Dec. 16, 1952 R. O. BILLINGS 2,621,428

CLAMSHELL BUCKET

Filed June 21, 1946 2 SHEETS—SHEET 1

Fig. 1.

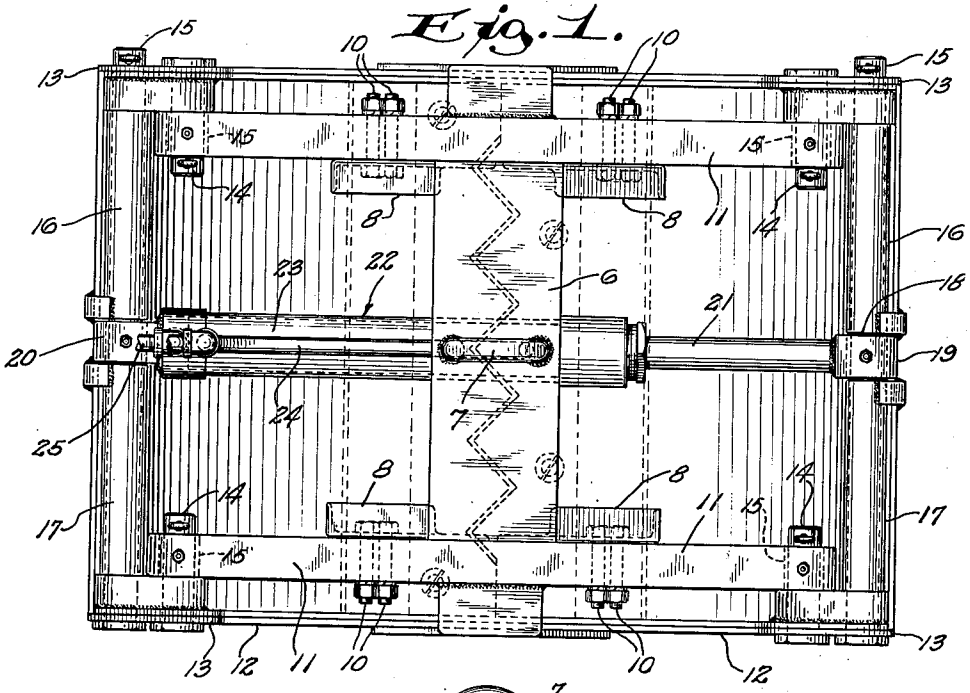
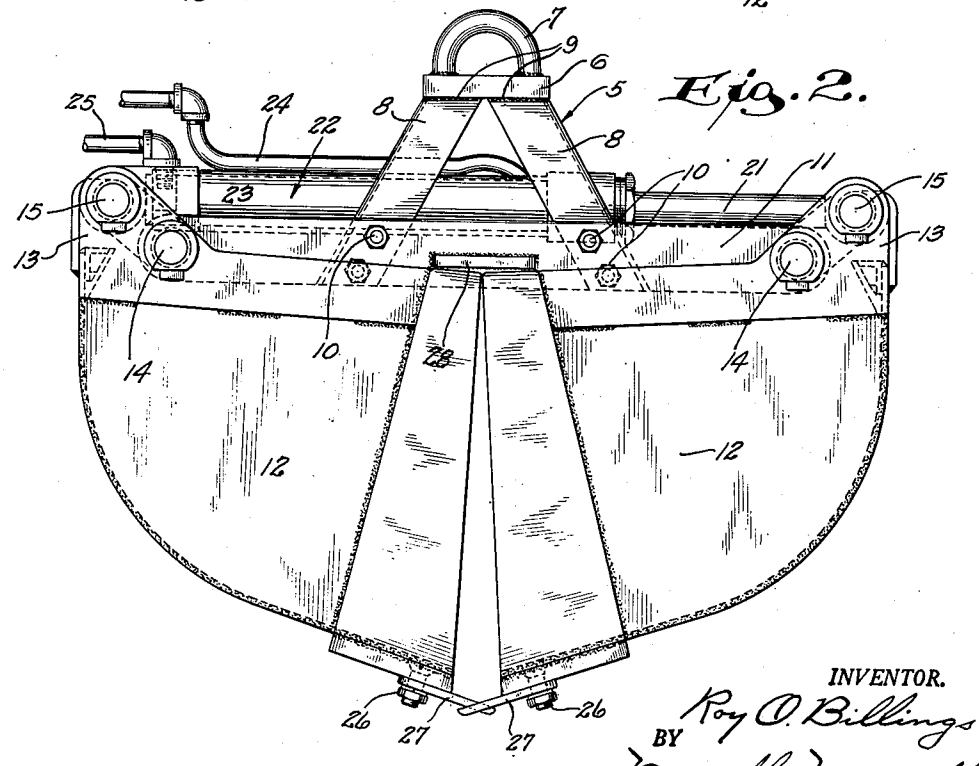


Fig. 2.



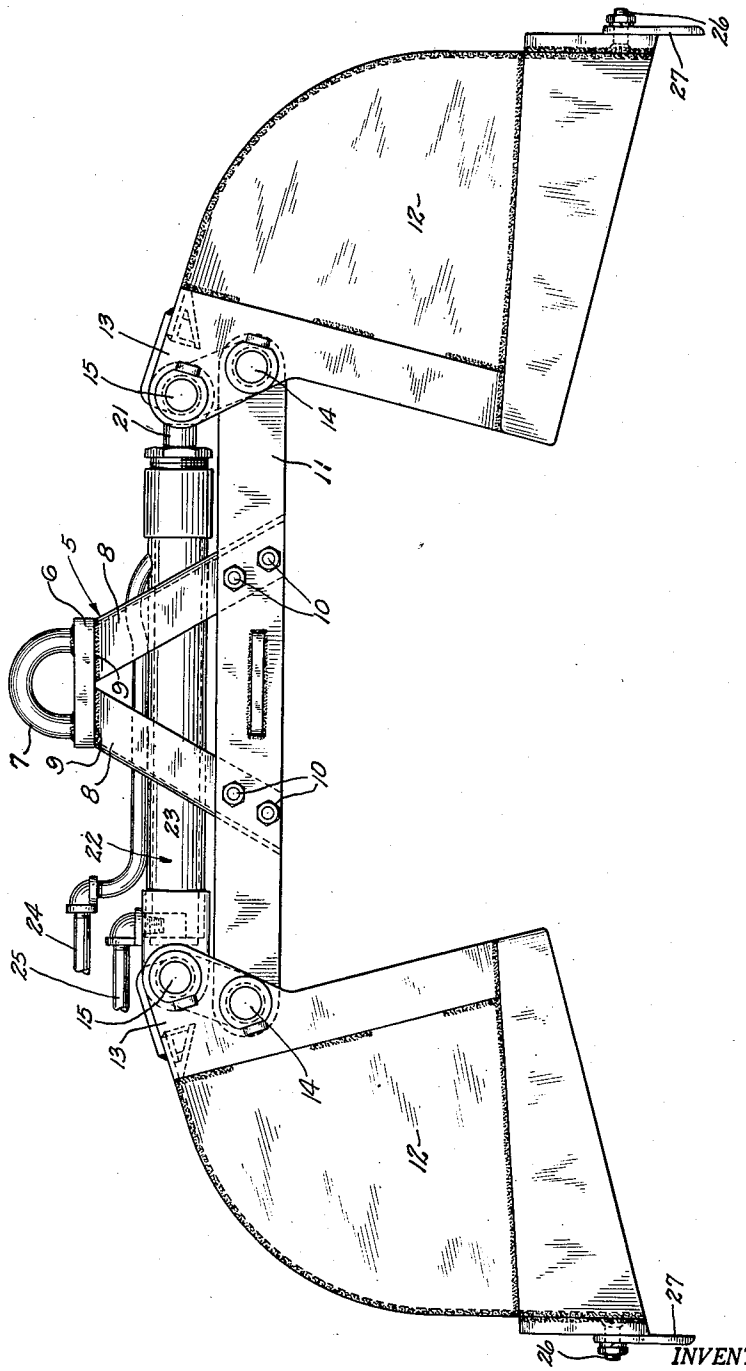
INVENTOR.
Roy O. Billings
BY
Mosell & Mosell
ATTORNEYS.

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Fig. 3.



INVENTOR.
Roy O. Billings
BY
Morsell & Morsell
ATTORNEYS.

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CLAMSHELL BUCKET

Roy O. Billings, Milwaukee, Wis.

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2 Claims. (Cl. 37—187)

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This invention relates to improvements in clamshell buckets.

While the opening and closing of clamshell buckets has heretofore been controlled by hydraulic mechanism, these devices as heretofore proposed, have required a substantial amount of headroom. In most buckets of this type, the hydraulic ram projects substantially vertically upwardly from the top of the bucket and there must be relatively long supporting arms connected to a head thereabove. This type of construction requires too much headroom for use in unloading loose material from boxcars or for other work such as sewer work where spaces having limited height are encountered.

It is a general object of the present invention to provide an improved hydraulically operated clamshell bucket which is designed for successful use in places where headroom is limited.

A further object of the invention is to provide a bucket of the clamshell type having a horizontally disposed ram and having a bucket supporting head, the said ram and head being so arranged as to require a minimum of working height and being so arranged and constructed that the bucket sections may swing from open to closed position or vice-versa without requiring additional headroom during or after the change.

A further object of the invention is to provide a bucket of the class described which is strong and durable, efficient in operation, relatively inexpensive to manufacture, and otherwise well adapted for the purpose described.

With the above and other objects in view, the invention consists of the improved clamshell bucket, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a plan view of the improved bucket;

Fig. 2 is a side elevational view showing the bucket in closed condition; and

Fig. 3 is a side elevational view showing the bucket in open condition.

Referring more particularly to the drawings, the supporting head is designated generally by the numeral 5 and includes a transverse bar 6 having a hanger eye 7 projecting upwardly from a point midway of the length thereof. A pair of diverging supporting arms 8 extends

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downwardly from each end of the bar 6. The upper ends of the supporting arms are preferably welded as at 9 to the lower surface of the bar 6. For purposes of strength the arms 8 may be formed of angular stock as is illustrated.

The lower ends of the arms on each side are rigidly connected by bolts 10 or any other suitable means to a link 11. It is to be noted that the arms 8 are relatively short and that each link 11 is formed of heavy bar stock so as to be able to support a relatively heavy load.

A pair of grapple members 12, forming the bucket proper, have their outer remote upper corners, when the grapple members are closed, as in Fig. 2, provided with upstanding reinforced ears 13 on each side of the bucket. There are, therefore, two alined ears on each grapple member. Each ear has an inwardly projecting stud 14 extending through an opening 15 in the adjacent end of one of the bars 11. The grapple members are, therefore, pivotally mounted on the ends of the bars 11 for swinging movement from the position of Fig. 2 to the position of Fig. 3.

Connecting the oppositely disposed ears 13 on each grapple member is a rod 15 and there are preferably spacer sleeves 16 and 17 surrounding portions of each rod within the bucket. The inner ends of the sleeves terminate short of meeting to provide central gaps 18 for the reception of bearing members 19 and 20. These bearing members 19 and 20 have openings through which the rods 15 are journalled.

The bearing member 19 is rigidly connected to the outer end of the piston rod 21 of a hydraulic ram 22. The bearing member 20 is rigidly connected to the outer end of the cylinder 23 of the hydraulic ram. By referring to Fig. 2 it is apparent that the hydraulic ram extends horizontally below the bar 6 of the supporting head. The ram is of the double acting type. When hydraulic fluid is pumped under pressure into the line 24, it will cause the piston 21 to be forcibly retracted, and will cause movement of the grapple members from the closed position of Fig. 2 to the open position of Fig. 3. When the direction of flow is reversed, and hydraulic fluid is forced under pressure into the line 25, then the grapple members are moved to the closed position of Fig. 2.

Removably connectable to the forward edge of the bottom of each grapple member 12 by nuts and bolts 26 is a toothed bar 27. When the device is to be used for digging, the toothed members 27 are attached as is illustrated. However, if the bucket is to be used for purposes such as loading

and unloading of bulk material, the toothed plates 27 may be omitted. When they are detached, the grapple members close tightly.

In order to form stops for the closing movement of the grapple members, stop lugs 28, which are welded or otherwise secured to the bars 11, may be employed.

By comparing Figs. 2 and 3, it is clear that the axes of the rods 15 do not change appreciably in vertical position during opening or closing movement. It is also clear that the distance which the bottom teeth project downwardly below the head is about the same in the closed position of Fig. 2 as in the open position of Fig. 3. Thus, both opening and closing movements may be effected while the bucket is in a location such as a freight car or sewer tunnel where limited head room is present.

It is thus apparent that substantially the same amount of headroom is needed whether in open position or closed position and that the arc of movement of the free edge of the grapple member from the position of Fig. 3 to the position of Fig. 2 is such that very little additional headroom is required when a grapple member is midway between the position of Fig. 3 and the position of Fig. 2.

Various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated, as may come within the scope of the claims.

What I claim is:

1. In a clamshell bucket: a pair of elongated spaced generally horizontally extending links; a supporting head including a transverse bar spaced above said links and provided with a hanger eye, said head also including downwardly directed supporting bars rigidly connecting said transverse bar to intermediate portions of said links; a pair of grapple members, the upper outer corners of said grapple members being pivotally connected to the outer ends of said links, and the pivotal connections at corresponding ends of the links being coaxial; and a horizontally extending fluid pressure operated ram pivotally connected at one end to one of said grapple members and pivotally connected at its other end to the other of said grapple members, the axes of the latter pivotal connections being spaced outwardly of and closely above the axes of the pivotal connections between the outer ends of the links and the grapple members and below said transverse bar, the ram being above and close to the plane of said links and below said transverse bar in all positions of pivotal movement of the grapple members.

2. In a clamshell bucket: a pair of elongated, spaced, generally horizontally extending links; a supporting head including a transverse bar spaced above said links and provided with a hanger eye, said head also including downwardly directed supporting bars rigidly connecting said transverse bar to intermediate portions of said links; a pair of bucket members, the upper outer corners of said bucket members being pivotally connected to the outer ends of said links, and the pivotal connections at corresponding ends of the links being coaxial; an upstanding ear formed on each bucket member and laterally outwardly offset from the ends of said links, said ears terminating above said links and below said transverse bar; and a horizontally extending fluid pressure operated ram pivotally connected at one end to the ear of one of said bucket members and pivotally connected at its other end to the ear of the other of said bucket members, the axes of the latter pivotal connections being spaced closely above the axes of the pivotal connections between the outer ends of the links and the bucket members and below said transverse bar, the ram being above and close to the plane of said links and below said transverse bar in all positions of pivotal movement of the bucket members.

ROY O. BILLINGS.

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