

J. HOWE, Jr.
DREDGING-MACHINE

No. 178,930.

Patented June 20, 1876.

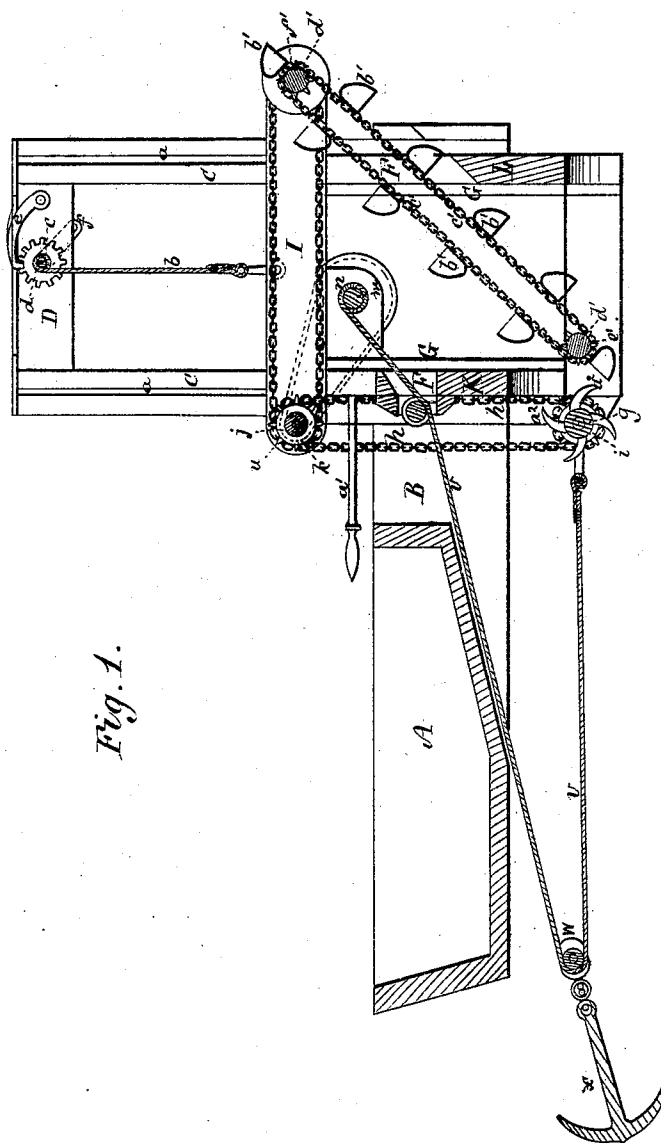


Fig. 1.

Witnesses.
H. Hummell.
M. Boardman.

Inventor.
John Howe Jr.
A. Curtis, Atty.

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Fig. 2.
Enlarged.

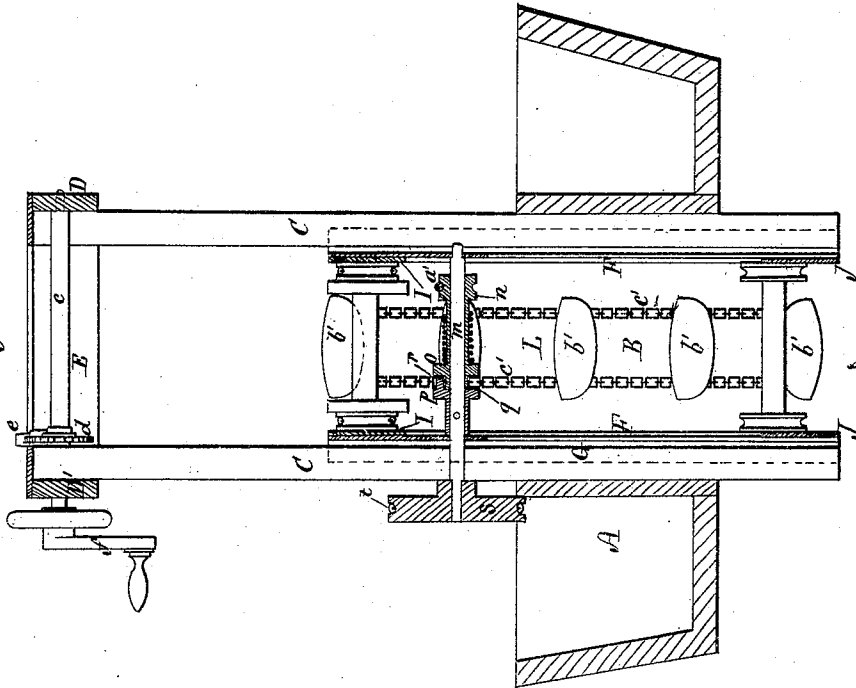
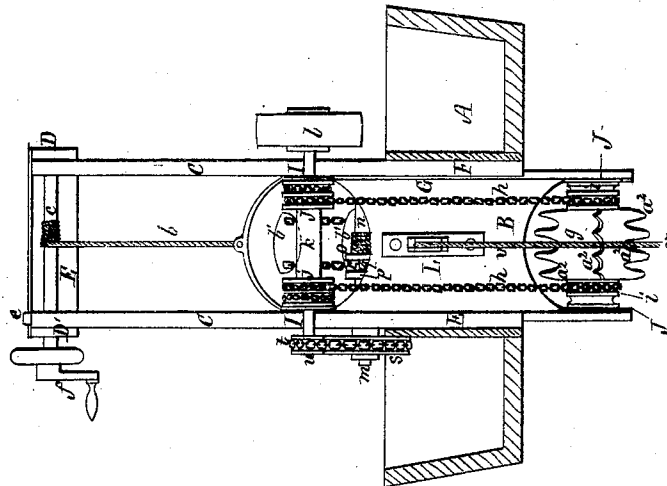


Fig. 3.



Witnesses.
J. Hunniewell.
W. Boardman.

Inventor.
John Howe Jr.
J. Curtis. Atty.

UNITED STATES PATENT OFFICE

JOHN HOWE, JR., OF EAST BOSTON, MASSACHUSETTS.

IMPROVEMENT IN DREDGING-MACHINES.

Specification forming part of Letters Patent No. **178,930**, dated June 20, 1876; application filed March 18, 1876.

To all whom it may concern :

Be it known that I, JOHN HOWE, JR., of East Boston, Suffolk county, Massachusetts, have invented certain Improvements in Dredging Machinery, of which the following is a specification:

These improvements relates to machinery for removing deposits of silt from harbors, estuaries of rivers, and other localities, or for land service, and consists, mainly, in the following elements: First, "a vertically-sliding carriage, carrying the dredging-buckets, which are mounted upon endless chains traveling about suitable drums situated at the top and bottom of the said carriage; secondly, in suspending the said carriage from a horizontal shaft, mounted in suitable bearings at the top of the frame which steadies and guides the movements of the carriage, the shaft being provided with a crank, and with a ratchet-wheel and dog, in order that the altitude of the said carriage and traveling buckets with respect to the vessel in which the machine is placed, or the soil to be dredged, may be varied, as occasion requires; thirdly, in the employment of a windlass, mounted loosely upon a horizontal shaft which spans the carriage, and clutched to the latter in a suitable manner, the rope or chain from such windless being attached to a kedge, or other stationary object, and the purpose of the windlass and kedge being to warp the vessel slowly ahead as the dredging operation proceeds, and the clutch being to throw the windlass into action, or allow it to remain idle; fourthly, in the application to the forward part of the machine of a rotary or otherwise operating toothed drum or breaker, or equivalent object, for loosening, detaching, or disturbing hard soil, or other impediments which might obstruct the working of the traveling buckets.

The drawings accompanying this specification represent, in Figure 1, a longitudinal section; and in Figs. 2 and 3 transverse sections of a machine embodying my invention.

Referring to such drawings it will be seen that A represents the vessel in which the machine is erected, such vessel being a scow of any suitable character sufficiently large and steady to support the machine. Within the vessel A, and preferably at its extreme rear

end or stern, I build a vertical well or passage-way, B, and I erect at the corners of this well upright posts C, &c., spanned at top by suitable side rails D D', and end rails E, a vertical groove, *a*, being formed in each post to receive a spline or rib projecting laterally from the side corner-posts F of the carriage G, which supports the traveling dredging-buckets. The said carriage G is a skeleton structure, composed of the corner-posts F, top and bottom side rails I and J, and cross-bars or braces K L, and is suspended by a rope or chain, *b*, from a horizontal cross-shaft, *c*, which spans the top of said carriage, and is provided at one end with a toothed wheel, *d*, with which a dog, *e*, pivoted to the adjacent rail D, operates, a crank, *f*, being affixed to the rear end of said shaft by which it may be rotated upon release of the dog. By means of the suspensory *b*, shaft *c*, and crank *f*, the carriage G and its adjuncts may be raised or lowered, as occasion requires, while the wheel *d* and dog *e* holds such carriage in any desired position. To the lower front part of the carriage G I attach, by suitable journals, a rotary cylinder, *g*, and I arm the periphery of this cylinder with a series of teeth, &c., bars, or other projections *a*² *a*², &c., which shall break up, loosen, or disturb hard soil, stones, or other obstructions, and prepare the way for the effectual working of the traveling lifting-buckets.

I do not confine myself to any precise form of the breaker above named, as I consider my invention, in this respect, to consist in the employment of a device located in advance of the lifting-buckets, to prepare the way for the latter. The breaker *g* is rotated by an endless chain, *h*, traveling about a pulley, *i*, fixed to each of its journals, and about a second pulley, *j*, affixed to each end of a horizontal transverse shaft, *k*, which is mounted in bearings in the upper forward part of the carriage G, the front end of such shaft being furnished with a pulley, *l*, by which power from an engine is applied to rotate the shaft and pulleys, and put the breaker in rotation.

More than one instrument or breaker may be employed to prepare the way for the elevating-buckets, and the position of the same may be greatly varied from that herein shown.

Within the upper part of the carriage G, and spanning the same, I mount a horizontal transverse shaft, *m*, and upon this shaft I mount, loosely, a windlass, *n*, the hub *o* of such windlass being connected with a collar, *p*, on the shaft by a clutch, *q r*.

The shaft *m* is rotated by means of a pulley, *s*, fixed to one extremity, and connected by a rope or chain, *t*, with a pulley, *u*, fixed to the adjacent end of the shaft *k*.

A hawser or chain, *v*, is connected at one end to the windlass *n*, and its other end carried thence to and about a pulley, *w*, attached to the head of a kedge or anchor, *x*, or to any suitable object in advance of the vessel, and thence returned and secured to a yoke, *y*, attached to the lower part of the carriage G.

When it is desired to advance the vessel and machine through the water, the windlass is clutched to the shaft *m* by a hand-lever, *a*¹, and the windlass thereby put in motion, and the winding of the hawser about it causes the vessel to forge slowly ahead. In lieu, however, of moving the vessel or scow in which the machine is situated, I propose, under some conditions, to allow the vessel to remain stationary, and feed or move the machine along in or upon it, such vessel being constructed with a long well, to enable this to be done.

The gang of buckets for lifting the silt from below the machine are shown at *b' b'*, &c., as attached to chains *c' c'*, which travel about sprocket-wheels *d' d'* affixed to opposite ends of rotary drums *e' f'*, the first-named drum *e'* being mounted, by suitable journals, within the lower forward part of the carriage G, and immediately in rear of the breaker or loosening cylinder *g* before named, while the drum *f'* is situated at the extreme upper rear corner of the said carriage G, the chains *c'*, as a consequence, traveling in a direction obliquely to the longest plane of the carriage.

The buckets or scoops *b'* are to be of such shape and material as shall best adapt them to the service required of them, and, although I have premised the description of my invention by the statement that it is designed to remove submarine deposits of silt, it is capable, with some slight changes, of performing the duties of a steam-shovel on land; and I propose adapting it to this purpose as well as to submarine purposes.

The operation of this machine is as follows, it being understood that the vessel A is moved to a wharf, kedge, or other stationary object, by the hawser or warp-line *v*. By means of the shaft *c* and the suspensory *b* the carriage G is lowered until the breaker is sunken to the sufficient depth in the silt or soil to be removed. The driving-shaft *k* is now put in rotation and the breaker *g* revolved, while, at the same time, the buckets *b'* begin to ascend the inclined plane which they travel. The soil below the machine is disturbed or loosened by the breaker *g* and taken up, in succession, by the buckets *b'*, and by the latter carried upward to and over the drum *f'*, and thence precipitated into the proper vessel which receives it. My object in placing the machine at the extreme rear end or stern of the vessel A is that the soil, dumped by each bucket as it passes the apex of the drum *f'* and is inverted, shall be precipitated directly into a scow secured to the said stern, thus avoiding the necessity of an intermediate chute or vehicle. As fast as the buckets take up the soil immediately in advance of them the attendant clutches the windlass *n* to the shaft *m*, by which means the vessel A forges slowly ahead, and the speed of the windlass, or the times at which it is allowed to be in rotation, are to be governed by the character of the soil and the degree of rapidity with which it is removed.

If the vessel A is moored to a kedge or other object whose position is to be shifted, such kedge is, as soon as such vessel closely approaches it, to be taken up and carried on, in advance of said vessel, as far as the warp-hawser *v* will permit, and then dropped, and these respective movements are repeated until the intended dredging operation is completed.

I claim—

The combination, in a dredging-machine, with the vertically-adjustable sliding bucket-frame, of the inclined buckets, and the breaker mounted on the lower part of the sliding frame independently of and in advance of the buckets, said parts being constructed and arranged for operation as herein shown and described.

JOHN HOWE, JR.

Witnesses:

F. CURTIS,
W. E. BOARDMAN.