

No. 716,980.

Patented Dec. 30, 1902.

R. J. ASPIN & J. A. ERICKSON.
BUCKET.

(Application filed May 19, 1902.)

(No Model.)

3 Sheets—Sheet 2.

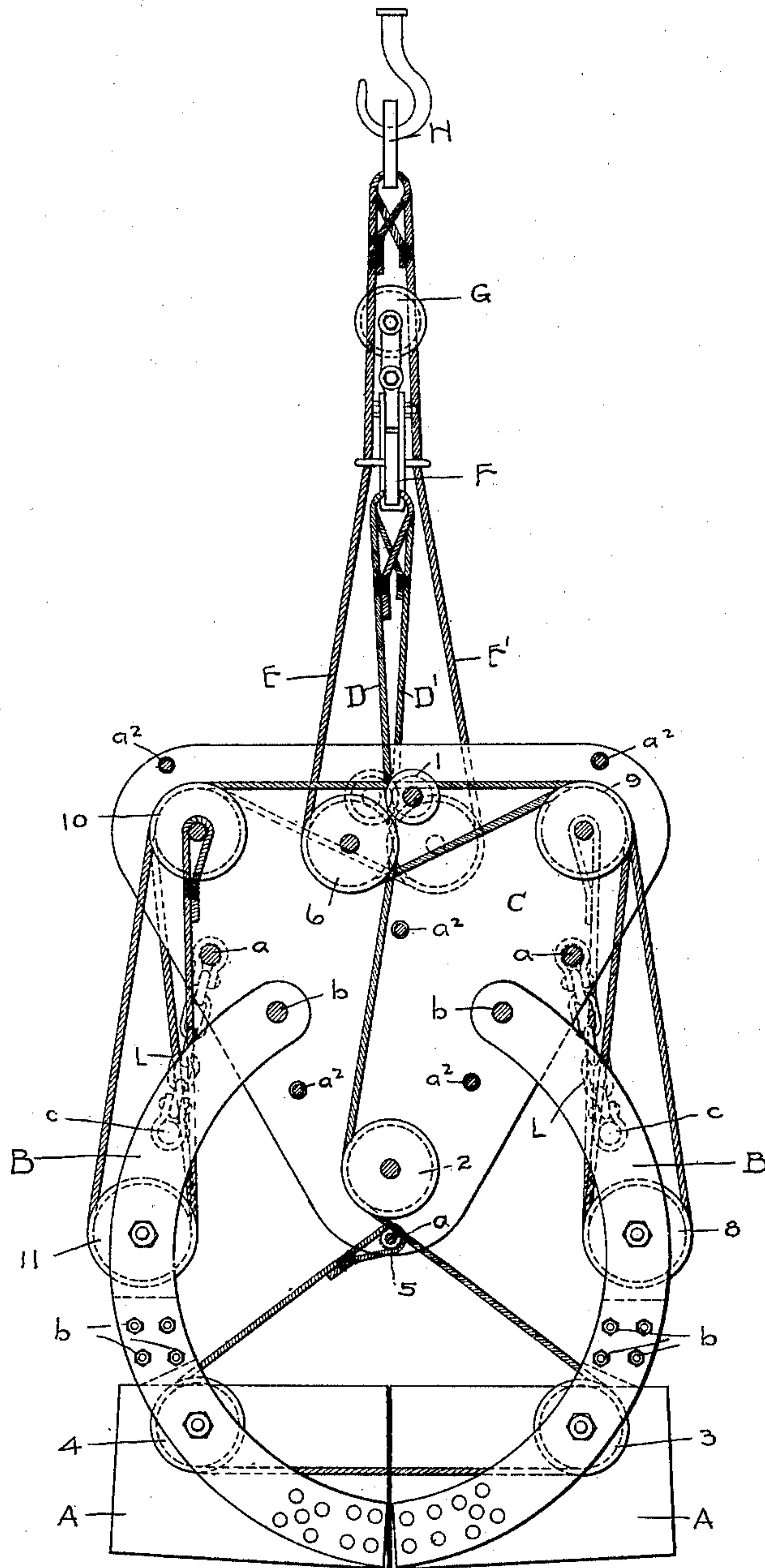


FIG. 2

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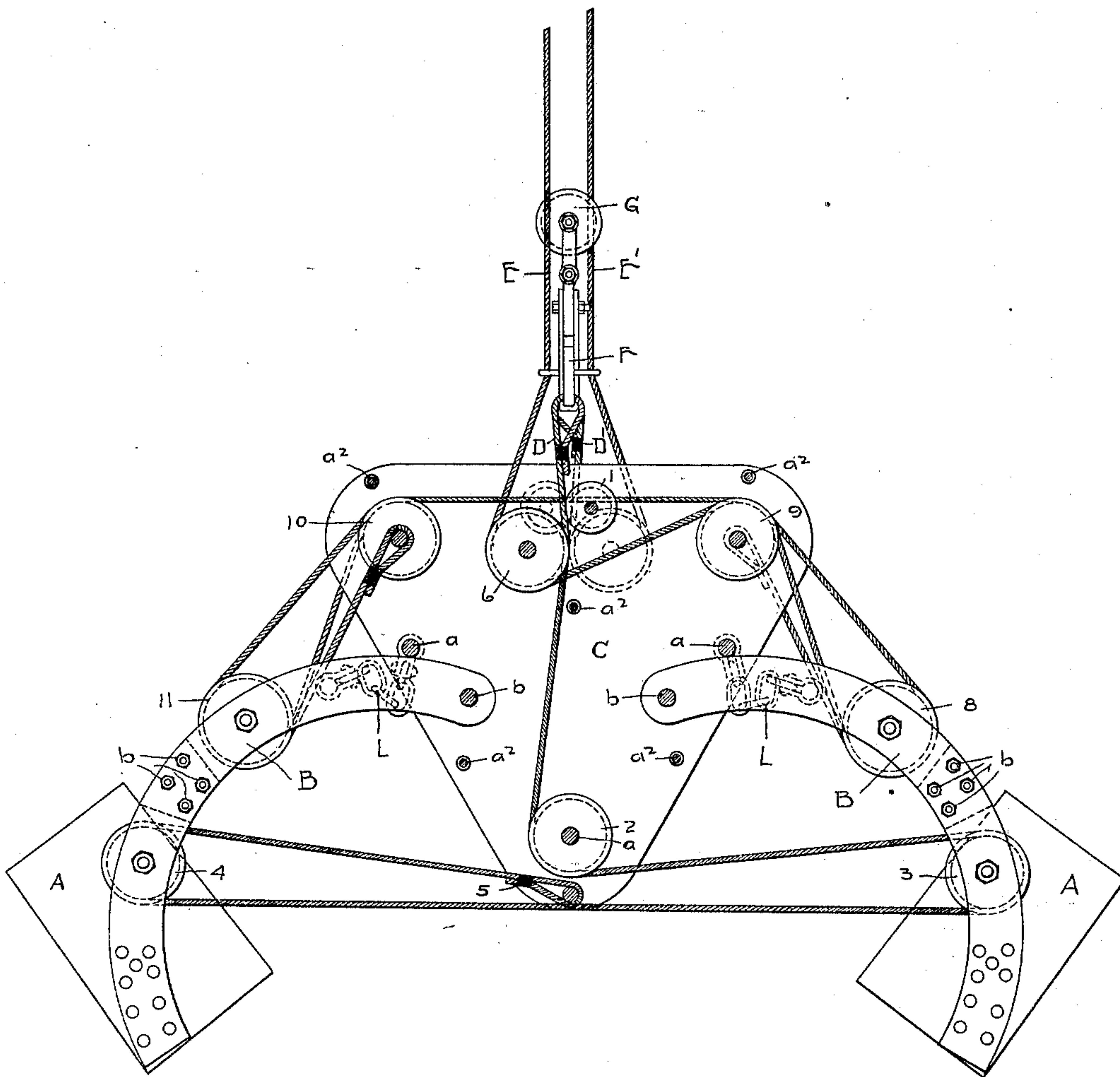


FIG. 3

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UNITED STATES PATENT OFFICE.

ROBERT J. ASPIN AND JOHN A. ERICKSON, OF LORAIN, OHIO.

BUCKET.

SPECIFICATION forming part of Letters Patent No. 716,980, dated December 30, 1902.

Application filed May 19, 1902. Serial No. 107,928. (No model.)

To all whom it may concern:

Be it known that we, ROBERT J. ASPIN and JOHN A. ERICKSON, of Lorain, in the county of Lorain and State of Ohio, have invented a
5 new and useful Improvement in Buckets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

10 Our invention has relation to certain new and useful improvements in buckets of that type commonly known as "clam-shell" buckets and used for the purpose of loading and unloading coal, ore, grain, &c., and also for
15 dredging purposes. Buckets of this type are from the nature of the work which they perform subjected to extremely-rough usage, and as heretofore constructed have been liable to frequent breakage and injury from the vari-
20 ous knocks and strains which they receive in service, making the expense of their maintenance a very large item.

An object of our invention is to provide a bucket of this type which is free from
25 sprocket-chains, cumbersome drums, and other parts which have heretofore been a source of trouble and to make all the parts of simple and durable character, protected as far as possible from injury, generally adapted to withstand rough usage, and put together
30 in such a manner as to permit any part to be quickly removed and replaced.

Our invention is also designed to simplify the operating mechanism used for opening
35 and closing the bucket, to so arrange the same that the bucket will be balanced in operation, and to provide in a bucket of a given height a maximum opening of the bucket sections or trays, thereby particularly adapt-
40 ing it for use in places where the space is limited in height, as in the hold of vessels.

A further object is to provide means whereby if when in use one section or tray of the bucket should encounter an obstruction of
45 sufficient resistance to prevent such section or tray from closing the other section will come up to meet it in order to make the lift; also, to provide means whereby one tray or section of the bucket can be made to hold its
50 load until the other half or section has un-

loaded and cleared itself, and thus prevent scattering of the material being handled.

Other objects and advantages of our invention will hereinafter appear.

With these objects in view our invention 55 consists in the novel construction, arrangement, and combination of parts, all substantially as hereinafter described, and pointed out in the appended claims, reference being had to the accompanying drawings, in which— 60

Figure 1 is an end view showing the bucket closed; Fig. 2, a side view, also showing the bucket closed, one of the housing-plates being removed to more clearly show the arrange-
65 ment of the operating sheaves and cables; and Fig. 3, a view similar to Fig. 2, but showing the bucket open.

The bucket sections or trays A shown in these drawings are carried by four curved arms B, whose upper ends are pivoted to the
70 transverse rods or fixed shafts *b*, supported in the frame or housing plates C. These housing-plates are preferably solid plates of steel, two at each side, placed parallel with each other and inclosing the several sheaves
75 for the operating-cables presently described. They are rigidly braced and connected by the several transverse rods or shafts *a*, which are also formed with spacing collars or shoulders *a'*. The two plates at each side are also
80 individually connected by the short connecting and bracing bolts *a*². The curved arms B are also preferably constructed each of two parallel steel plates, which form a housing
85 for certain of the operating parts and which are rigidly connected and braced by bolts *b* and spacing-blocks *b'*. The two arms at each end are also connected and braced by the rods or shafts *c*.

The opening and closing of the bucket is 90 effected by an arrangement of sheaves and cables now to be described.

D D' designate the two closing lines or cables. Each closing line or cable is connected at one end to a transverse bridle or hoist-bar 95 F, to the center of which is swiveled a block G, from which a cable (not shown) runs to the drum of the hoisting engine or motor. From the bridle F the closing-line at each side is carried centrally through the housing at 100

that side down past a guide pulley or sheave 1, thence under a sheave 2 at the central bottom portion of the housing, thence outward and downward around a sheave 3 on the lower
 5 portion of one of the arms B, thence horizontally across and around a sheave 4 on the other arm B at the same side of the bucket, and thence upward at back to the bottom of the housing, where its end is made fast at 5.
 10 This arrangement of one of the cables D is clearly shown in Figs. 2 and 3, and the arrangement of the other cable is precisely the same. It will be readily seen, the bucket being open, as shown in Fig. 3, that when power
 15 is first applied to the closing lines or cables there is a strong downward pull on the four arms B, which gives the bucket sections or trays A a hold in the material and the required digging power necessary to load them.
 20 Each section is held from swinging in beyond its proper meeting position with the other section by means of jointed links or chains L, which connect the rods or shafts c with two of the transverse rods or shafts a.
 25 Inasmuch as these rods or shafts a are eccentric with respect to the centers b of the arms B, it will be readily seen that these links or chains will effectually limit the inward movement of said arms beyond the positions shown
 30 in Fig. 2. If, however, in operation one of the sections or trays should engage an obstruction of sufficient resistance to prevent it from closing, the other section or tray will come up to its closing position, and the further application of power to the closing-lines
 35 will cause the entire frame to swing on the centers b of the arms B of the obstructed section or tray until such section clears itself and the two sections come together to make
 40 the lift. To further illustrate this operation, suppose the left-hand tray in Fig. 3 to be held by an obstruction. The continued application of power to the closing-lines would first bring the right-hand section up to its normal closing
 45 position, at which point further inward movement on the centers b would be prevented by the chain G. The pull on the closing-lines will then cause the entire frame to turn on the centers b of the arms of the obstructed
 50 tray, the top portion of the frame moving toward the right. The center of movement of the arms B of the right-hand tray is thus changed from their own centers b to the centers b of the other pair of arms, causing the
 55 said tray to dig deeper and tend to force its way under the obstruction or to a position where the trays will have a powerful lift on the said obstruction. This is an important feature of our bucket and one which, in so far
 60 as we are aware, has not been present in any prior bucket of this type.

By bringing the closing lines or cables up through the center of the housing in the manner described the bucket is caused to be properly balanced when hanging from these lines.
 65

Each of the opening-lines E E' is connected

at one end to a transverse bridle H, (above the bridle F,) to which is attached a line (not shown) running to a second drum of the engine-motor. From this bridle the line is carried down and under a sheave 6 at the central upper portion of the housing, thence outward and over a sheave 7 at one of the upper corner portions of the housing, thence down and around a sheave 8 on the central portion of
 75 one of the arms B, thence back, up, and over a sheave 9, placed side by side with the sheave 7, thence horizontally across and over a sheave 10 at the opposite corner of the same housing, thence down and around a sheave 11 on
 80 the other arm B at the same side of the bucket, and thence up, where its end is made fast to the axle of the sheave 10. The arrangement for the line or cable E is clearly shown in Figs. 2 and 3, and the arrangement of the line-cable E' at the opposite side of the bucket is
 85 precisely the same, except that, as indicated in dotted lines in Figs. 2 and 3, it is carried in the opposite direction—that is to say, its sheaves 7 and 10 are located at the opposite
 90 corner of the housing from the sheaves 7 and 10 at the other side, and its fixed end is brought up and secured at a diagonally opposite point from the end of the line or cable E. This arrangement is for the purpose of
 95 keeping the bucket properly balanced when the closing-lines take the load required to open the bucket. It will be readily seen that when power is applied to these lines a very powerful leverage is exerted on the arms B
 100 to move them to the positions shown in Fig. 3. For some purposes, as in loading cars, it is desirable in order to prevent scattering of the material that only one section or tray of the bucket be emptied at a time. This may
 105 readily be done with our bucket by resting one section or tray on the edge of the car and applying power to the lines E E'. The weight of the tray, which rests on the car, will prevent it from opening, and the entire frame
 110 will turn on the centers of that tray, while the other tray will swing over the car and empty. The bucket can then be raised somewhat by operation of the closing-lines and the other tray swung over the car and emptied. This we believe to be an entirely new
 115 feature in buckets of this type.

By the housing and arm construction described we protect the various sheaves from damage by being struck or coming in contact
 120 with surrounding objects when the bucket is in operation. The entire construction, it will be seen, is a very rigid and durable one without unduly increasing the weight of the bucket, and the manner in which the power
 125 is applied makes it very powerful in operation. The parts being connected by bolts and nuts can be readily taken apart for repairs.

It will also be noted that the bucket may be operated by only two lines or cables to the
 130 engine-drums for both opening and closing the bucket instead of four.

We have found the bucket to be of great utility, not only for loading and unloading ore, coal, and the like to or from boats or cars, but also for excavating and removing snags, boulders, and other obstructions from the bottom of navigable channels. For different classes of work the bucket sections or trays can be secured at different angles, according to the degree of hardness of the material to be handled.

We do not wish to limit ourselves to the particular arrangement and combination of parts herein shown and described, as various changes may be made in the details thereof without departing from the spirit and scope of our invention as defined by the following claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a bucket of the character described, the frame having the side housings formed of parallel rigid metallic plates, and the tray-carrying arms pivoted to said housings and also formed of rigid parallel plates or bars, forming housings.

2. In a bucket of the character described, the combination of the frame, the curved tray-carrying arms pivoted to said frame, and the independent opening and closing lines or cables working over sheaves or pulleys on the frame and arms, said frame and arms being constructed of parallel rigid metallic plates between which the sheaves or pulleys are journaled and forming housings therefor.

3. In a bucket of the type described, the combination with the frame, and the tray-carrying arms pivoted thereto, of means for opening the trays, consisting of two central lines or cables, each of which is made fast to the frame at one end, and which is carried over a system of sheaves or pulleys on the frame and arms, whereby when power is applied to said lines or cables, the said arms will be drawn together in the manner described.

4. In a bucket of the character described, the combination with the frame, the tray-carrying arms pivoted thereto, and the trays secured to said arms, of means for closing the trays, consisting of two closing lines or cables, one at each side, made fast at one end to the frame and carried over a system of sheaves or pulleys on the frame and arms, and a transverse bridle to which the opposite ends of the lines or cables are connected and to which the power is applied.

5. In a bucket of the character described, the combination with the frame, the tray-carrying arms pivoted thereto, and the trays carried by said arms, of the two central closing-lines each made fast at one end of the frame, and passing thence around pulleys or sheaves on the lower portions of said arms and thence around pulleys or sheaves on the

frame, and stops for limiting the inward swing of said arms.

6. In a bucket of the character described, a frame, two pairs of tray-carrying arms pivoted to said frame on different centers, a system of cables for opening and closing said arms, and sheaves on the arms and frame forming bearings for said cables, the closing-cables and their bearing-sheaves being arranged to permit a pivotal movement of the frame on the centers of said arms under certain conditions.

7. In a bucket of the character described, the frame, the two pairs of tray-carrying arms pivoted thereto, said frame also being capable of a pivoted movement on the centers of both pairs of said arms, together with closing lines or cables each having one end fast to the frame and each passing around pulleys or sheaves on one of each pair of said arms.

8. In a bucket of the character described, the combination of a frame, of two trays pivoted thereto on different centers, and means for limiting the closing movement of each tray on its own centers.

9. In a bucket of the character described, the combination of a frame, two trays pivoted thereto on different centers, the said frame also being capable of a pivoted movement on each of said centers, and means for limiting the closing movement of each tray on its own center, whereby under certain conditions, further closing movement thereof will, through the said frame, be from the centers of the other tray.

10. In a bucket of the character described, the combination with a frame, and the two pairs of tray-carrying arms pivoted to said frame, of the two opening lines, or cables, each of said lines being made fast to the frame at one end and passed over a system of pulleys on the frame and also each over a pulley on the intermediate portion of one arm of each pair of arms.

11. In a bucket of the character described, the combination with a frame, and the two pairs of tray-carrying arms pivoted to said frame, of the two opening lines, or cables, each of said lines being made fast to the frame at one end and passed over a system of pulleys on the frame and also each over a pulley of the intermediate portion of one arm of each pair of arms, the two lines or cables being carried in reverse directions around their respective pulleys and having their fixed ends made fast to diagonally opposite portions of the frame.

12. In a bucket of the character described, the combination of the frame having the housings at each side, the four curved tray-carrying arms pivoted to said housings, a sheave or pulley on the lower portion of each of said arms, a sheave or pulley on the intermediate portion of each arm, a system of sheaves or pulleys journaled in each of said

housings, the two closing lines or cables each
 made fast at one end to the frame and thence
 each passed around the pulleys or sheaves on
 the lower portions of two of said arms and
 5 thence around pulleys or sheaves in the hous-
 ings, a bridle to which the opposite ends of
 said lines or cables are connected, the two
 opening-lines made fast at one end to the
 frame and each passing around the pulleys or
 10 sheaves on the intermediate portions of two
 of the arms and thence and also around pul-

leys or sheaves in the housings, and the bridle
 to which the opposite ends of said opening-
 lines are connected.

In testimony whereof we have affixed our 15
 signatures in presence of two witnesses.

ROBERT J. ASPIN.
JOHN A. ERICKSON.

Witnesses:

R. H. WATERMAN,
D. W. LAWRENCE.