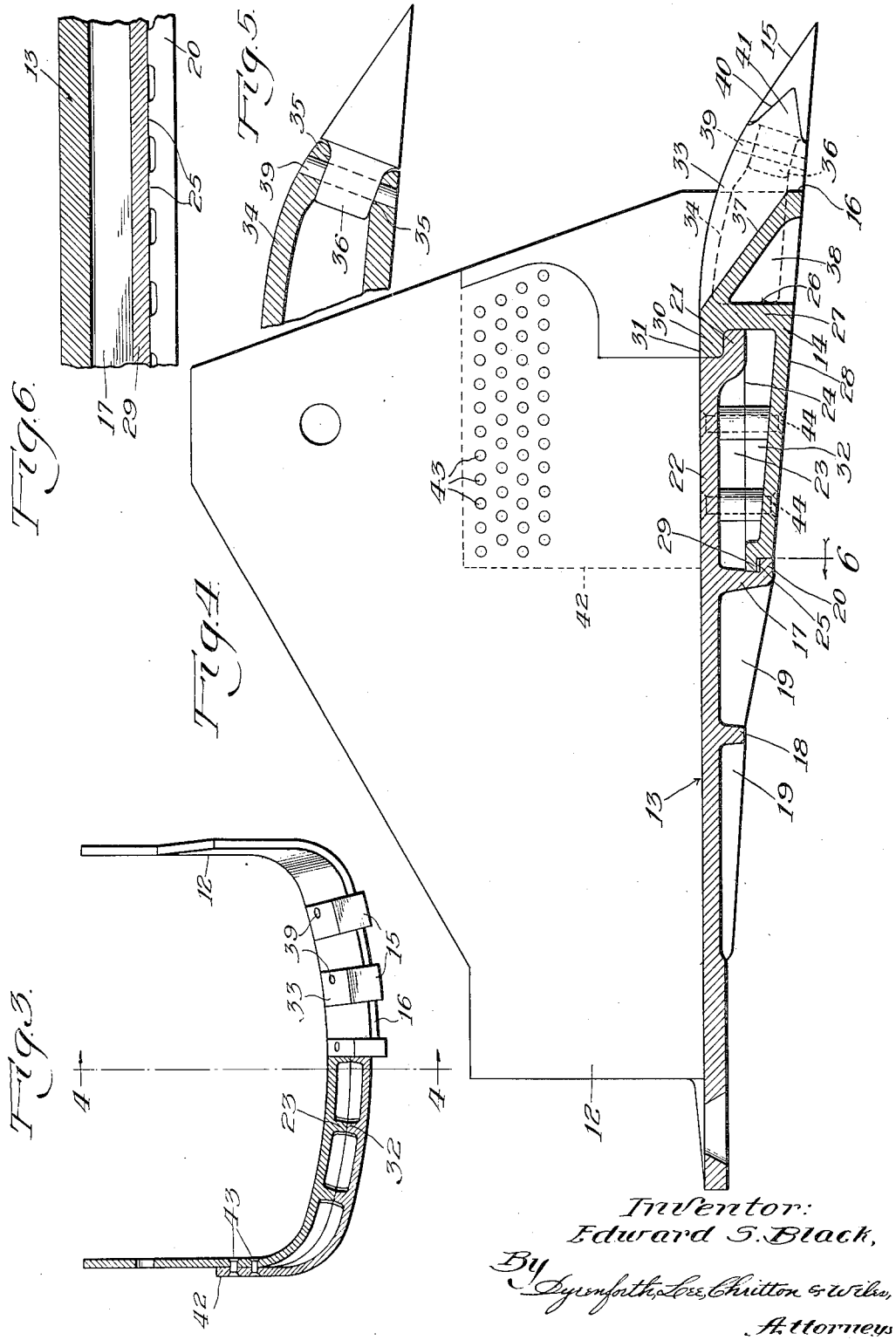

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DIPPER

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Fig. 7.

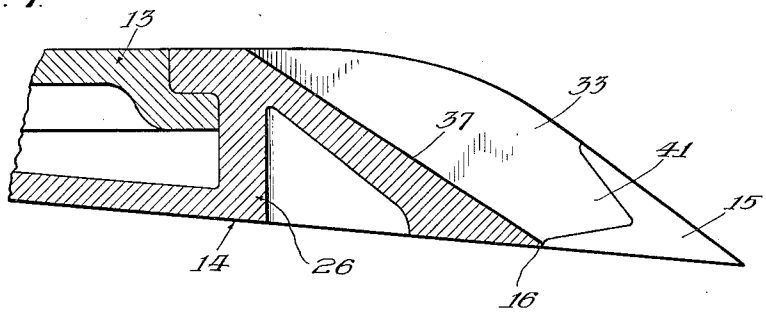


Fig. 8.

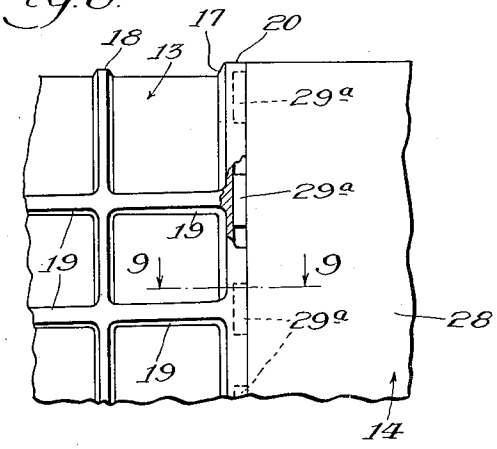


Fig. 9.

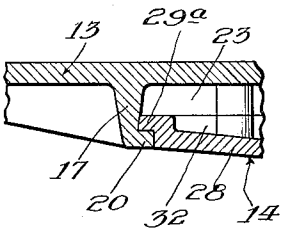


Fig. 10.

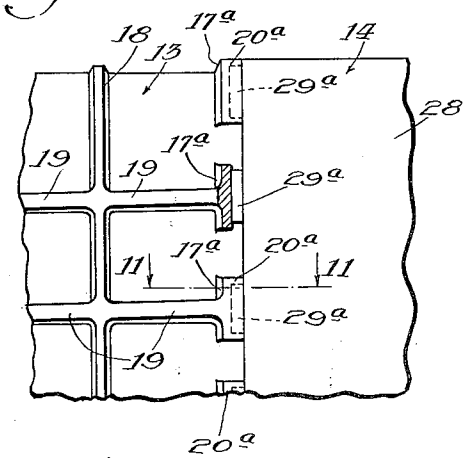
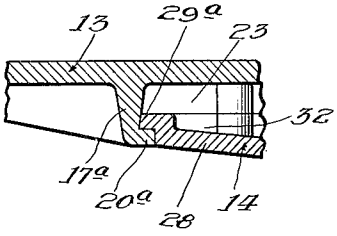


Fig. 11.



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Patented May 16, 1933 1,908,883

UNITED STATES PATENT OFFICE

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DIPPER

Application filed June 20, 1932. Serial No. 618,389.

My invention relates, more particularly, to dippers, or buckets, for use in excavating, dredging, or similar work, and especially to the front construction of such articles.

One of my objects is to provide in a front construction of dipper formed of separate parts, for the ready assembling of such parts and the presentation of a high degree of resistance to displacement of the parts relative to each other under the great stresses to which they are subjected in use.

Another object is to provide in a dipper front the cutting edge portion of which is formed as a part separate from the remainder of the front, for the connecting of these parts in a novel, simple, and highly effective way providing a construction which will permit of the ready assembling, or disassembling, of these parts, as for example, for the purpose of replacement, and which will be strong and durable.

Another object is to provide a dipper front, especially for dippers of very large capacity, which will be of relatively light weight, present great strength, and which may be made of cast metal, as for example manganese steel.

Another object is to provide a two-part front construction wherein reliance on rivets or other separate fastening devices, is not required to resist the stresses in digging; and other objects as will be manifest from the following description.

Referring to the accompanying drawings in which I have chosen to illustrate my invention as embodied in a dipper front having a main body portion and a separate tooth base equipped lip forming portion:

Figure 1 is a view in side elevation of the dipper front.

Figure 2 is a face view of the dipper front.

Figure 3 is a reduced view, partly in section and partly in elevation of the dipper front, the section being taken at the line 3 on Fig. 2 and viewed in the direction of the arrow.

Figure 4 is an enlarged sectional view taken at the lines 4—4 on Figs. 2 and 3, and viewed in the direction of the respective arrows.

Figure 5 is an enlarged broken sectional view taken at the line 5 on Fig. 2 and viewed in the direction of the arrow.

Figure 6 is an enlarged fragmentary sectional view taken at the line 6 on Fig. 4 and viewed in the direction of the arrow.

Figure 7 is a sectional fragmentary view of a modification of the construction of the preceding figures, this view being taken at a line corresponding in position with the line 4—4 on Figs. 2 and 3 and viewed in the direction of the respective arrows.

Figure 8 is a fragmentary face view of a dipper front constructed in accordance with a further modification of the invention, a portion of the structure being shown in section.

Figure 9 is a broken section taken at the line 9—9 on Fig. 8 and viewed in the direction of the arrows.

Figure 10 is a view like Fig. 8 of still another modification; and

Figure 11, a section taken at the line 11—11 on Fig. 10 and viewed in the direction of the arrows.

Referring to the construction shown in Figs. 1 to 6, inclusive, the dipper front therein shown is of a general shape as commonly provided, namely, of general trough shape as shown in Fig. 3 presenting side plates or wings 12 at which the dipper front is adapted to be united with the other side walls (not shown) of the dipper in accordance with common practice.

The dipper front in this particular construction is formed of a main body section 13 and an upper lip section 14 interlocked with the body section 13 and presenting seats for the dipper teeth represented at 15 and cutting edge portions 16 between these teeth.

The body section 13 is shown as of externally ribbed construction and particularly desirable in the case of large cast dipper fronts, the transverse ribs 17 and 18 thus provided between the upper and lower edges of the body section 12 being united with longitudinal ribs 19.

The rib 17 is provided at its forward edge with an upwardly extending flange 20 shown as extending continuously across the face of the dipper front, and the upper edge of the

body section 13 is provided with an upwardly extending flange 21 offset forwardly from the rear face 22 of the body section as represented and extending across the dipper front.

The body section at its outer face between the rib 17 and the flange 21 is provided with a series of spaced apart, substantially vertically disposed, parallel ribs 23 which thus extend lengthwise of the dipper front, these ribs being shown as extending at their outer faces represented at 24 substantially flush with the outer face of the flange 21, but short of the rear surface of the flange 20, (Fig. 4), which latter is preferably formed with pads 25 integral therewith to reduce the amount of surface to be ground away to condition the parts for the desired interfitting of the parts as hereinafter described.

The lip section 14 of the construction shown and also provided as a casting, is formed of a cored body portion 26 which extends along the upper edge portion of the body section 13 and around the sides thereof as shown (Figs. 3 and 4), the body portion 26 being formed at the forward edge of its base portion 27, with a skirt portion 28 lapping the forward surface of the upper edge portion of the body section 13, the skirt portion 28 terminating at its lower edge in a depending rearwardly offset flange 29 adapted to enter the space between the flange 20 and the ribs 23 as shown in Fig. 4 and bear against the pads 25.

The base 27 of the upper section 14 is provided at its rear edge with a depending flange 30 adapted to hook over the flange 21 on the body section 13 and interlock therewith as shown, the rear face 31 of the flange 30 being substantially flush with the rear surface 22 of the body section 13.

The upper section 14 is also provided on the rear surface of its skirt portion 28 with ribs 32 which extend lengthwise of the dipper front and in alinement with the ribs 23 which they flatwise oppose as shown.

The body portion 26 of the upper section 14 is provided at intervals with tooth bases 33 integral therewith and in alinement, respectively, with the pairs of ribs 23 and 32. The bases 33 are cored out as represented at 34 and present at their outer ends sockets 35 to receive the shanks 36 of the teeth 15. The rear surface of the body portion 26, between the bases 33, is inclined forwardly as represented at 37 to form the series of penetrating, or cutting, edges 16 which thus alternate with the teeth 15, the body portion 26 between the bases 33 being cored out as represented at 38.

The teeth 15 in the particular construction shown are held at their shanks 36 in the sockets 35 by pins represented at 39, the teeth at opposite sides of the shanks 36 being formed with V-shaped recesses 40 at which they seat on V-shaped projections 41 formed on the outer ends of the bases 33 at opposite sides of the sockets 35.

The upper section 14 is assembled with the body section 13 to the position shown in the drawings in which position the flange 30 interlocks with the flange 21 and the flange 29 extends, preferably by a relatively close fit, into the space between the ribs 23 and the flange 20. The rearwardly extending portions at the ends of the upper section 14 and represented at 42 are shown as overlying the wings 12 of the body section 13 to which they are riveted as indicated at 43, and the sections 13 and 14 are secured together as by means of rivets represented at 44 which pass through the alining ribs 23 and 32 these ribs being preferably bulged at the portions thereof through which the rivets pass as represented in Figs. 2 and 3 to provide the desired body of metal at these points.

The modification shown in Fig. 7 is the same as the construction shown in the preceding figures except that the portions of the base 26 of the upper section 14 and located between the tooth bases 33, are carried upward substantially to the teeth 15 instead of terminating a considerable distance below the teeth.

The modifications shown in Figs. 8, 9, 10 and 11 are the same as the construction shown in Figs. 1–6, inclusive, except that instead of providing the flange 29 as a continuous flange it is formed discontinuous as by providing a series of lugs 29^a; and in addition, in Figs. 10 and 11, instead of providing the rib 17 and flange 20 as continuous structures they are formed discontinuous as by providing a series of short ribs 17^a and flanges 20^a which register with the lugs 29^a on the upper section 14.

As will be understood from the foregoing the construction provided as stated possesses a high degree of strength resisting the stresses to which the dipper is subjected in use; is of relatively light weight; affords the desired smooth rear surface to the front and provides for the ready substitution of a worn lip section for a new one.

While I have illustrated and described certain constructions constituting embodiments of my invention, I do not wish to be understood as intending to limit my invention thereto, as the constructions shown may be variously modified and altered and the invention embodied in other forms of structure without departing from the spirit of my invention.

What I regard as new. and desire to secure by Letters Patent. is:

1. A front construction of a dipper comprising a body section and a separate upper lip section, said body section having an upwardly extending projection adjacent its upper edge and offset toward the front side of said body section. and said lip section lap-

ping a rearwardly facing surface of said projection to interlock these parts and at a lower elevation lapping the front surface of said body section.

2. A front construction of a dipper comprising a body section and a separate upper section, said body section being provided below its upper edge with an upwardly extending projection and said upper section lapping a rearwardly facing surface of said body section at the upper edge of the latter and also lapping the rear surface of said projection, that portion of said upper section which laps the rear surface of said projection being wholly below the portion of said upper section which laps the upper edge of said body portion.

3. A front construction of a dipper comprising a body section and a separate upper section, said body section having an upwardly extending projection adjacent its upper edge and offset toward the front side of said body section and provided below its upper edge with an upwardly extending projection, said upper section lapping the rear surfaces of said projections.

4. A front construction of a dipper comprising a body section and a separate upper lip section, said lip section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with ribs between said portion and said body section, said lip section, including said portion, extending continuously across the face of said body section.

5. A front construction of a dipper comprising a body section, a separate upper lip section, said lip section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with ribs between said portion and said body section, said lip section, including said portion, extending continuously across the face of said body section and means holding said sections in lapped position.

6. A front construction of a dipper comprising a body section and a separate upper section, said upper section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with alined ribs on said portion and said body section flatwise opposing each other.

7. A front construction of a dipper comprising a body section, a separate upper section, said upper section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with alined ribs on said portion and said body section flatwise opposing each other, and means extending through said alined ribs for holding said sections in lapped position.

8. A front construction of a dipper comprising a body section and a separate upper section, said body section having an upwardly extending projection, and said upper section having a portion lapping the rearwardly facing surface of said projection to interlock these parts and having a portion at the front side of said body section depending to a point below the lower edge of said first referred-to portion, with ribs between said portion and said body section.

9. A front construction of a dipper comprising a body section and a separate upper section, said body section having an upwardly extending projection forwardly offset from the rear face of said body section and said upper section lapping the rearwardly facing surface of said projection to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with ribs between said portion and said body section.

10. A front construction of a dipper comprising a body section and a separate upper section, said body section being provided below its upper edge with an upwardly extending projection extending continuously across said body section and said upper section lapping a rearwardly facing surface of said body section at the upper edge of the latter and also lapping the rear surface of said projection.

11. A front construction of a dipper comprising a body section and a separate upper section, said body section being provided below its upper edge with an upwardly extending projection and said upper section lapping a rearwardly facing surface of said body section at the upper edge of the latter and having depending lugs at its lower edge lapping the rear surface of said projection.

12. A front construction of a dipper comprising a body section and a separate upper section, said body section being provided below its upper edge with a series of upwardly extending projections extending transversely of said body section and said upper section lapping a rearwardly facing surface of said body section at the upper edge of the latter and having depending lugs at its lower edge alining with said projections and lapping the rear surfaces of said projections.

13. A front construction of a dipper comprising a body section, a separate upper lip section, said lip section lapping a rearwardly facing surface of said body section and having a portion depending below the upper edge of said body section at the front side of said body section and extending continuously across the front of said body section and tooth bases integral with said upper section,

with substantially parallel ribs between said portion and said body section and alined with said tooth bases.

14. A front construction of a dipper comprising a body section and a separate upper lip section, said body section being provided below its upper edge with an upwardly extending projection and said lip section lapping a rearwardly facing surface of said body section and also lapping the rear surface of said projection.

15. A front construction of a dipper comprising a body section and a separate upper lip section, said body section having an upwardly extending projection adjacent its upper edge and offset toward the front side of said body section and provided below its upper edge with an upwardly extending projection, said lip section lapping the rear surfaces of said projections.

16. A front construction of a dipper comprising a body section and a separate upper lip section, said lip section having a portion lapping a rearwardly facing surface of said body section to interlock these parts and having a portion at the front side of said body section depending to a point below the lower edge of said first-referred-to portion and extending continuously across the front face of said body section.

17. A front construction of a dipper comprising a body section and a separate upper section, said upper section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with projections on said body section and said depending portion of said upper section flatwise opposing each other.

18. A dipper having a front portion formed of a body section, a separate lip having rearwardly extending wings at its ends, and means connecting said wings with side portions of the dipper, said lip having a portion lapping a rearwardly facing surface of said body section and relieving stress on said means in digging and a portion which depends below that portion of said lip section which laps a rearwardly facing portion of said body section and extends continuously across the front face of said body section.

19. A dipper having a front portion formed of a body section, a separate lip having rearwardly extending wings at its ends, and means connecting said wings with side portions of the dipper, said body section having an upwardly extending projection below its upper edge, said lip having a portion lapping a rearwardly facing surface of said body section and relieving stress on said means in digging and a portion lapping the rear surface of said projection.

20. A front construction of a dipper comprising a body section and a separate upper lip section, said lip section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with alined ribs on said portion and said body section flatwise opposing each other.

21. A front construction of a dipper comprising a body section, a separate upper lip section, said lip section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with alined ribs on said portion and said body section flatwise opposing each other, and means extending through said alined ribs for holding said sections in lapped position.

22. A front construction of a dipper comprising a body section and a separate upper lip section, said body section having an upwardly extending projection, and said upper section lapping the rearwardly facing surface of said projection to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with ribs between said portion and said body section.

23. A front construction of a dipper comprising a body section and a separate upper lip section, said body section having an upwardly extending projection forwardly offset from the rear face of said body section and said lip section lapping the rearwardly facing surface of said projection to interlock these parts and having a portion depending below the upper edge of said body section at the front side of said body section, with ribs between said portion and said body section.

24. A front construction of a dipper comprising a body section and a separate upper lip section, said body section being provided below its upper edge with an upwardly extending projection extending continuously across said body portion and said lip section lapping a rearwardly facing surface of said body section at the upper edge of the latter and also lapping the rear surface of said projection.

25. A front construction of a dipper comprising a body section and a separate upper lip section, said body section being provided below its upper edge with an upwardly extending projection and said lip section lapping a rearwardly facing surface of said body section at the upper edge of the latter and having depending lugs at its lower edge lapping the rear surface of said projection.

26. A front construction of a dipper comprising a body section and a separate upper lip section, said body section being provided below its upper edge with a series of upwardly extending projections extending transversely of said body section and said lip section lapping a rearwardly facing sur-

face of said body section at the upper edge of the latter and having depending lugs at its lower edge alining with said projections and lapping the rear surfaces of said projections.

27. A front construction of a dipper comprising a body section and a separate upper lip section, said body section being provided below its upper edge with an upwardly extending projection and said lip section lapping a rearwardly facing surface of said body section and also lapping the rear surface of said projection, that portion of said lip section which extends at the front face of said body section extending continuously across the latter and the portion of the front comprising said last referred to portion of said lip section and the portion of said body section lapped thereby being of cellular form.

28. A front construction of a dipper comprising a body section and a separate upper lip section, said lip section lapping a rearwardly facing surface of said body section to interlock these parts and having a portion depending below the upper edge of said body section at the front side of the latter and extending continuously across said body section with ribs between said depending portion of said lip section and said body section.

29. A front construction of a dipper comprising a body section and a separate upper lip section, said body section being provided below its upper edge with an upwardly extending projection and said lip section lapping a rearwardly facing surface of said body section and also lapping the rear surface of said projection with ribs between said lip and body section.

EDWARD S. BLACK.