O. Allen.

Dredger.

No. 4,020. Patented May 1, 1845.

Fig. 3.

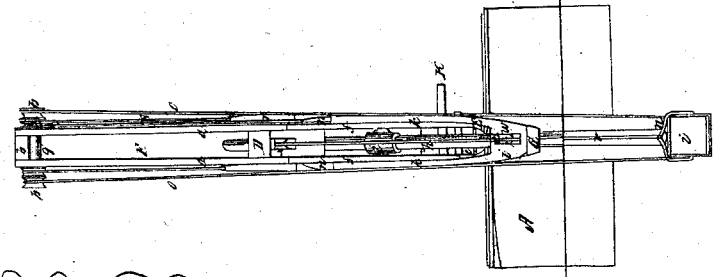


Fig. 1.

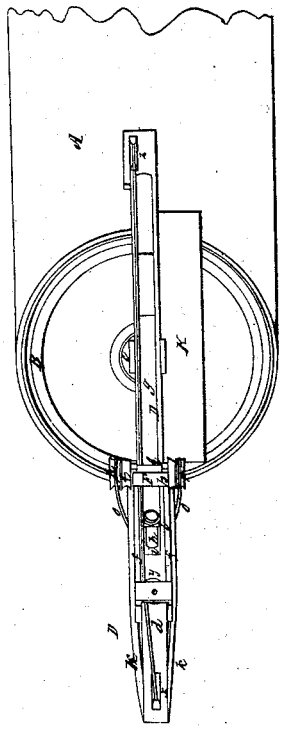
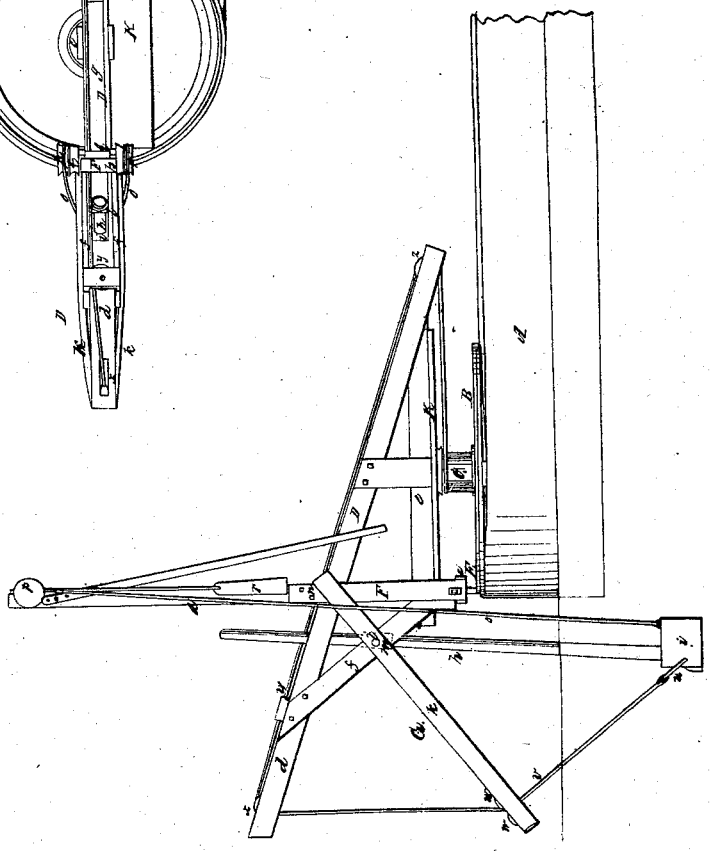


Fig. 2.



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UNITED STATES PATENT OFFICE.

OLIVER ALLEN, OF NORWICH, CONNECTICUT.

MACHINE FOR DREDGING OR EXCAVATING.

Specification of Letters Patent No. 4,020, dated May 1, 1845.

To all whom it may concern:

Be it known that I, OLIVER ALLEN, of Norwich, in the State of Connecticut, have invented a new and useful Improvement in Machinery for Dredging or Excavating Earth for the Purpose of Deepening Rivers, Harbors, &c.; and I do hereby declare that the nature of my invention and the manner in which the same is to be performed are particularly described and ascertained in and by the following statement thereof, reference being had to the drawings accompanying and making part of the same and to the figures and letters marked thereon—that is to say, Figure 1 of the drawings aforesaid represents a top or plan view of my improved dredging-machine. Fig. 2 is a side elevation of the same, and Fig. 3 an elevation of its front end.

A, Figs. 1, 2, denotes a vessel or scow, having a semicircular or other proper shaped bow and a circular railway B, arranged upon its deck at the bow, as seen in the drawings. At the center of the railway is a capstan C, and over the capstan and railway a long crane D, which extends beyond the bow and rearward over the railway as seen in Figs. 1, 2.

The crane turns around horizontally upon a central vertical shaft, carried downward through the capstan, and it has a grooved wheel E fixed within it, so as to bear and move upon the railway; the said wheel being arranged at the foot of a long mast F, raised vertically upon the crane as seen in Figs. 2, 3; and being composed of two planks *a*, *a*, united at their upper and lower ends by horizontal cross pieces *b*, *c*; each of the said planks being bolted or otherwise properly secured to the outer side of the crane.

The crane may be said to be composed of a long beam or lever *d*, united or connected with the mast before mentioned by a horizontal beam *e*, and inclined struts *f*, *f*, the beams *d* and *e*, having a space *g*, formed vertically through them so as to receive the pole *h*, of the excavating bucket *i*, and permit of the movement thereof to take place within it.

The pole of the bucket or scoop, is arranged in front of the mast and has its turning fulcrum *l* disposed between the struts *f f*, in the position as seen in the drawings.

A long lever or arm G, (composed of two planks *k*, *k*, connected together at their front ends by an intervening piece of wood *l'*) is applied to the crane in such manner, as to turn vertically upon a fulcrum or bearing (at *m*), extending from the struts. The rear end of each plank *k*, abuts, when the lever is in its lowest position, against a stop *n*. The excavating bucket is suspended by two lines or chains *o*, *o*, each of which is attached to it in rear of the pole *h*, and extends upward and is attached to, and winds upon, a grooved pulley or barrel *p*, placed upon a horizontal shaft *q*, at the top of the mast.

The bucket and its pole are counterbalanced by a weight *r*, attached to a chain or rope *s*, which depends from and winds about a grooved pulley or barrel *t*, placed by the side of the grooved pulley *p*, upon the same shaft with it. The bail *u*, of the excavating bucket, has a line or chain *v*, extending from it and through the end of the arm G (that is, between two grooved pulleys or sheaves *w*, *w*, arranged therein), thence upward through the front end of the crane and over a sheave *x*, thence through a leading block *y*, arranged upon the top of the crane, thence along the top of the crane, toward and through its rear end, and over a sheave *z* therein, and thence is carried to and wound upon the capstan C.

The above particular arrangement of the crane, capstan, and chain which winds around the latter, and lifts the excavating bucket, is one of very great convenience and importance, inasmuch, as by it, I am enabled to turn the crane around throughout an entire circle, without twisting the chain in the slightest degree. The carrying the chain through the after part of the crane, and thence forward and upon the capstan so concentrates the forces in action upon the crane as to bind its parts together, and thereby cause the strains upon it to act in such directions as to insure or promote its stability. It also presents the chain to the capstan, at a proper distance to enable it to freely wind thereon, without any injurious tendency of riding or overlapping of its coils. The twisting of a chain is a great point to be guarded against, as, when such takes place, even to a very small extent, there is great liability of fracture or rupture of it.

Steam, or horse, or other suitable power, is to be applied to the capstan, in such manner as may be required to operate it, so as

to wind up the chain or line which actuates the excavating bucket. The capstan should have a mechanical arrangement, by which it may be readily disconnected from the power which turns it, so as to permit the excavating bucket to descend to the depth required, after being drawn up and its contents discharged. It should also have a friction brake applied to it, by which the descent of the bucket may be regulated.

The maintenance of the crane in any required position, and the prevention of its slipping upon the circular railway is a matter of considerable importance. To effect this, a series, or beveled wheel of vertical cogs, may be applied to either the exterior or interior side of the circular railway, and the wheel of the crane, which rests and moves upon the railway, may have a beveled pinion arranged by the side of it on its axis, and so as to engage with the aforesaid horizontal beveled wheel. The friction brake which acts upon the railway wheel of the crane, will thus be enabled to act with the requisite certainty. Or, instead of the above, any other suitable contrivance may be adopted. The crane should also have an apparatus or mechanical contrivance adapted to it, and of such character as will enable an attendant to connect the turning shaft of the crane, or the crane itself, with the power by which the capstan is operated, or with the capstan; the same being for the purpose of moving the crane upon the railway to the point required, to bring the excavating bucket over the barge or scow, into which its load is to be deposited, or to bring the said bucket over any spot where it may be desirable to discharge its contents. There should also be some suitable mechanism, connected to the crane, for reversing its motions, or bringing it back over the spot where the excavation is being performed. The shaft of the grooved pulley *p* should have a friction brake or apparatus applied to it (to be actuated by a lever or other suitable contrivance, within reach of the attendant, who stands upon a platform K), in order to regulate the descent of the excavating bucket. There may also be a friction brake or any other proper mechanical contrivance applied to the crane wheel (which rests and moves upon the railway B,) and railway, for the purpose of arresting or regulating the motion of the crane upon the railway, as may be required.

As the bucket is drawn forward in the act of excavating, it is to be forced downward by a snubbing line attached to its pole, and operated in the usual manner, or any other suitable mechanical contrivance may be adapted to it, to effect the same end. The adjustable arm G, serves to bring down the line or direction of draft upon the excavating bucket, thereby causing the same to scrape up the earth with certainty and ease. It rises and falls with the bucket, and may, if desired, be counterbalanced.

The above described peculiar arrangement of the several parts, renders the dredge almost, if not entirely, applicable to every kind of excavation beneath the water's surface. The open mast, the adjustable arm, and particular crane admit of a bucket pole of great length being used within the unobstructed space *g*. The extension of the rear part of the crane beyond the point of bearing upon the circular railway, is very advantageous; inasmuch as it presents an opportunity to apply a weight thereon in order to counterbalance the crane and trim the dredge.

Having thus described my invention, I shall claim, my improvement in dredging machinery; the same consisting in the arrangement of the mast directly upon and so as to be supported by the movable crane, in such manner as to be moved by, and with the crane, whenever the latter is turned horizontally toward the right or left, instead of making the said mast a fixture to the deck of the vessel or dredge, as heretofore.

I claim—

The above described peculiar arrangement, with respect to each other, of the capstan and crane; and, in combination therewith, that of the chain which elevates the excavating bucket, the latter differing from other arrangements thereof in being carried through the rear or after end of the crane, in the manner and for the purpose as herein before specified.

In testimony whereof, I have hereto set my signature, this third day of March 1845.

OLIVER ALLEN.

Witnesses:

PHILO M. JUDSON,

EDWARD Y. THOMAS.