EXCAVATING DIPPER WITH INTEGRAL BAIL EARS

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This invention relates to dippers, buckets, drag-line scrapers, or like excavating implements, and the term "dipper" as herein employed, is to be taken as indicating any or all of such implements.

One object of the invention is to provide a dipper with an integral bail attaching ear as distinguished from an ear separately produced and formed with an attaching bracket or base that is riveted to the dipper in assembling the same therewith, and it applies with particular advantage to dippers in which the draft or supporting connections are located wholly upon the front or digging portion of the dipper.

Another object of the invention is to provide a form of bail-attaching ear, and more particularly a web by which it is integrally united in offset relation to the dipper member, which will have a greater load-bearing capacity than ears and attaching brackets as herefofore constructed, and will be better adapted to withstand destructive influences which are encountered by such parts of excavating implements, in service.

Still another object of the invention is to provide replaceable means for receiving the wear that is imposed upon bail-attaching ears in service in order to preserve the portion of the ear which is integral with the dipper, and thus render feasible the employment of integral ears as distinguished from ears that are bodily removed and replaced when worn beyond the safety limit.

The several objects of the invention are realized by integrally uniting the bail-attaching ear through the medium of an offsetting web of substantially arcuate form which is particularly efficient in resistance to stresses imposed transversely to the web, the term "substantially arcuate form" being understood to include a portion of a circle or other curved or approximately curved perimeter, a plurality of adjacent sides of a polygon, or equivalent form, involving the incident of change in the direction of the web; and this web is strengthened through means of ribs integral with it and with the dipper wall which carries it; said ribs being preferably located at the ends of the web, and additional ribs being located intermediately thereof when the capacity of the dipper is such as to require additional staying of the ear. The bearings of the ear and corresponding dipper wall are provided with replaceable bushings in order not to wear the permanent parts, and the bushing for the ear is provided with an outer flange with or without a surrounding sleeve to enclose those faces of the ear which are in position for contact with the abrasive mineral matter over which the dipper is dragged in service. But while all of these features are desirable in realizing the advantages of the invention to the fullest measure, it is to be understood that the invention is not limited to the use of all of them in a single organization but is to be ascertained, as to its scope, from the appended claims.

In the accompanying drawings of which several emendations of the invention are shown by way of illustration,

Figures 1 and 2 are, respectively, a side and an end view of an excavating dipper embodying all of the features of the invention.

Figures 3 and 4 are sectional detail views showing modified constructions of the bushings employed in the pin bearing of the ear; and

Figure 5 is a detail face view showing a modified construction of bushing web and strengthening ribs.

1 represents an excavating dipper which is usually constructed of a front member 1, on which the draft or lifting connections are carried, and a rear section 1. 3 represents the bail-attaching ear which is usually mounted upon excavating implements of this kind, in a position sufficiently offset from an opposing wall 4 of the dipper, to leave between the ear and wall, a space 5 to receive the eye of a bail by which the dipper is to be controlled. According to the present invention, the ear 3 is integrally united with the dipper 1 and preferably the section 1 thereof, by means of an offsetting web 6, and in order that this web may be better adapted to resist the strains incident to draft or lift applied to the dipper, which occur as strains transverse to the web, the present invention gives to this web the form of an arc of a cylinder or polygon or some form approximating either of said geometrical figures, so that by resultant deflection of section of the web, it has much greater resistance to the stresses referred to; and to still further strengthen the web, it is provided with ribs 7 and 8 preferably located....
at the ends of the web and merging tangentially with the ear itself, and also such number of the ribs as may be required.

In order to protect the ear from wear and enable it to equal the life of the dipper itself in service, it is provided with a bushing 10 held in place by a cotter pin 11 that will also be employed, if desired, for holding the bail pin in position; and this bushing 10 may be provided with a facing flange 12 that overlies the outer face of the ear to protect the latter from impingement against the mineral matter in which the dipper is used, and also with a housing sleeve 13 that surrounds the greater portion of the edge face of the ear, to lend additional protection to the ear.

The opposing wall 4 of the dipper is provided with a bushing 14 which preferably carries a facing flange 15 that receives the eye of the bail; said facing flange being thus located in the position which not only protects a permanent part of the structure from wear, but serves as a means for keeping the bushing 14 in position.

As shown in Figure 3, the ear bushing may have the from 3 in which both the facing flange 12 and housing sleeve 13 are omitted, or it may have the form 3' as shown in Figure 4 in which facing flange 12' is employed, while the sleeve 13 is omitted.

As shown in Figure 5, the web which integrally unites the ear with the dipper, may be in the form of a segment of a cylinder as shown at 6' and be sustained by the ribs 7' and 8' alone.

The use of integral bail ears of substantially arcuate form as herein described, adds materially to the strength of ears as well as the body member that carries the ears; and when the ears are formed with offsetting webs of substantially arcuate form and ribs at the ends of the segments diverging from different points of a segment, as herein described, they still further strengthen the body member, besides involving increased strength and resistance in themselves. The casting of ears integrally with the body of the dipper, particularly when proper coreing is employed, insures accurate alignment of the two bores in the ear and opposing dipper wall, in which the bail pin is to be mounted, and less finishing work is required in rendering the bearing satisfactory. By bushes the pin bearing in both the ear and opposed dipper wall, replacement on account of wear at the bail attachment will be rendered unnecessary except as it may be required to insert new bushings from time to time, and this advantage is incident to the faces surrounding the bushings as well as in the bushings themselves.

By locating the cotter pin in a plane within the outer face of the ear, not only is the outer face left unobstructed to receive the wearing flange of the bushing, but the cotter pin is retired to a position which prevents destructive wear by the mineral in which the dipper is used. The bushing used in the wall of the dipper which opposes the ear crosses the lapping plane of the two members of the dipper and makes a better bearing for the pin. By holding the bail pin against rotation, by means of the cotter pin 11, wear is restricted to the meeting surfaces of the bail pin and eye of the bail and this is likewise accomplished by the use of a square or faced opening in the bushing 3' in Figure 5.

I claim:

1. An excavating dipper having a wall member, a bail-attaching ear and an offsetting web all cast in one integral piece; said web being of substantially arcuate form.

2. An excavating dipper having a wall member, a bail-attaching ear and an offsetting web all cast in one integral piece; said web being of substantially arcuate form and having strengthening ribs integral with said ear, web and wall.

3. An excavating dipper having a wall member, a bail-attaching ear and an offsetting web all cast in one integral piece; said web being of substantially arcuate form and having strengthening ribs integral with said ear, web and wall located at the ends of said web.

4. An excavating dipper having a wall member, a bail-attaching ear and an offsetting web all cast in one integral piece; said web being of substantially arcuate form and having strengthening ribs integral with said ear, web and wall located at the ends of said web, and merging tangentially with said ear.

5. In an excavating dipper, a bail-attaching ear, a bushing for said ear, and a wearing flange carried by said bushing and overlying a face of said ear.

6. In an excavating dipper, a bail-attaching ear, a bushing for said ear, and a wearing flange carried by said bushing and overlying a face of said ear; said ear having a pin passing through it and said bushing to hold the bushing in place.

7. In an excavating dipper, a bail-attaching ear having a bail pin opening, a bushing in said opening, and a housing sleeve carried by said bushing in position to surround an edge face of said ear.

8. In an excavating dipper, a bail-attaching ear having a bail pin opening, and a bushing in said opening, an ear-facing flange carried by said bushing, and a housing sleeve carried by said flange.

Signed at Chicago Heights, Illinois, this 29th day of August 1924.

CLAUDE RORABECK.