

Jan. 2, 1940.

W. M. BAGER ET AL

2,185,176

EXCAVATING DIPPER

Filed Jan. 27, 1938

2 Sheets-Sheet 1

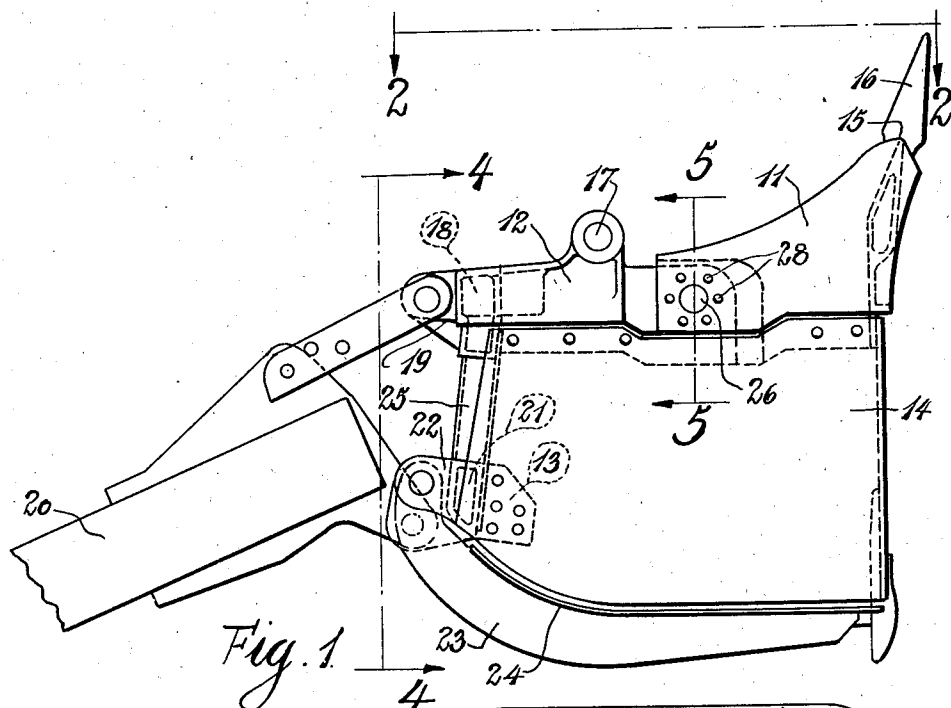


Fig. 1

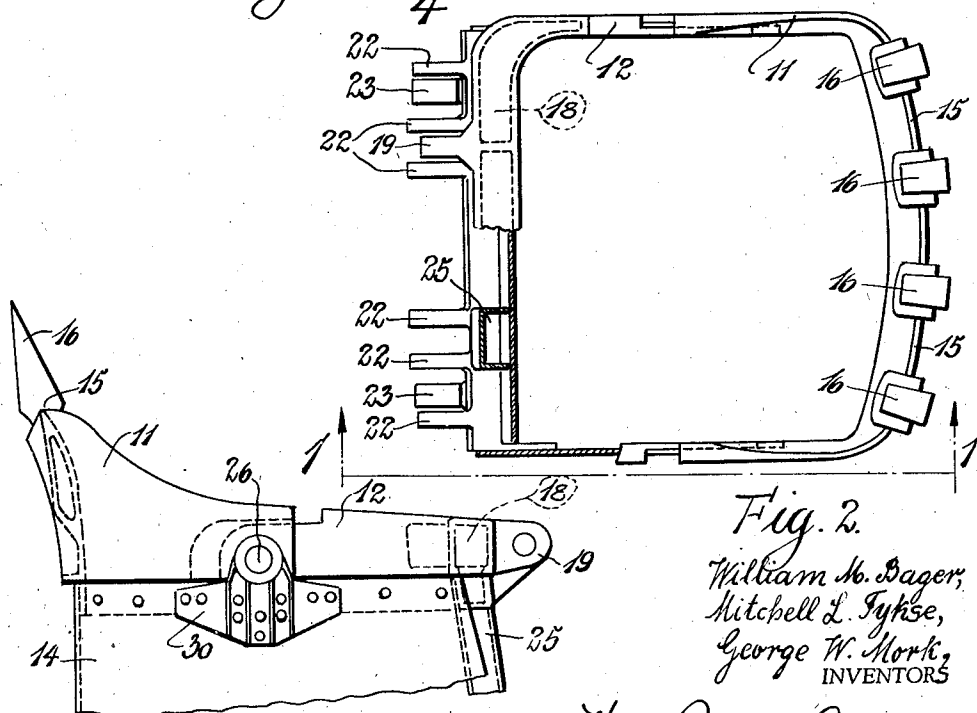


Fig. 2.

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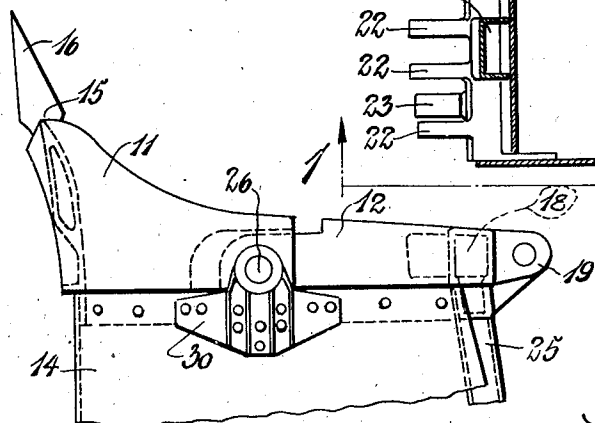


Fig. 3.

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2 Sheets-Sheet 2

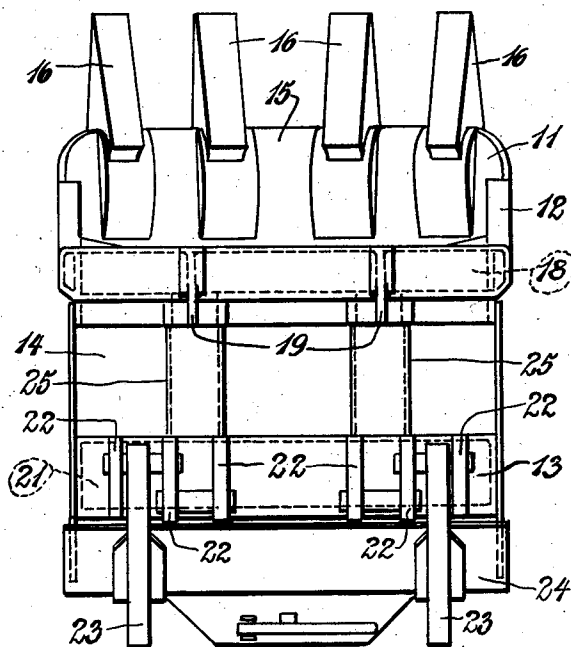
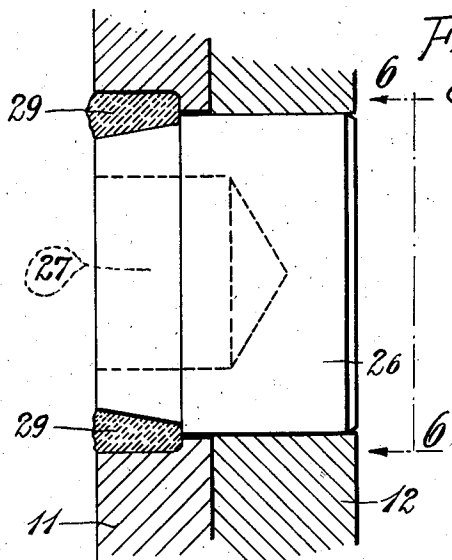


Fig. 5.

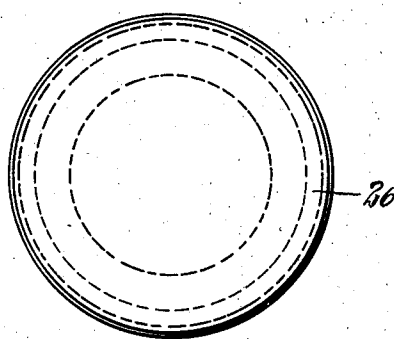


Fig. 6. William M. Bager,
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UNITED STATES PATENT OFFICE

2,185,176

EXCAVATING DIPPER

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Application January 27, 1938, Serial No. 187,208

13 Claims. (Cl. 214—145)

Our invention relates to new and useful im-
provements in excavating dippers.

Devices of this sort comprise a substantially
cubical body, having a front, a back and two
sides, being open at top and bottom, and having
a door to close the bottom opening. The back is
secured to the end of a handle, which is used to
thrust the dipper into the material to be exca-
vated. The front upper edge constitutes the dig-
ging lip, usually equipped with teeth. Means,
such as bail-lugs, are provided for attachment of
the hoist-rope.

Various problems of construction, not hereto-
fore adequately solved, include: making the dip-
per sufficiently strong and rigid to carry the
digging stresses from the lip to the handle and
hoist rope, and yet at the same time sufficiently
light to involve no unnecessary dead weight;
building the different parts of the dipper, each
of the best material for the particular function
to be performed by that part, and yet securing
these parts together adequately and strongly; and
so designing the parts that one given size of parts
can be utilized in building several different sizes
of dipper. It is the principle object of our in-
vention to attain these ends.

In addition to our principal object, above stated,
we have worked out a number of novel and useful
details, which will be readily evident as the de-
scription progresses.

Our invention consists in the novel parts and
in the combination and arrangement thereof,
which are defined in the appended claims, and of
which one embodiment is exemplified in the ac-
companying drawings, which are hereinafter par-
ticularly described and explained.

Throughout the description, the same reference
number is applied to the same member or to
similar members.

Figure 1 is a side elevation of our dipper, taken
along the lines 1—1 of Figure 2, with handle
attached.

Figure 2 is a plan view of our dipper, taken
along the lines 2—2 of Figure 1.

Figure 3 is a side elevation of the upper portion
of a variant of our dipper.

Figure 4 is a rear elevation of our dipper, taken
along the lines 4—4 of Figure 1.

Figure 5 is a section, taken along the lines 5—5
of Figure 1, showing our plug, joining the front
and rear castings of the upper edge of our dipper.

Figure 6 is an end view of our plug, taken along
the lines 6—6 of Figure 5.

Turning now to Figures 1 and 2, we see that
the body of our dipper is made up of a lip 11, a

rear top casting 12, and a rear lower casting 13;
the balance 14 being built up of structural plate.
In the claims, lip 11 and rear top casting 12 will
collectively be referred to as the "upper cast
rim," and rear lower casting 13 will be referred
to as the "lower rear heel casting."

The lip casting 11 is preferably made of man-
ganese steel, to withstand abrasion. A part of it
constitutes the lip 15, and carries digging
teeth 16.

The upper rear casting 12 is preferably made
of carbon steel, for cheapness and tensile strength.
It preferably carries, as an integral part, two bail
lugs 17 for attaching the hoisting means. Its
rear portion preferably contains box hollows 18
for combined strength and lightness. It also
carries lugs 19, for support by the dipper
handle 20.

The lower rear casting 13 is preferably made
of carbon steel, for cheapness and tensile strength.
Its rear portion preferably contains box hollows
21 for combined strength and lightness. It car-
ries lugs 22, for support by the dipper handle 20,
and to support the hinges 23 of the dipper door 24.

The plate portion 14 is built up of commercial
plate steel, cut and bent to fit, and attached to
the three castings by bolts, or preferably rivets,
as shown. Its back is reinforced by two or more
channel pieces 25, welded in place.

Our two upper castings 11 and 12 are secured
together in the following manner, as shown in
Figure 5. The back casting 12, being of a type
of steel which renders this possible, is machined
to a close fit, for the insertion of the cylindrical
portion of plug 26. The front casting 11, being of
manganese steel, is cast with a rough core-hole,
slightly larger than the cylindrical portion of the
plug, and considerably larger than the tapered
portion of the plug. The plug itself is cast with
a recess 27, to avoid blow-holes.

In assembling the upper rim of the dipper each
plug is inserted, the two portions of the rim, 11
and 12, are secured in surface contact with each
other by a ring of bolts, or preferably rivets 28,
and against sliding apart, by the plug which is
welded to the front portion 11, as at 29.

This construction of the upper rim is as sturdy
as if it were built all in one piece, and yet permits
the use of two kinds of metal (one for lip and
one for back, each the best for its own purpose),
and also permits the size-change about to be
discussed. The channels, welded to the plate
back, serve as braces for the two levels of attach-
ment to the handle.

Thus it is now possible to carry the digging

stress from the lip and teeth, to bail and handle, through a minimum of metal, with the rest of the dipper serving as a mere light bag to hold the excavated material.

5 Portions 11 and 12 of the upper rim are built so that they can overlap to a greater or less degree. Thus, by properly locating the holes for the plugs, several alternate sizes of rim are thus available. In the smaller sizes, the superfluous
10 overlap of one or both of the parts can be burnt off. The structural plate portion of the dipper can be built to match; and also, if desired, can be made deeper or shallower in proportion. The rear lower casting 13 presents no problems in
15 this connection.

If desired, the lugs 17 can be dispensed with, and instead the holes 27 be bored clear through both of the plugs 26, and two separate bail-lug castings 30 be added, which together with the
20 plugs 26, will serve to attach the hoist means.

Having now described and illustrated one form of our invention, we wish it to be understood that our invention is not to be limited to the specific form or arrangement of parts hereinbefore described, except insofar as such limitations are
25 specified in the appended claims.

We claim:

1. In an excavating dipper, in combination of:
30 an upper cast rim in two parts; means for securing the two parts of the rim together, against sliding apart or prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attach-
35 ing lugs on the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and vertical reinforcing ribs on the back of the plate portion, extending from the
40 heel piece to the rim.

2. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being of carbon steel; means for securing the
45 two parts of the rim together, against sliding apart or prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rim; a lower rear hollow heel piece, extend-
50 ing clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel
55 piece to the rear part of the rim.

3. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being of carbon steel; aligned holes in over-
60 lapping portions of the two parts of the rim; a plug in one of these aligned holes, secured to the part containing the other; means securing the two overlapping portions against prying apart; a digging lip on the front part of the rim;
65 handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the
70 dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to the rear part of the rim.

4. In an excavating dipper, the combination
75 of: an upper cast rim in two parts, the front

part being of manganese steel, and the rear part being of carbon steel; aligned holes in overlapping portions of the two parts of the rim; a plug in one of these aligned holes, secured to the part
5 containing the other; a ring of rivets, surrounding the plug and securing the two overlapping portions against prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attach-
10 ing lugs on the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the
15 heel piece to the rear part of the rim.

5. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being of carbon steel; means for securing the two
20 parts of the rim together, against sliding apart or prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rim; a lower rear hollow heel piece, extend-
25 ing clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to
30 the rear part of the rim; each of the two rear castings being of hollow box construction.

6. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being
35 of carbon steel; means for securing the two parts of the rim together, against sliding apart or prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rim;
40 a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate por-
45 tion, extending from the heel piece to the rear part of the rim; each reinforcing web consisting of a channel welded to the back.

7. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being
50 of carbon steel; means for securing the two parts of the rim together, against sliding apart or prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rear
55 part of the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel
60 piece to the rear portion of the rim.

8. In an excavating dipper, the combination of: an upper cast rim in two parts; means for securing the two parts of the rim together, against
65 sliding apart or prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rear part of the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs
70 on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to the rear part of the rim.

means on the back of the plate portion, extending from the heel piece to the rim.

9. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being of carbon steel; aligned holes in overlapping portions of the two parts of the rim; a plug in one of these aligned holes, secured to the part containing the other; means securing the two overlapping portions against prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rear part of the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to the rear portion of the rim.

10. A plug for joining the front and rear parts of the two-part cast rim of an excavating dipper against sliding apart, characterized by having a cylindrical portion, a frusto-conical portion, and a substantial axial cavity.

11. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being of carbon steel; aligned holes in overlapping portions of the two parts of the rim; a plug in one of these aligned holes, secured to the part containing the other; means securing the two overlapping portions against prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rear part of the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to the rear part of the

rim; said plug characterized by having a cylindrical portion, making a close fit within a machined hole in the back part of the rim, and having a portion making a loose fit within a hole in the front part of the rim and welded thereto.

12. In an excavating dipper, the combination of: an upper cast rim in two parts, the front part being of manganese steel, and the rear part being of carbon steel; aligned holes in overlapping portions of the two parts of the rim; a plug in one of these aligned holes, secured to the part containing the other; means securing the two overlapping portions against prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; hoist-means-attaching lugs on the rear part of the rim; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to the rear part of the rim; the overlapping parts of the rim being substantial, so as to permit of assembling the rim in several sizes.

13. In an excavating dipper, the combination of: an upper cast rim in two parts; a plug, passing through aligned holes in overlapping portions of the two parts of the rim; means securing the two overlapping portions against prying apart; a digging lip on the front part of the rim; handle-attaching lugs on the rear part of the rim; a hoist-means-attaching lug aligned with the plug; a lower rear hollow heel piece, extending clear across the rear lower edge of the dipper; handle-attaching lugs on this piece; the balance of the dipper body being built of structural plate; and reinforcing means on the back of the plate portion, extending from the heel piece to the rim.

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