C. O. DAVIS.

DREDGING-MACHINE.

No. 183,543. Patented Oct. 24, 1876.

Fig: 1.

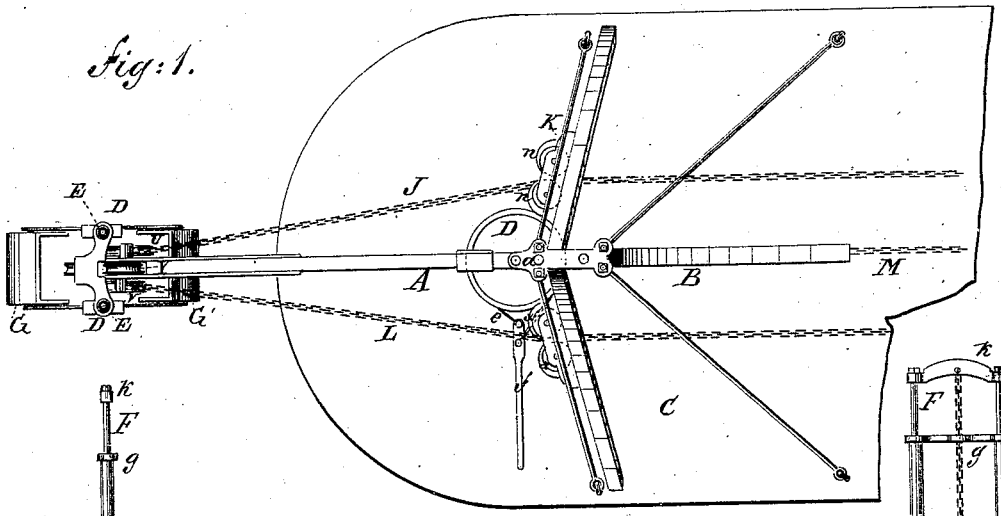


Fig: 2.

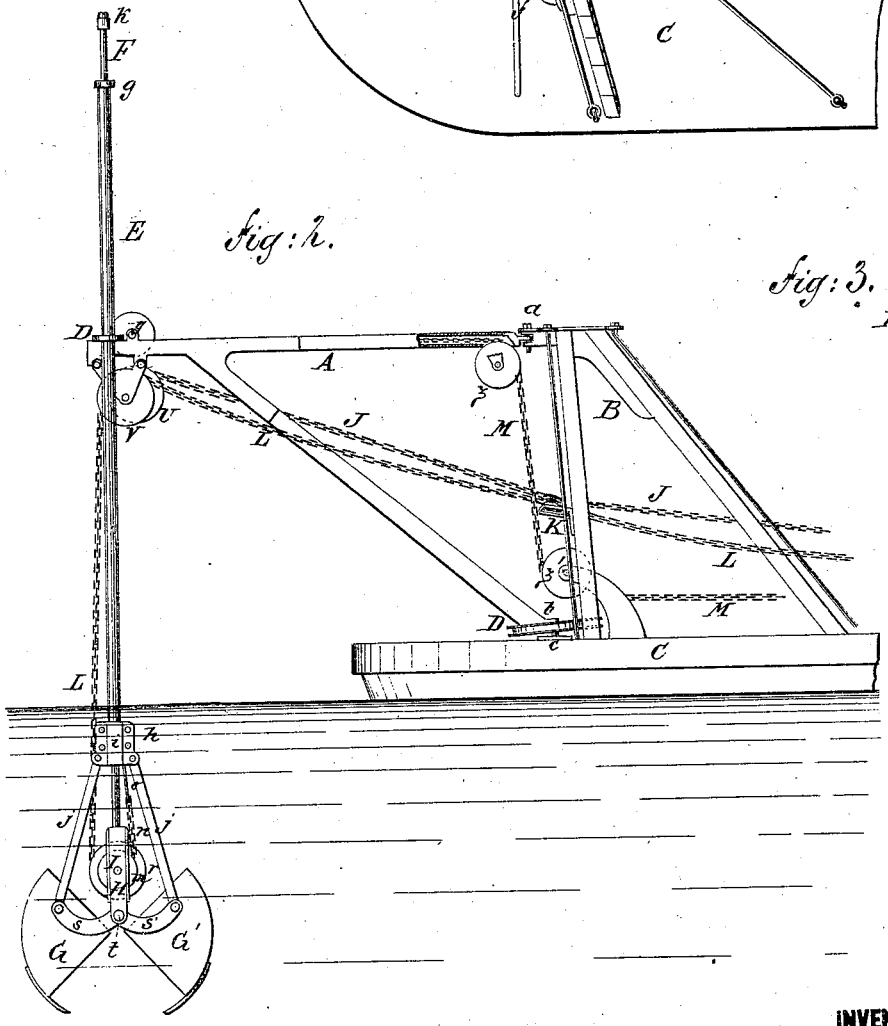
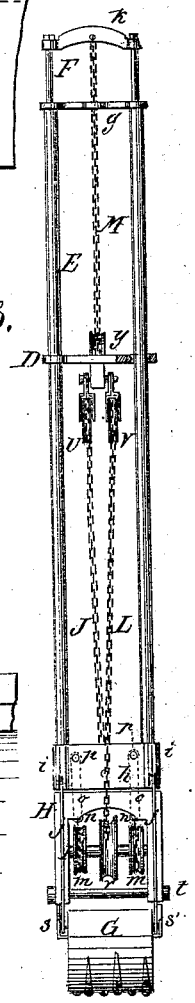


Fig: 3.



WITNESSES:

Chas. Nida

John Goethals

INVENTOR:

C. O. Davis

BY

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES O. DAVIS, OF PORTLAND, MAINE.

IMPROVEMENT IN DREDGING-MACHINES.

Specification forming part of Letters Patent No. **183,543**, dated October 24, 1876; application filed October 2, 1876.

To all whom it may concern:

Be it known that I, CHARLES O. DAVIS, of Portland, in the county of Cumberland and State of Maine, have invented a new and Improved Dredging-Machine, of which the following is a specification:

Figure 1 is a plan view of a dredge embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a front elevation of a portion of the same.

My invention relates to improvements in that class of dredging-machines known as "clam-shell dredges;" and it consists in the arrangement of a crane that swings on an inclined axis, the various parts of which are rigidly fixed together, and not capable of vertical motion. The said crane is provided with a friction-wheel at its lower pivot, which is encircled by a metallic strap, which is tightened by a suitable lever. It also consists in the arrangement in guides at the end of the crane-arm of vertical tubular shafts or supports, and rods or guide-poles passing through the said shafts, for operating the dredge-buckets. It also consists in an arrangement of chains, by which the buckets are raised and lowered, and opened and closed. It further consists in a chain attached to a yoke, which connects the upper ends of the tubular shafts, or to the yoke that connects the upper ends of the rods or guide-poles, and runs under a pulley at the ends of the crane, by means of which the buckets are held down, as hereinafter more fully described.

The object of the invention is to obviate the difficulties experienced in operating dredges of ordinary construction, and provide a dredge whose buckets can be held down to their work with more or less force.

Referring to the drawing, A represents a crane, which may be of any ordinary construction, provided the parts of which it is composed are rigidly attached together. The axis of the said crane is inclined slightly toward the front of the machine, so that the natural tendency of the crane is to swing to the center-line of the boat which supports it.

The swinging part of the crane A is pivoted to the standing portion B at *a*. The lower pivot of the crane (indicated by *b*) has its bearing in a step, *c*, secured to the deck of the boat C. Upon this lower pivot a friction-wheel, D, is secured, which is of such diameter that a metallic strap, *e*, which encircles it, may be contracted by the lever *f*, so as to stop and hold the crane in any desired position.

Guides D are attached to the outer end of the arm of the crane A for guiding the vertical tubular shafts E. These shafts are rigidly connected at their upper ends by a yoke, *g*, and at their lower ends by the slotted piece *h*. The ends of the slotted piece *h* are clamped to the tubular shafts E by the pieces *i i*, which are firmly bolted to flanges formed on the ends of the slotted piece *h*. Between these flanges and the pieces *h* the upper ends of the bars *j* are pivoted.

Rods or guide-poles F F are placed in the tubular shafts E, and are connected at their upper ends by the yoke *k*, and are secured at their lower ends to a frame, H. The rods or guide-poles F, in the present case, are longer than the shafts E, and are capable of sliding in the said shafts when the dredge-buckets are opened or closed.

I is a horizontal shaft, journaled in the frame H, and carrying the small chain-sheaves *m m*, which are attached to the shaft near the sides of the frame H. Chains *n* are attached to the sheaves *m*, and are connected with the slotted piece *h* by means of straps *o*, which hang from pins *p*, that run through the slotted piece *h*. A chain-sheave, *r*, which is larger than the ones described, is attached to the center of the shaft I.

G G′ are the ordinary clam-shell dredge scoops or buckets, which are provided with the hinge-pieces *s s′*, which are pivoted at *t* in the lower part of the frame H. The bars *j*, which are pivoted to the slotted piece *h*, are also pivoted to the outer ends of the hinge-pieces *s s′*.

J is a chain attached to the center of the slotted piece *h*, and running over a sheave, *u*, which is suspended from the end of the crane arm, and thence between inclined sheaves *w* in the cross-tree K, which carry the chain one side of the axis of the crane.

A chain, L, is attached to one side of the sheave *r*, and runs over a sheave, *v*, suspended from the outer end of the crane-arm, and between inclined sheaves *x* in the cross-tree K.

The arrangement of the inclined sheaves *w* and *x* is such that, by drawing upon one or the other of the chains J L, the crane is moved on its pivots as may be required.

A chain, M, is attached to the yoke *k*, that connects the rods or guide-poles F, and runs under the sheave *y*, which is journaled in the end of the arm of the crane, and thence through the hollow arm of the crane, and downward over the sheave Z on the line of the axis of the crane, and under the sheave Z′, which is supported by a standard secured to the deck of the dredge.

In the present case the vertical tubular shafts are arranged transversely in relation to the arm of the crane; but they may, with equal advantage, be arranged in a line parallel with the said arm. I have also described the chain as being attached to the yoke *k;* but the same effect may be produced, in a slightly different way, by connecting it with the yoke *g*.

If it is not essential to stiffen the rods F by inclosing them in the tubular shafts E, the said tubular shafts may be shortened, so as to act merely as guides for the slotted piece *h;* and when the chain M is attached to the yoke *g* the rods or guide-poles F may be shortened, and will act as guides to the frame H.

It is obvious that timbers may be substituted for the hollow metallic crane-arm, and for the rods F and tubular shafts E. It will also be seen that various devices may be used for producing friction on the wheel D, for retaining the crane A in any desired position.

The operation of my invention is as follows: The chains J L H being connected with suitable drums driven in the ordinary manner, the crane is moved into the required position by pulling more upon one of the chains J L than upon the other. The strap *e* is tightened on the wheel D by the lever *f*. The buckets G G′ are now opened by sustaining the weight mainly by the chain J, which permits them to hang by the bars *j*, while the weight of the bars F and frame H, resting on the pivot *t*, throws the buckets open. The buckets are lowered by slackening the chains J and L, and when in contact with the surface to be excavated, if the weight of the buckets and superimposed parts is not sufficient to hold the buckets down to the work, an additional downward pressure is created by drawing the chain M. The chain L is now drawn, and, in unwinding from the sheave *r*, it winds the chain *n* upon the sheaves *m*, thus drawing up the frame H until the buckets are closed, when the chain M is slackened, and the load is raised by drawing equally on the chains J L. When the load is sufficiently high to dump, the strap *e* on the drum D is loosened, and the crane moved in the required direction by pulling more upon one of the chains J L than upon the other. The chain L is slackened, while the chain J is held taut, which permits the frame H to drop and throw the buckets open.

The advantages claimed for the invention are, that by using a crane which is not capable of vertical motion, an amount of force may be put upon the buckets which is limited only by the strength of the parts and weight of the dredge. The crane can be effectively and quickly stopped and held in any desired position, and may as easily be released. It is peculiarly adapted to work in sand, and in other places where the earth offers resistance to the excavating-buckets.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the rigid swinging crane A, of the horizontal friction-wheel D and a device, substantially as described, for clamping said wheel, as and for the purpose specified.

2. The combination, in dredging machinery, of the chain M and the vertical rods or shafts that operate the buckets, for holding the buckets down, substantially as shown and described.

3. The combination of the chains J and L, sheaves *m* and *r*, frame H, rods F, slotted piece *h*, bars *j*, and buckets G G′, substantially as herein shown and described.

4. The combination of the tubular shafts E, rods F, slotted piece *h*, bars *j*, buckets G G′, frame H, guides D, chains J L M, and crane A, substantially as shown and described.

CHARLES O. DAVIS.

Witnesses:
C. SEDGWICK,
GEO. M. HOPKINS.