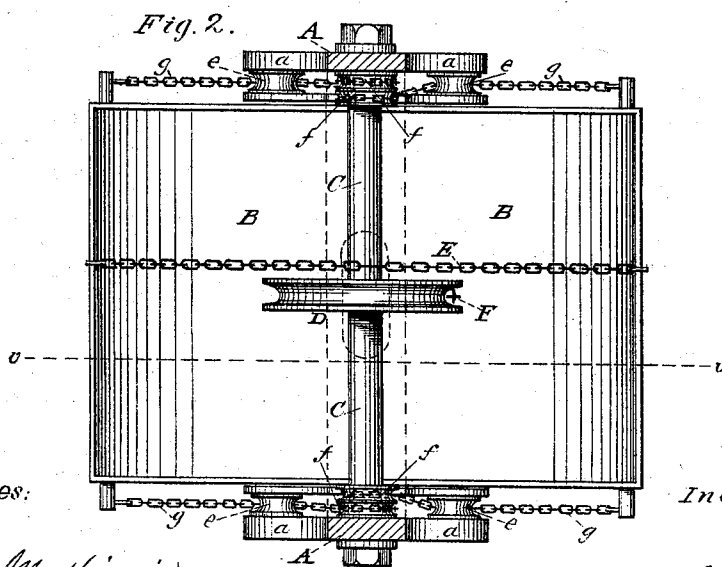
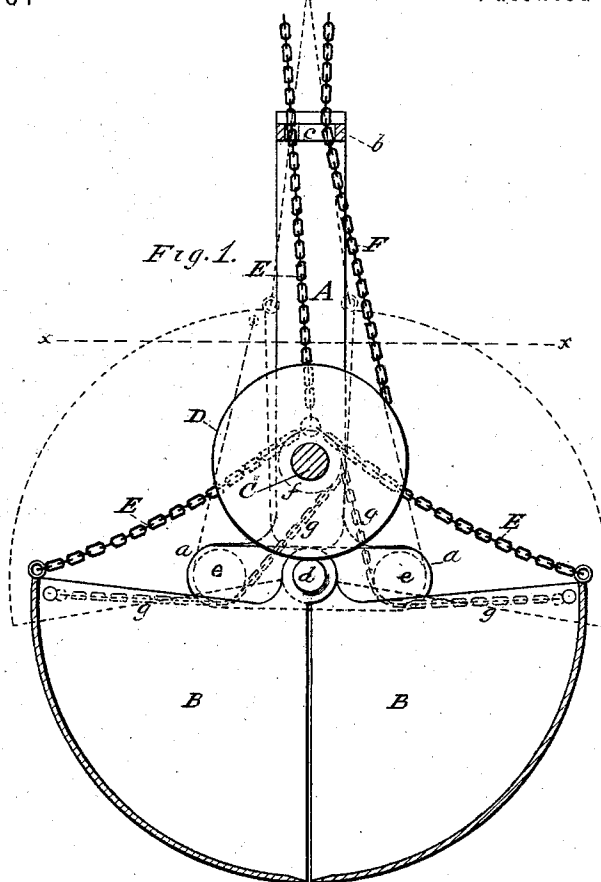


A. E. HALL.
Dredging-Scoops.

No. 149,750.

Patented April 14, 1874.



Witnesses:

Chas M. Higgins.
Arthur C. Fraser.

Inventor:

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UNITED STATES PATENT OFFICE

ALBERT E. HALL, OF LE ROY, NEW YORK, ASSIGNOR TO LEVI HAYDEN, OF NEW YORK CITY.

IMPROVEMENT IN DREDGING-SCOOPS.

Specification forming part of Letters Patent No. 149,750, dated April 14, 1874; application filed March 2, 1874.

To all whom it may concern:

Be it known that I, ALBERT E. HALL, of Le Roy, Genesee county, New York, have invented an Improved Excavating-Scoop, of which the following is a specification:

This invention relates to that class of excavating scoops or grapples used more especially in submarine dredging, which are commonly termed "clam-shell," consisting of a semi-cylindrical bucket formed in halves, each hinged to an upright frame, and the whole suspended by two chains, termed, respectively, hoisting and lowering, or closing and opening chains, from a boom-derrick, the chains being so connected with the bucket, and so manipulated from aboard the dredge, that, as the weight of the scoop is borne by either chain successively, the bucket is alternately opened and closed to effect the desired result; and it consists in the combination, with the upright frame to which each half of the bucket is hinged, of a transverse shaft free to revolve in bearings in said frame, and provided on each end with a double-grooved pulley of small diameter, and at or near its center with a single-grooved pulley of large diameter, the small pulleys being connected with chains attached to the outer corner of each half of the bucket, while the large pulley is connected with the hoisting-chain, each half of the bucket being also connected directly with the lowering-chain, which also passes over the boom of the derrick, and both it and the hoisting-chain connect with the winding-drums on board the dredge, the whole being so arranged that, as the scoop is lowered, the weight is borne by the lowering-chain, and the bucket is caused to open, the motion of which unwinds the chains from the small pulleys, and winds the slackened hoisting-chain upon the large pulley; but when the scoop is being raised the weight is borne by the hoisting-chain, which then becomes unwound from the large pulley, rotating the shaft and winding the chains again upon the small pulleys, causing the bucket to close.

In the annexed drawings, Figure 1 is a vertical section of my improved scoop or grapple on line *vv* of Fig. 2, which is a plan view, the

upright frame being removed on line *xx* of Fig. 1.

As represented, A is the upright frame of the apparatus, which is formed of two standards joined at their tops by a transverse bar, *b*, provided with an aperture, *c*, for the passage of the hoisting and lowering chains F and E, which suspend the scoop from the boom of the derrick, and connect with the machinery on board thereof. On the pin *d* at the lower end of the frame each half of the bucket B B is hinged, and to the frame above the bucket the transverse shaft C C is journaled. Upon each end of the shaft, and close to the standards of the frame, small double-grooved pulleys *ff* are secured, while between the two, and, preferably, on the center of the shaft, is secured a large single-grooved pulley, D. To the corners of each half of the bucket chains *gg* are secured, which pass around guide-sheaves *ee*, journaled in the arms *aa* of the frame, extend to and connect with the small pulleys *ff* upon the ends of the shaft C, the chains from both halves of the bucket winding upon the same side of the pulleys, as shown more clearly by the dotted lines in Fig. 1. To the periphery of the large pulley D the hoisting-chain F is secured, and winds upon the same side as the small chains *gg*, as shown in the figures. Each section of the bucket is connected at its upper edge with the lowering-chain E, which is placed a little one side of the pulley D, as shown.

As represented by the full lines in the drawings, the bucket is closed and in the act of being raised, the weight being borne by the hoisting-chain F, while the lowering-chain E is slackened and the small chains *gg* wound upon the pulleys *ff*, while the hoisting-chain F is unwound. In this position, the entire weight of the scoop and the contents of the bucket being borne by the chain attached to the pulley D, the strain tends to further rotate the shaft with its pulleys and wind up the chains *gg*, and it thus keeps the bucket closed with great force. This strain also acts at a mechanical advantage, as the leverage gained by the large wheel D, in connection with the small ones *ff* is very great, and causes the bucket

or grapple to hold with a very strong grasp any object which it seizes.

When the bucket is being lowered the chain F is slackened, and the weight is borne by the chain E, which, being connected directly with each section of the bucket or grapple, the strain thus brought upon it causes the jaws or sections to open, as represented by the dotted lines in Fig. 1. This movement unwinds the small closing chains *g g* from the small pulleys *f f*, and thus rotates the shaft C in the reverse direction, and winds the slackened hoisting-chain F upon the large pulley D, so that, when the scoop is again raised, the strain brought on the chain F will again rotate the pulley D and shaft C, wind in the chains *g g*, and close the bucket.

In the drawings I have shown my invention applied to a tight scoop for excavating purposes, but it is equally applicable to the skeleton form of bucket, constructed with strong teeth for grappling hard solid bodies, as rocks, logs, &c., and when this form of bucket is used, I prefer to pivot all the teeth thereof directly upon the transverse shaft C, and, if preferred, the sections of the tight bucket may also be so pivoted. I also contemplate pivoting the bucket to the outside of the standards of the frame, so that the guide-sheaves *e e*, pulleys *f f*, and chains *g g*, will be brought within the bucket.

The advantages of my invention are: First, simplicity of construction and operation, as the operative parts of the apparatus are of such a nature that there is no liability of their getting out of order in the ordinary uses to which they are put; and as the strain and

wear are borne chiefly by the chains, they can be very readily and economically repaired, when necessary, by the addition of a link, while the sheaves and pulleys are so situated, and of such size and strength, that there is little liability of their being injured by any force to which they are exposed; second, greater leverage is secured, so that a stronger gripe can be effected on the object seized by the jaws of the bucket or grapple; third, as all the operative mechanism is situated in the lower part of the frame, the frame can be made quite short, and thus not only effect a great saving in material, but thereby lower the center of gravity of the apparatus, which is of great importance, as when the apparatus is lowered upon an irregular surface, as rocks, there is no liability of its falling over upon its side, as is the case with those now in use, which are necessarily formed with very high frames. This feature also enables a shorter boom to be used, which is an additional advantage.

I claim as my invention—

The shaft C, provided with the wheel D and pulleys *f f*, and mounted in a frame to which is hung the bucket B B, in combination with the chains *g g* and F, and lowering-chain E, arranged and operating substantially as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALBERT E. HALL.

Witnesses:

CHAS. M. HIGGINS,
ARTHUR C. FRASER.