H. W. BOTTEN.
GRAB BUCKET.
APPLICATION FILED OCT. 2, 1920.

1,437,392.

Patented Dec. 5, 1922.
2 SHEETS—SHEET 1.

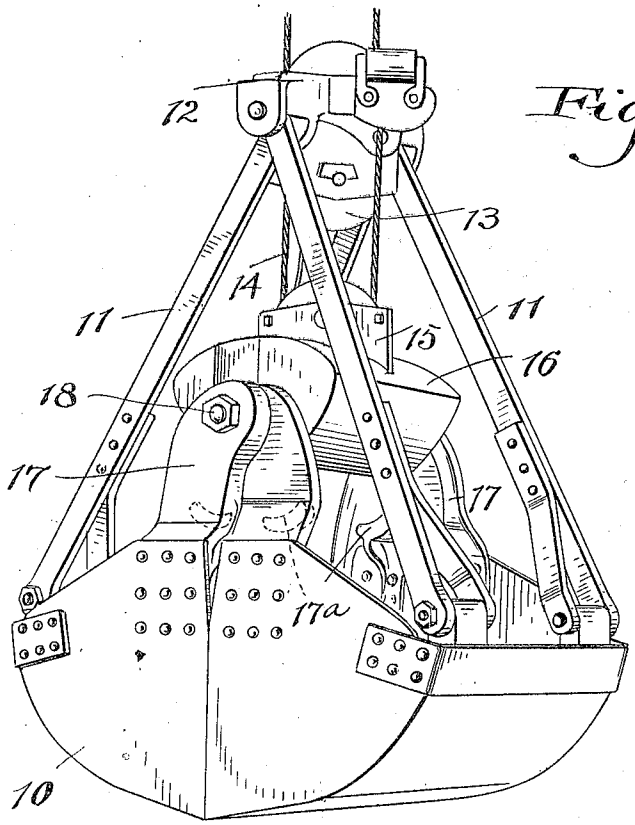


Fig. 1.

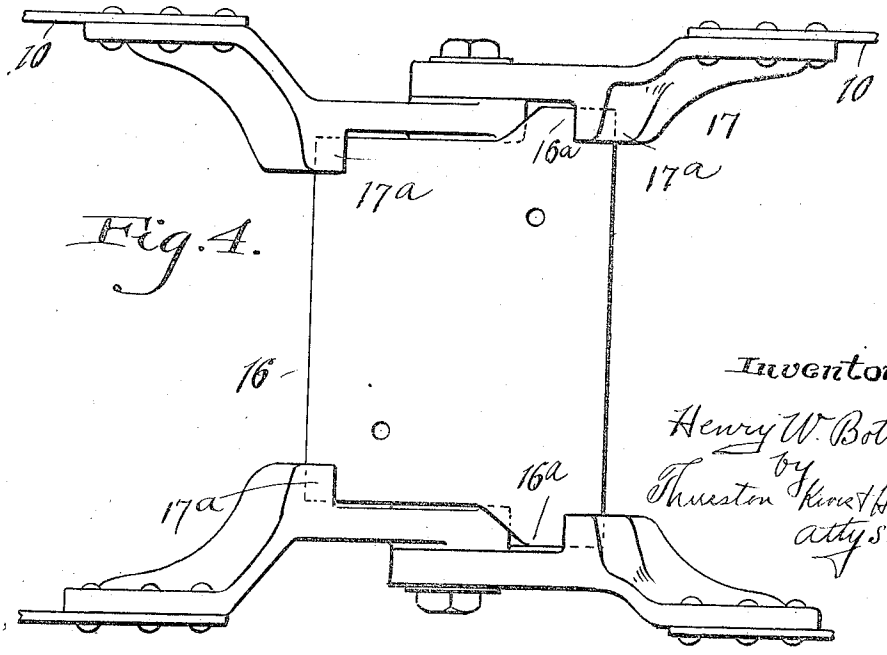


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 2.

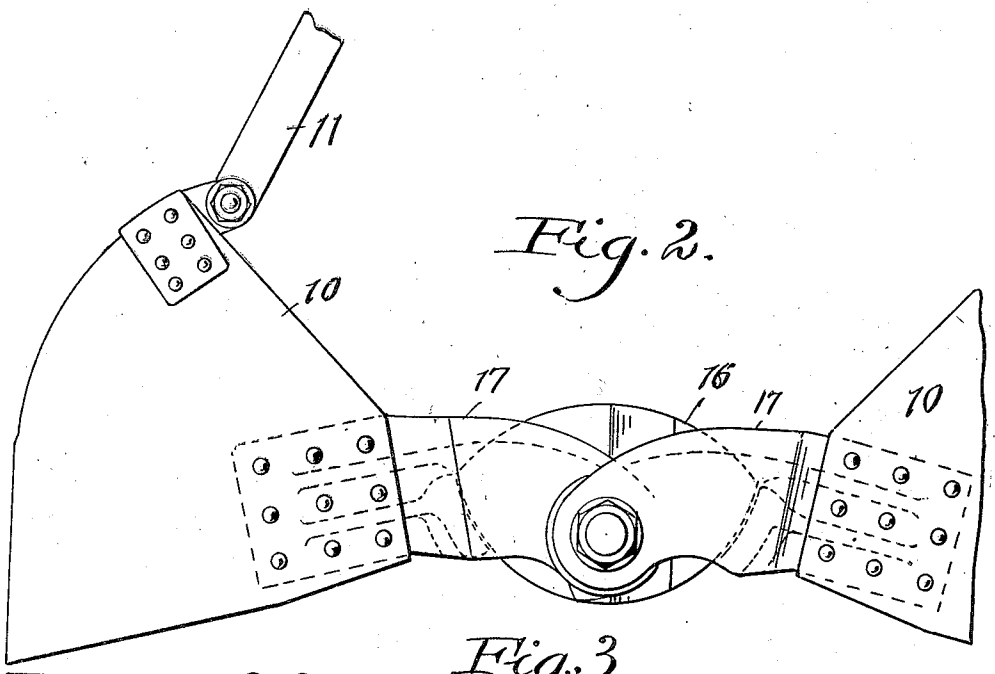
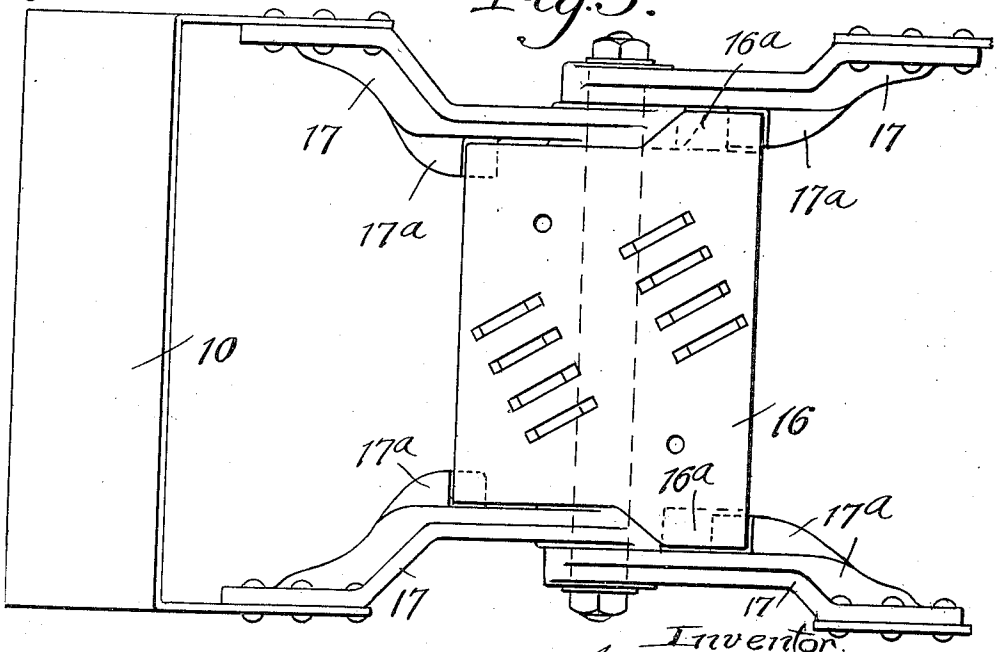


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY W. BOTTEN, OF LAKEWOOD, OHIO, ASSIGNOR TO THE OWEN BUCKET COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

GRAB BUCKET.

Application filed October 2, 1920. Serial No. 414,226.

To all whom it may concern:

Be it known that I, HENRY W. BOTTEN, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Grab Buckets, of which the following is a full, clear, and exact description.

This invention relates to grab buckets of the type employing a counterweight at the axis of connection between the jaws to open the jaws when the jaw closing rope is released and the bucket is suspended by the holding rope.

Heretofore buckets of the counterweight type have employed a counterweight having its center of gravity either at or a considerable distance below the axis of connection of the counterweight with the jaws or of the hinges attached to the jaws. This construction, while desirable in some respects, has the objection that the counterweight extends downward a distance such that when the opened bucket is lowered onto a pile of material the counterweight frequently engages material and prevents the digging edges of the jaws being sunk into the material.

Likewise in buckets of this type, the opening movement of the jaws is usually limited by stops or shoulders on the hinge castings of the jaws, these castings being so designed that the stops or shoulders on adjacent hinges engage each other to stop the opening movements of the jaws when they have been opened a predetermined amount. This construction has the disadvantage that the stops must of necessity be located close to the eyes of the hinges, and in consequence are located at the weakest point of the hinges with the result that occasionally the hinges are broken at the eyes by the sudden engagement of the two pairs of stops especially when the open bucket is dropped onto clay or other hard surfaces.

In accordance with the present invention the counterweight has its center of gravity well above the axis of connection of the jaws or the points of attachment of the hinges with the counterweight, and the counterweight and jaw hinges are specially constructed so as to come into engagement when the bucket is opened so as to hold the counterweight in upright position or to prevent its rotating or tipping sideways when the tension or pull on the closing rope is released, and also stop or limit the opening movement of the jaws.

The invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawings illustrating my invention, Fig. 1 is a perspective view of a bucket embodying my invention; Fig. 2 is a bottom view of the counterweight and adjacent parts with the jaws open; Fig. 3 is an enlarged side view of the same; and Fig. 4 is a top plan view of the same.

The bucket here shown, has a pair of jaws 10, the outer corners of which are pivotally connected by arms or links 11 with a head 12 in the usual manner. The head is provided with the usual upper block 13 having sheaves which are adapted to receive a closing rope 14, the latter also passing about the sheaves of a lower block 15 which is attached to the upper part of a counterweight 16 to which the hinges 17 secured to the inner corners of the jaws are pivotally connected at 18.

This type of bucket is old and well-known, and further description will be confined to the special features of the counterweight 16 and hinges 17. It will be observed both by reference to Figs. 1 and 2 that the counterweight 16 in this instance has its center of gravity well above the stud or bolt 18 by which the hinges are connected to the counterweight. By having the major portion of the weight above the axis of the stud or bolt 18 rather than below it the bottom of the counterweight is well above the digging edges of the jaws when the latter are in full open position as will readily be seen from Fig. 2.

In view of the high center of gravity of the counterweight, the latter would have a tendency to turn or rotate on its axis 18, and turn the block 15 through a half revolution or a portion thereof when the tension on the closing rope is relieved. This would be highly objectionable as it would disarrange the sections of the closing rope passing up and down between the upper and lower sheave blocks.

As long as there is any pull or tension in the closing rope the counterweight will be

held by the closing rope in normal upright position and it is only when the jaws are full open and when the tension is released entirely from the closing rope that there would be any liability of the counterweight rotating about the axis of the bolt 18 to any appreciable extent.

To prevent the counterweight turning when the jaws are full open and to limit the opening movement of the jaws I provide stops on the hinges 17 and I construct the ends of the counterweight so that the stops both on the inside hinges and outside hinges will engage the rounded lower side of the counterweight. I therefore provide special hinges having on the inner sides thereof, stop lugs 17^a, these being arranged on all four of the hinge members 17. However, inasmuch as the inner ends of two of the hinges lie next to the counterweight, and the inner ends of the other two hinges are outwardly therefrom, on one side of the counterweight the latter is provided at its ends with extensions 16^a so that these extended ends of the counterweight will engage the stop lugs of the two outermost hinges, and thus there is eliminated the necessity for extending the stop lugs of the outer hinges inwardly a greater distance than the stop lugs of the inner hinges.

The stop lugs of all four hinges are provided with rounded counterweight engaging surfaces which engage the rounded lower portion of the counterweight so as to stop the opening movement when the jaws reach the full open position and so that when the jaws are in this position the counterweight is positively held in upright position. Therefore though the center of gravity of the counterweight is elevated to a point such that the counterweight will not limit to any undesirable degree the distance that the digging edges of the jaws will sink into the material, the counterweight cannot rotate.

Furthermore, whereas with the prior constructions wherein the stop lugs which engage each other to limit the opening movement of the jaws, were of necessity located close to the eyes of the hinges, in the present construction the lugs or shoulders which engage the counterweight are located relatively remote from the eyes, and in practice, nine or ten inches back from the center of the eyes. By increasing the distance between the center of the eyes of the hinges and the counterweight engaging stops or shoulders, I decrease the distance between the latter and the cutting edges of the jaws and thereby shorten the effective leverage through which is transmitted the force incident to the engagement of the open bucket with the ground or other surface, and therefore reduce the strain at any one part of the hinge casting. Furthermore, the rounded or concave surfaces of the stops on the hinges engage the rounded bottom surface of the counterweight at such an angle, or in such a manner with respect to the direction that the force is exerted, that there is no direct impact in line with the force, and the stops have a tendency to slide on the bottom surface of the counterweight so as to provide a "give" or cushioning action. These features contribute considerably to the durability of the bucket and practically eliminate liability of the hinges breaking even though the bucket should be dropped a considerable distance with the cutting edges of the jaws engaging a hard surface.

Having described my invention, I claim:

1. A grab bucket of the counterweight type having a pair of jaws, a counterweight to which the jaws are connected, a head to which the jaws are attached, upper and lower closing blocks one carried by the head and one connected to the upper part of the counterweight, said counterweight having its center of gravity above the axis of connection between the jaws and the counterweight.

2. In a grab bucket of the counterweight type, a pair of jaws, a head to which the outer portions of the jaws are connected, a counterweight to which the inner portions of the jaws are connected, said counterweight having its center of gravity above its connection with the jaws, and means for holding the counterweight against rotation when the jaws are full open.

3. In a grab bucket of the counterweight type, a pair of jaws, a head to which the outer portions of the jaws are connected, a counterweight, hinge members connecting the inner portions of the jaws to the counterweight below the center of gravity of the counterweight, said counterweight and the hinge members having portions which engage when the jaws reach full open position.

4. In a grab bucket of the counterweight type, a pair of jaws, a head to which the outer portions of the jaws are connected, a counterweight to which the inner portions of the jaws are connected, said inner portions of the jaws having stops adapted to engage the bottom of the counterweight when the bucket is opened.

5. In a grab bucket of the counterweight type, a pair of jaws, a head to which the outer portions of the jaws are connected, and a counterweight, the jaws having hinges which are connected to the counterweight and which have lugs adapted to engage the bottom of the counterweight when the jaws are opened a predetermined amount.

6. In a bucket of the counterweight type, a pair of jaws, a head to which the outer portions of the jaws are connected, a pair of counterweight hinges connected to each jaw, the four hinges being pivotally con-

nected to the counterweight below its center of gravity, said hinges having lugs adapted to engage the bottom of the counterweight when the bucket is full open.

7. In a grab bucket of the counterweight type, a pair of jaws, a counterweight, a head to which the outer portions of the jaws are connected, hinges connected to the inner portions of the jaws and connected together and to the ends of the counterweight, the inner ends of two of the hinges being arranged on the outer sides of the inner ends of the other two hinges, lugs on the inner sides of the hinges adapted to engage the counterweight to limit or prevent its rotation when the jaws are open, the ends of the counterweight having extensions which are engaged by the lugs of the two outer hinges.

In testimony whereof, I hereunto affix my signature.

HENRY W. BOTTEN.