2 Sheets—Sheet 1.

R. R. OSGOOD.

Dredging-Machine.

No. 196,378. Patented Oct. 23, 1877.

Fig. 1.

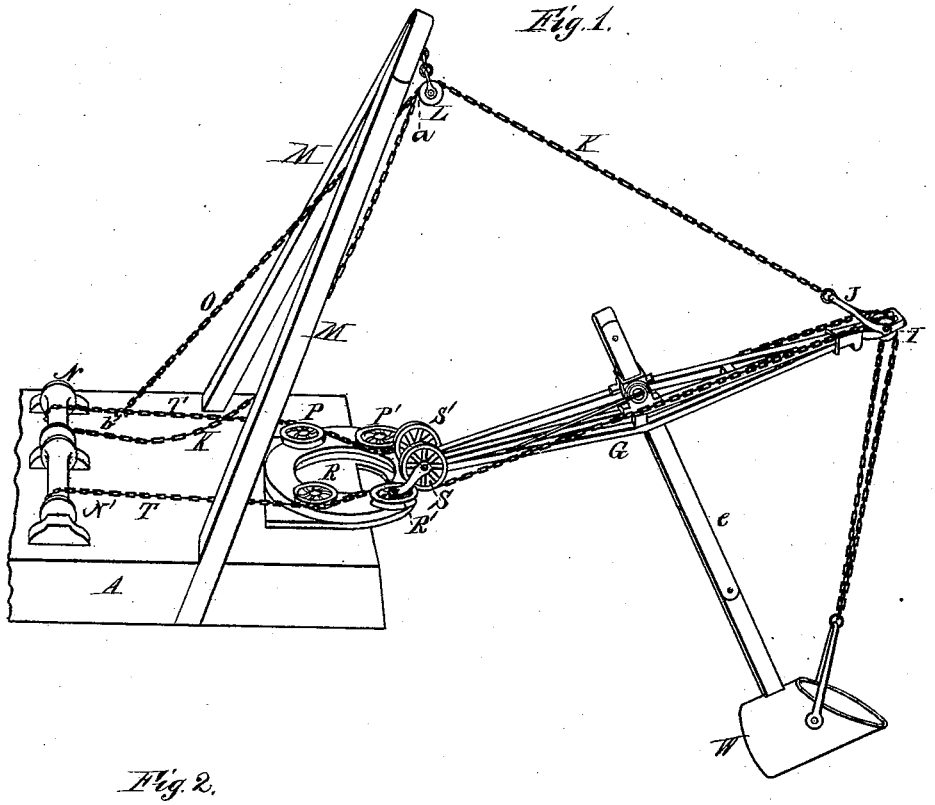


Fig. 2.

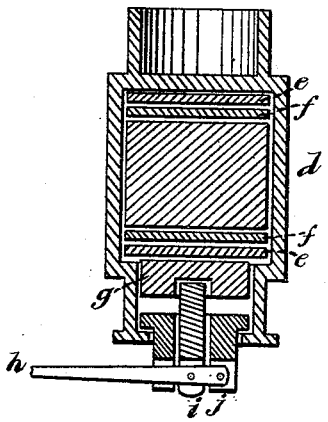
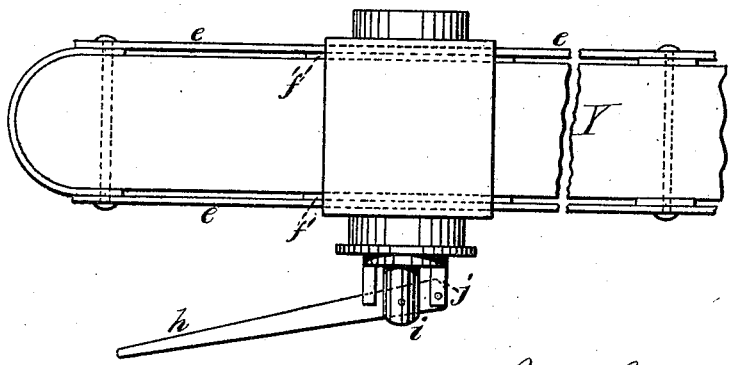


Fig. 3.



Witnesses:
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2 Sheets—Sheet 2.

R. R. OSGOOD.

Dredging-Machine.

No. 196,378. Patented Oct. 23, 1877.

Fig. 4.

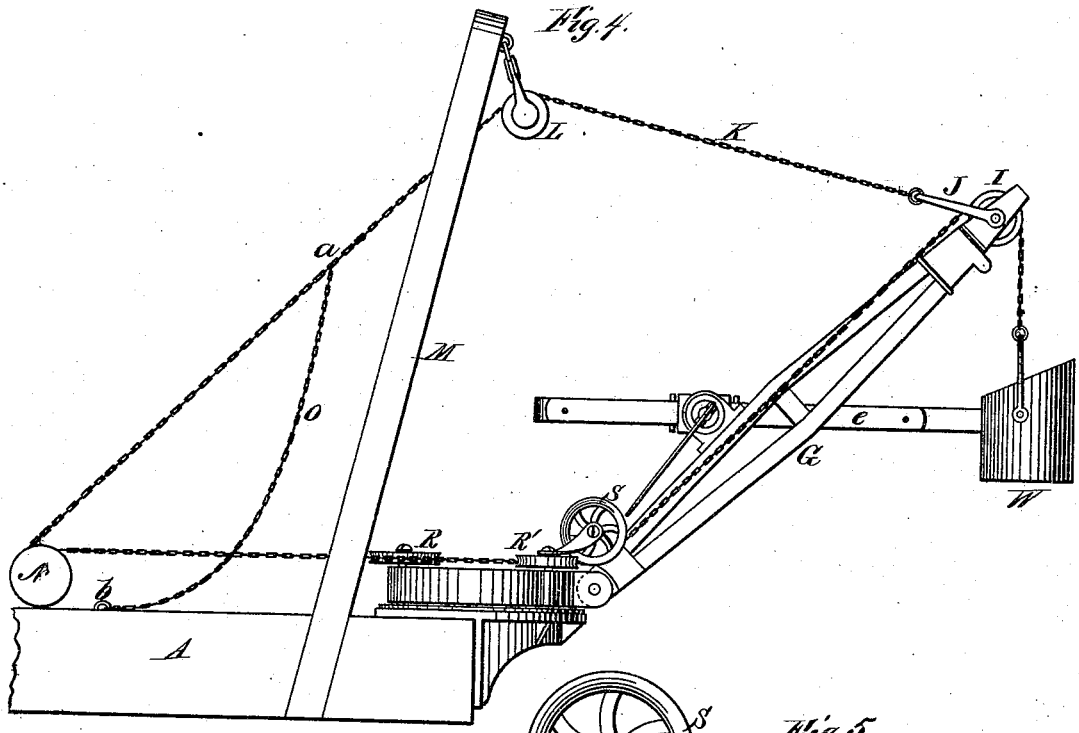


Fig. 5.

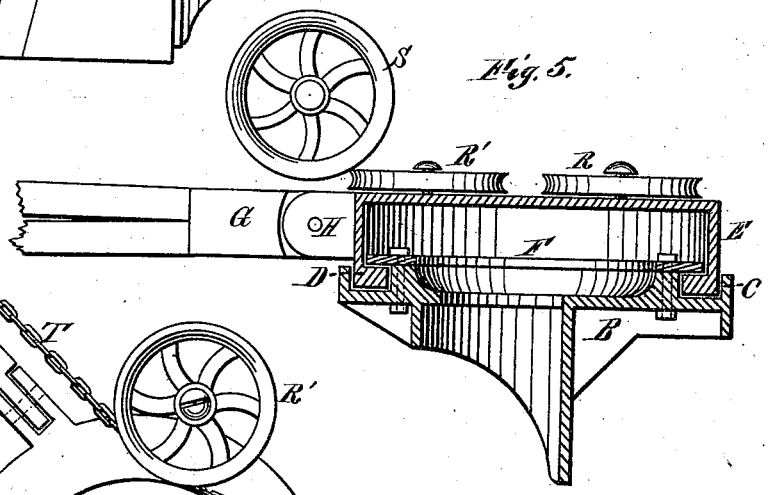
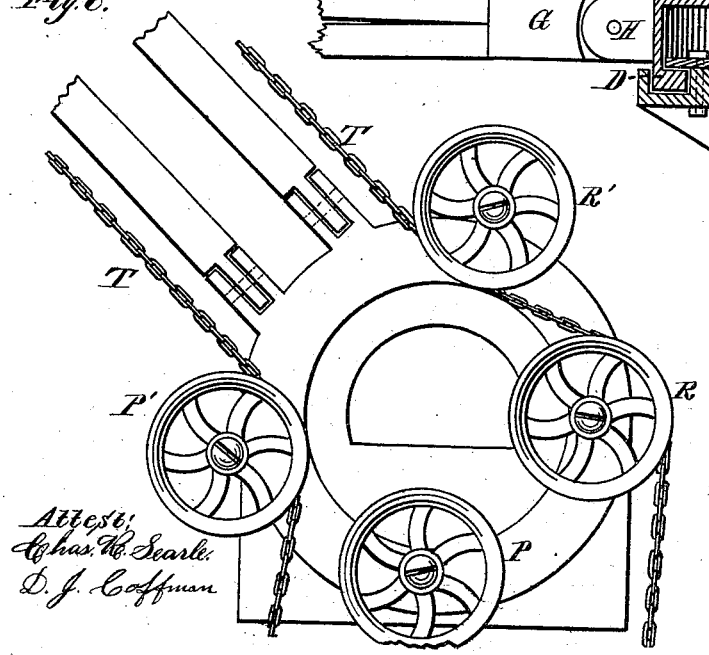


Fig. 6.



Attest:
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UNITED STATES PATENT OFFICE.

RALPH R. OSGOOD, OF TROY, NEW YORK.

IMPROVEMENT IN DREDGING-MACHINES.

Specification forming part of Letters Patent No. **196,378**, dated October 23, 1877; application filed August 25, 1877.

To all whom it may concern:

Be it known that I, RALPH R. OSGOOD, of Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Dredging and Derrick Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a perspective view, illustrating the essential elements of my improved machine as they appear when assembled for use. Fig. 2 is a longitudinal section through the axis of the dipper-handle trunnion, representing the location and arrangement of the clamping mechanism used in connection with said dipper-handle; and Fig. 3 is a plan view of a portion of the dipper-handle with the clamping mechanism applied thereto. Fig. 4 is a side elevation of the improved machine, the dipper being represented as elevated and ready to be swung around. Fig. 5 is a vertical section of the turn-table and step, showing the relative location of the vertical and horizontal sheaves mounted thereon. Fig. 6 is a plan view of the turn-table and a portion of the boom, the maneuvering-chains being broken off, the boom swung part way around, or at an angle with the face of the machine, and the vertical or guide sheaves being omitted to better represent the lead of the chains.

Like letters in all the figures refer to corresponding parts.

My invention has relation to all manner of boom-machines, particularly such as are used for dredging, excavating and derrick purposes; its object being to simplify and lessen the cost of construction, and to increase the power and efficiency, as well as to add to the convenience and ease with which the general machine may be manipulated.

To accomplish all of this it (the invention) consists, first, in hinging or pivoting a boom to a turn-table, upon which are pivoted guide-sheaves in such relative location as to make the maneuvering-chain lead fair with the horizontal sheaves, no matter what position the boom may assume; second, in spreading the hoisting-chains, so as to make them operate also as swinging chains; third, in so locating the horizontal sheaves upon the turn-table that the bearing of the maneuvering-chain will be changed from one to the other as the boom is swung out of line with the axis of the boat, platform, or foundation; fourth, in hinging the boom forward of the joint, between the turn-table and its step, to afford ample room for the sheaves upon the upper surface of said turn-table, and so that in case the hoisting-chain breaks the boom may fall without coming in contact with either the turn-table or the sheaves thereon; fifth, in connecting a stop-chain with the boom-chain or with the boom, so that said boom may be automatically arrested at any desired point; sixth, in an improved means of clamping the dipper-handle, and in certain other novel arrangements or combinations of parts, all of which will be first fully described, and then pointed out in the claims.

A in the drawings represents a boat for a dredge, or the floor of an excavator or derrick, and B is a strong step or bracket, firmly secured to some convenient part thereof. C is an annular groove in the upper part of the step, which receives and holds the flange D of the turn-table E. Suitable annular segments F are bolted to the step B, and project over the flange D, in such manner as to hold the latter in proper place, but to permit the desired motion of the turn-table.

This form of connection between the turn-table and its step is advantageous, principally in affording an extended bearing between the two parts, whereby they are more firmly connected with each other, less liable to damage or derangement, and better adapted for supporting the load upon the boom than are those forms wherein a central pivot is employed.

The boom G is pivoted or hinged upon the periphery of the turn-table, as at H, and is provided with one or more chain-sheaves, I I, at its outer end. A pair of links, J J, connected with the axle of sheaves I I, serves as an attachment for the boom-chain K, which passes from said links through the sheave L, supported upon the A-frame M M, and thence to the moving power or chain-drum N. A stop-chain, O, is shown as connected with the boom-chain, as at *a*, and to the flooring or platform, as at *b*.

It is obvious, however, that this chain may

be otherwise connected with the boom in any convenient manner—as, for instance, it may be attached to the boom itself, and to the A-frame or to the flooring.

By means of this stop-chain, however attached, the boom is automatically arrested at the proper working-point whenever the boom-chain is slackened up, as it will be when the dipper is being lowered in the case of a dredge or excavator, since the boom-chain and dipper-chain are connected with the same hoisting-drum or moving-power, as will appear hereinafter.

The stop-chain is intended to be so arranged as that it may be lengthened or shortened at pleasure, in order to determine the point at which the boom shall be arrested. Upon the upper surface of the turn-table are mounted the two sets of horizontal sheaves P P′ and R R′, and also the vertical sheaves S S′. The hoisting-chains T T pass from the chain-drums N N′ outside of sheaves P R, inside of P′ R′, and under the vertical sheaves S S′, (not shown in Fig. 6,) thence over I I, and are attached to the dipper or load W.

The boom-chain K and one of the hoisting-chains are both wound upon the same drum N, or otherwise suitably connected with the same moving-power. When this drum is so turned as to unwind the chains both are let off together, and the point of the boom begins to drop, and continues in its downward movement until arrested by the stop-chain O, when the hoisting and boom chains are left free to be still further unwound. The dipper or load W continues to descend until it reaches its lowest desired position, or until the drum is arrested. When the chains T and K are wound up sufficiently to raise the boom G with the load W, then the chain O becomes slack. In this movement the weight of the point of the boom and its load is changed from chain O to chain K, the former serving to support the weight when the boom is lowest, and the latter performing a similar office when said boom is highest. The boom is thus operated automatically at the same time with the hoisting-chain.

As shown in Figs. 1 and 6, the chains T T are separated by the sheaves P R, mounted upon the top of the turn-table.

When both chains are employed they may be wound up with equal rapidity until it is desired to turn the boom toward one side or the other, when it will only be necessary to wind that chain most rapidly which is upon the side toward which the boom is to be inclined. The chain being carried outside of the periphery of the joint between the turn-table and its step, it is obvious that, if one chain be wound more rapidly than the other, one component of the force exerted will act in the direction of a tangent to the turn-table, and will cause the same to turn about its vertical axis, carrying the boom with it. By the time that the chain leaves the sheave P, as at the left of Fig. 6, it exerts a corresponding tangential force upon the turn-table through the medium of sheave P′, and this will continue to act until the boom is turned at right angles to its normal position, or to the axis of the boat or foundation; and when the boom has reached this position it can be drawn no farther by the hoisting-chain, so that there is very little danger of turning said boom too far.

To return the boom to its normal position, or to the opposite side, it will only be necessary to slack up on the first drawn chain and draw upon the other, for which purposes the drums are suitably arranged and geared in a manner not necessary to be here explained.

The power to return the boom from one side is increased accordingly as it has been moved more or less, since the more it is turned the greater will be the tangential component of the force exerted to return it, as will appear from a consideration of Fig. 6.

The same general results would be obtained by mounting the sheaves nearer together or farther apart than indicated in the drawings, and it is not intended that the invention shall be limited to any particular size or location of said sheaves, so long as they are mounted upon the face of the turn-table, and capable of the functions assigned to them.

With this arrangement of chains and sheaves in connection with a boom, it will be observed that the handling of the load is accomplished by attending to the hoisting-drums only, and the motions resulting from a compound of all those which may be produced through the medium of the hoisting-chains are peculiarly advantageous in the class of machines to which the improvements relate. For instance, in starting the load from its lowest position upon one side of the machine, it may be easily and quickly carried in the most direct line to its final point of delivery, both as regards its vertical as well as horizontal lead or travel.

The chain K is intended to be regulated in length so that the play of the boom will be such as not to interfere with the simultaneous movements of chains T T, which might occur in case it were not desirable to elevate said boom.

The use of the double chains T T is desirable, though not essential, for all purposes of the invention. They may, if both are used, be made much lighter than the ordinary single chain, and therefore more wieldy, while at the same time they are less liable to break. In case a single chain be used, the boom is operated in the same manner, (as is also the dipper,) with the exception of the particular means employed for swinging from side to side. Any desirable attachments may be made to accomplish this movement; but the horizontal sheaves are brought closer together, and in such relative position with respect to the vertical sheaves that the single chain shall lead fair upon either, no matter what the position of the boom.

It should be understood that, although it is suggested that the chain K and a hoisting-chain should be wound upon the same drum,

in order to accomplish the simultaneous movement of the dipper-handle and the boom, this statement should not be construed literally, for it is obvious that two separate drums may be mounted upon the same shaft; or, if upon different shafts, they might be made to move at the same rate by being suitably connected with each other, or with the turning-power. The object to be accomplished is the simultaneous movement of the two elements, (dipper-handle and boom,) and for the sake of explaining the principle of the invention, the means chosen to accomplish the desired result are those which are regarded as simplest and best.

The dipper-handle Y is mounted in an oscillating trunnion, *d*, supported in suitable trunnion-beds upon the boom G, and it is arrested at any desired point by friction applied thereto for the same objects as in my patent of March 9, 1875, No. 162,849.

The dipper-handle is, in the present instance, provided with the plates *e e*, one upon each side, extending nearly the length of said handle, and separated from the material thereof by an unobstructed opening. Two gibs, *f f*, are inserted between said plates *e e* and the dipper-handle, being held within the trunnion-block by slight projections *f' f'*, Fig. 3, abutting against the walls thereof.

The dipper-handle, straps, and gibs are all forced toward one side of the trunnion-block by means of the plate *g*, operated upon by the lever *h* through the medium of the bar *i*. The bar *i* is contained within a cap, *j*, to which the lever is pivoted, and the trunnion-block revolves independently of the cap, so that the lever may always remain in position for use.

The friction required to hold the dipper-handle against the working strain is, of course, equal to that strain, and to exert the required pressure upon the handle so much force is sometimes needed as to compress the material of said handle, especially if the same be made of light wood. By increasing the number of friction-surfaces, as is done in the present instance, the amount of friction to be derived from a given pressure is increased proportionally, and therefore a lighter application of force may be made to accomplish the required results. This increase in the number of independent friction-surfaces is to be distinguished from a mere enlargement of one surface, which would afford no additional friction from the application of a given pressure.

Following the principles of this portion of the invention, the number of surfaces may be increased at pleasure.

The lever *h* is ordinarily operated by means of suitably-arranged gearing or attachments—as, for instance, something equivalent to devices shown in my before-mentioned patent.

Aside from the uses of the straps, or their equivalent bands or rods, as above indicated, they are advantageous in affording a stiffening or strengthening medium for the dipper-handle, and serve, also, to receive a portion of the necessary friction outside of and independent of the material of the handle, for which purpose they are slightly removed from said handle, as above explained.

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

1. In combination with a horizontal sheave axled upon the turn-table of a boom-machine, a vertical guide-sheave supported upon said turn-table in position to cause the hoisting-chain to lead fair with the first-named sheave, substantially as and for the purposes set forth.

2. A turn-table with one or more vertical guide-sheaves and two or more horizontal guide-sheaves, in combination with a hinged or pivoted boom and the hoisting chain or chains, substantially as set forth.

3. In combination with a turn-table having a hinged boom applied thereto, the two horizontal guide-sheaves, adapted to spread the hoisting-chains, substantially as and for the purposes set forth.

4. In combination with a hoisting-chain of a machine of the character herein indicated, two or more horizontal guide-sheaves arranged with respect to each other upon the turn-table, substantially as described, so that the chain shall shift its bearing from one sheave to the other as the boom is swung around, substantially as and for the purposes explained.

5. The combination, as before set forth, of a hinged boom, a boom-chain, and a hoisting-chain adapted to be wound or unwound equally by the application of the same motive power, and a stop-chain arranged to automatically arrest the downward motion of said boom, substantially as and for the purposes explained.

6. In a machine of the character herein specified, a turn-table bearing a series of guiding-sheaves and having a boom hinged at its periphery, the said turn-table being connected with its step or bracket by a loose joint, also at its periphery, the several parts being arranged to operate substantially as and for the purposes set forth.

7. In combination with a turn-table for a dredging or derrick machine having an annular flange, a step or bracket provided with an annular socket adapted to receive said flange, the two parts being connected by means of segments bolted to the step, substantially as shown and described.

8. In combination with a dipper-handle of a machine of the character herein alluded to, one or more straps, bands, or rods attached to said handle at points near the ends thereof, and leaving a free space between such straps, bands, or rods and the handle, for the objects named.

9. In combination with the dipper-handle of a machine of the character herein alluded to, one or more straps, bands, or rods passing between adjustable friction-surfaces, for the purposes set forth.

10. In combination with a dipper-handle mounted in a trunnion and provided with one

or more straps, a movable gib located between the handle and such strap, substantially as and for the purposes set forth.

11. The combination of a dipper-handle provided with suitable straps, a trunnion carrying the gibs and the adjustable plate, and a movable lever attached to said trunnion, for the purpose of regulating the amount of friction to be applied, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

RALPH R. OSGOOD.

Witnesses:
GEO. F. GRAHAM,
CHAS. R. SEARLE.