

2. Streets Street 1.

No. 10,157.

Patented Mar. 22. 1870.

Figure 1.

Figure 3.

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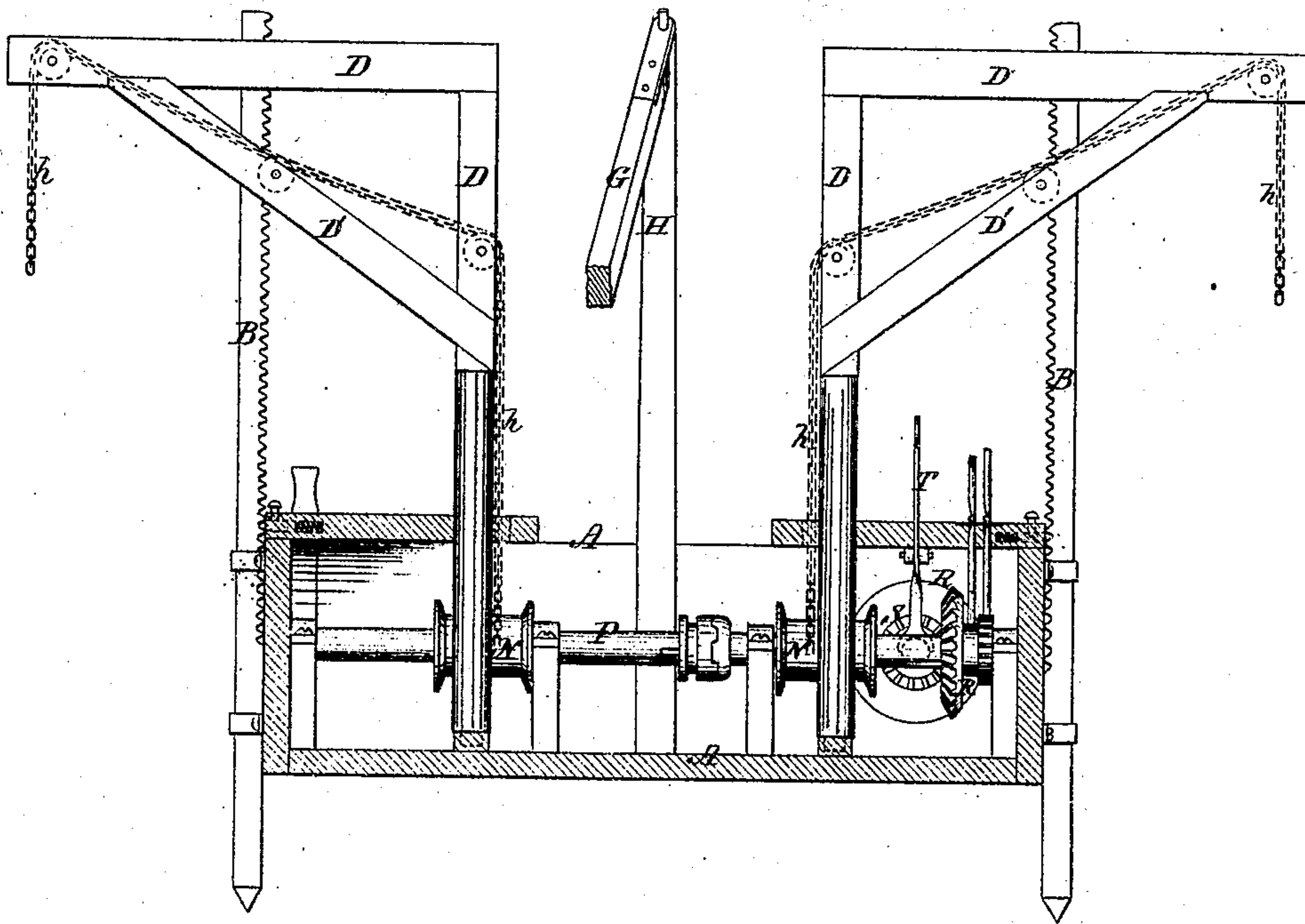
2. Sheets. Sheet 2.

Dredger.

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Figure 2.



Witnesses

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Letters Patent No. 101,157, dated March 22, 1870.

IMPROVEMENT IN DREDGING AND EXCAVATING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WALTER H. PEARSON, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Dredging and Excavating-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings which make a part of this specification, and in which—

Figure 1 represents a view in perspective of a dredging-machine, embracing my improvements, the bucket occupying the position it does when being elevated with its load.

Figure 2 represents a section, showing the mechanism for operating the bucket from either end of the machine.

Figure 3 represents a sectional view of the bucket-carriage and its adjustable supporting-arm, the beam of the bucket being in the position to be swiveled to reverse the bucket.

Figure 4 represents a view of the bucket-carriage, nearly in the position it occupies to detach the crane from its supporting and locking-post.

My invention relates to the construction of a machine for excavating under water, for deepening channels, docks, &c., and consists in the employment of a bucket, capable of being reversed in its position, so that it may be operated in either direction along the face of the machine, in connection with a traveling and supporting-carriage and a crane, located and arranged to operate the bucket at each end of the machine in either direction; also, in means for adjusting the arm which carries the bucket; also, in supporting and locking the crane to a stud, and automatically detaching it therefrom, at the proper moment, by the movement of the carriage of the excavating-bucket, and finally, in an adjustable arm or cat-head, for supporting the chain by which the bucket is operated, in such manner as to admit of its withdrawal when the bucket is being elevated.

In the accompanying drawings—

A represents the boat or screw, about thirty feet width of beam, fifty feet long, and eight feet hold, constructed in any suitable manner for sustaining the several operating parts of the machine.

The engine and operating mechanism is arranged in any suitable manner beneath the deck and on the side of the machine opposite the dredging-bucket. It is provided at three of its sides with vertical spuds B, which are driven by their weight into the bed of the river, to anchor the machine in position for operation, and they are provided with racks on their inner faces, into which levers may be made to bite, so as to raise them in moving the machine from place to place. It

may also be provided with stanchions at each end, by which the machine may be moved and further secured.

The dredging-bucket C is arranged to operate at the face of the machine, and is supported by suitable mechanism at the middle of its length, and on either side thereof a crane, D, is arranged, so as to sweep from the face to the end of the machine.

The mechanism for carrying and supporting the dredging-bucket consists of a wrought-iron carriage, E, of sufficient weight to keep it firmly upon its way, F, from which an arm, G, extends from the operating-face to the opposite side of the machine, where it is pivoted to a strong post, H, while the carriage is supported upon anti-friction rollers *a*, and runs upon a strong segmental way or rail, F, made preferably of wrought-iron, and is steadied and braced thereon by a shoulder, *b*, on its under side, acting against the inner edge of said way. This way is supported upon three studs I, the outer ones of which extend above it and form guards or stops I², to the movement of the carriage, the limit of which upon its supporting-way or rail should be about one-third the length of the boat.

To this carriage E is secured the arm J, which supports and carries the dredging-bucket C. It is made cylindrical and passes through two uprights in the carriage, so as to admit of its being adjusted toward or from the machine, and allow it to swivel within its bearings, to accommodate the movement of the bucket.

The means of adjusting it consists in providing it with a series of parallel grooves or channels *c*, into any one of which a plate, *d*, fitted to the rear vertical bar of the carriage, may be made to bite and hold by means of a set-screw, said plate having a slot, so that it may be raised and interlocked with the channels of the swiveling-arm, as it may be desired to adjust said arm with the bucket toward or from the machine.

These channels or grooves serve also as the means of effecting this adjustment of the supporting-arm by lever, *e*, pivoted to the lower rear end of the carriage E, so that its upper end will take into any one of the channels, and thus be connected therewith, so as to force it in or out, the lever having a slot to admit of its being raised and lowered to effect this connection, as shown in fig. 3.

The outer end of this arm has an oblong opening, *f*, through which the beam K of the bucket passes. This beam is made square and of proper length, to the lower end of which the bucket C is secured and braced in any suitable manner.

The bucket is provided with a bale, *g*, to which the elevating-chain *h* is attached by a hook, *i*, and with a hinged door provided with suitable catches, by which it may be opened, closed, and locked.

The square beam K of the bucket is fitted into and

moves within the oblong square opening *f*, in its carrying-arm *J*, which is fitted with a spring locking-pin, *j*, for a purpose to be presently described.

The cranes *D* pass through the deck of the machine, and are pivoted in suitable bearings in the bottom thereof, and the chain *h* connected to the bale of the bucket passes over a sheave or pulley, *L*, upon an adjustable arm or cat-head, *M*, secured to the deck of the machine, thence over three sheaves arranged in the crane, one within its projecting end, one within the vertical post, and one within its angular brace, and thence around a drum, *N*, driven by the engine.

In order to support and lock the crane *D* in a fixed position during the operation of dredging, a post, *O*, is arranged, having a shoulder, *k*, upon which the angular brace *D'* of the crane rests in a position at right angles to the face of the machine, and in which position it is locked to said supporting-post *O* by means of a weighted catch, *l*, pivoted to said post, so that one end will lock itself with the diagonal braces *D'* of the crane, while the other end extends toward the pivoted arm *G* of the bucket-carriage, and is curved upward and maintains a position to be struck by the said pivoted arm to release the crane from its locked position, when the carriage is brought over to the limit of its movement, as shown in fig. 4, and thus allow the crane to sweep around with the bucket in the position to discharge its contents.

Thus, it will be seen, the crane not only is firmly sustained against the great strain of the bucket while being filled, but is engaged and disengaged from its support automatically, as the crane when brought back against the post locks itself therewith, and is disengaged therefrom by a movement of the carriage, after the bucket is filled, and it becomes necessary that the crane should turn to change its position.

The bucket thus suspended and operated can move only in one direction. To reverse it, in order that it shall move in the opposite direction, it is raised by its connecting-chain *h*, so as to elevate it in a position near its adjustable supporting-arm *J*, in which position it is held by means of a hinged link, *m*, depending from the adjustable arm, so as to catch under a projection, *n*, on the beam of the bucket, and hold it in that position.

The hook *i* of the chain is then detached from the bale of the bucket, and the beam *K* is swiveled or turned within its socket, so as to reverse the acting end of the bucket, to allow it to dredge in an opposite direction.

This swiveling motion is effected by making the beam of the bucket cylindrical at a point, *p*, which is exactly within the square opening *f* of its supporting-arm, so as to allow it to be turned within said square opening, and it is suspended during this swiveling motion by the spring pin *j*, upon which, and the arm *J*, the square shoulders of the recess *p* rest.

When the bucket is to be reversed it is hooked to the chain of the opposite crane, the projection *n* on the beam leaves the hinged staple *m*, the pin *j* is withdrawn from the shoulders *p* by a cord or other convenient device, and the hinged link, which engages with the opposite projection on the beam, is released therefrom, which allows the beam with its bucket to descend by its own gravity, in the proper position to commence dredging in a reverse direction.

The drum *N* of the crane first operated is now unclutched from its driving-shaft *P*, and the drum of the opposite crane thrown into gear, and thus the two cranes are brought into operation by simply swiveling the bucket and disengaging and engaging the drums of their respective cranes.

The adjustable arm or cat-head *M*, for supporting the chain of the bucket, is secured by means of strong iron stirrups *q*, arranged at suitable distances apart,

and bolted to the bottom of the boat, so as to form additional braces to the structure.

The upper side of these cat-heads is cogged, into which a reversible dog, *r*, carried by a hinged lever, *Q*, is made to bite, so as to move said arm with the sheave *L*, which supports the chain, toward or from the machine, to adapt it to the adjustment of the bucket, and to allow it to be withdrawn out of the range of the chain when the bucket is being elevated and carried over to discharge its load.

The lever *Q* of the reversible dog *r* is hinged and provided with a slot, so as to allow the dog to be operated backward or forward by a corresponding movement of the lever.

The operating-drums *N* are attached to a common shaft, *P*, and are provided with suitable clutches to engage or disengage them therefrom. This shaft is driven by a gear-wheel, *R*, arranged at one end thereof, which meshes into a corresponding bevel-gear pinion, *S*, on a crank-shaft at right angles thereto, to which the connecting-rod from the engine is attached, whereby the bucket is operated from two separate cranes, by mechanism connecting with one end only of the driving-shaft.

The bevel-wheel *S* of the crank-shaft may be thrown into and out of gear with the driving-shaft by a suitable clutch, *T*, and the driving-shaft may be provided with suitable braking devices.

The operation of the machine will be readily understood from the foregoing description, and it need only be stated that the bucket, when filled and elevated, is opened, so as to discharge its load by any convenient means for opening the bottom, and closed by striking the water in its descent.

The carriage of the bucket is supported against the guards *I'* of the segmental way during the operation of filling the bucket, and is moved forward against the opposite guard by the swinging movement of the beam to carry the bucket up over the tender, the beam having a stop at its upper end, to prevent it from coming out of the socket of its supporting-arm.

The range of the motion of this carriage being about one-third of the length of the boat, and the beam about forty feet in length, will give an acting range to the bucket, not only along the entire face of the machine, but a distance beyond either side thereof, while the adjustment of the swiveling supporting-arm admits of the extension of the bucket beyond the face of the machine a distance of about twelve feet, thus operating back and forth over an area of about seven hundred and fifty square feet without requiring the removal of the machine from its fixed position.

In order to control the movement of the dredging-bucket so that it may be operated step by step in gradually increasing strokes, I construct the horizontal pivotal arm *J*, which carries and supports the bucket with a T-shaped handle, *U*, on its rear end, which the attendant grasps and swivels the supporting-arm, so as to present the bucket to the bed of the river always a sufficient distance beyond the limit of its preceding stroke to fill the bucket, and this movement is effected in either direction of the working of the bucket.

The T-shaped arm may be provided with chains *V*, by which the handle may be operated, if desired.

Having thus described my invention,

I claim—

1. The reversible bucket *C*, connected to a swiveling adjustable arm *J*, mounted in a carriage, *E*, pivoted and supported upon a segmental way, *F*, substantially as herein described.

2. The swiveling supporting-arm *J* of the bucket, adjusted and locked within and to its carriage by means of the parallel grooves *c*, adjusting lever *e* and locking-plate *d*, or their equivalents, substantially as described.

3. A dredging-bucket, mounted and carried upon its supporting-arm, so as to be swiveled and reversed, to excavate in exactly opposite directions along the entire face of the machine, substantially as described.

4. The beam K of the dredging-bucket, having a cylindrical portion, *p*, for the purpose of allowing it to be swiveled within the socket *f* of the adjustable arm J, in combination with the supporting-pin *j*, and supporting-link *m*, for maintaining the bucket in position to be reversed, substantially as described.

5. The cat-head or arm M of the bucket-chain, made adjustable and operated by means of the rack, hinged lever Q, and reversible dog *r*, substantially as described.

6. The weighted catches *l*, constructed and arranged in such manner as to lock the cranes D automatically to their respective supporting-posts O, when the bucket is operated from either crane, substantially as described.

7. In combination with the crane D and the weighted catch *l* of the supporting-post O, the arm G of the carriage E, for automatically releasing by its movement the said crane, to allow it to swing round with the bucket at the proper time, as herein described.

8. The combination and arrangement of the single driving-shaft P, drums N, cranes D, carriage E, and reversible bucket C, the whole constructed, arranged, and operating substantially as described.

9. The swiveling supporting-arm J, constructed with a handle, U, or its equivalent, for controlling the movement of the bucket, substantially as herein described.

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