(No Model.)

A. W. ROBINSON.

DREDGING MACHINE.

No. 428,141. Patented May 20, 1890.

Fig. 2.

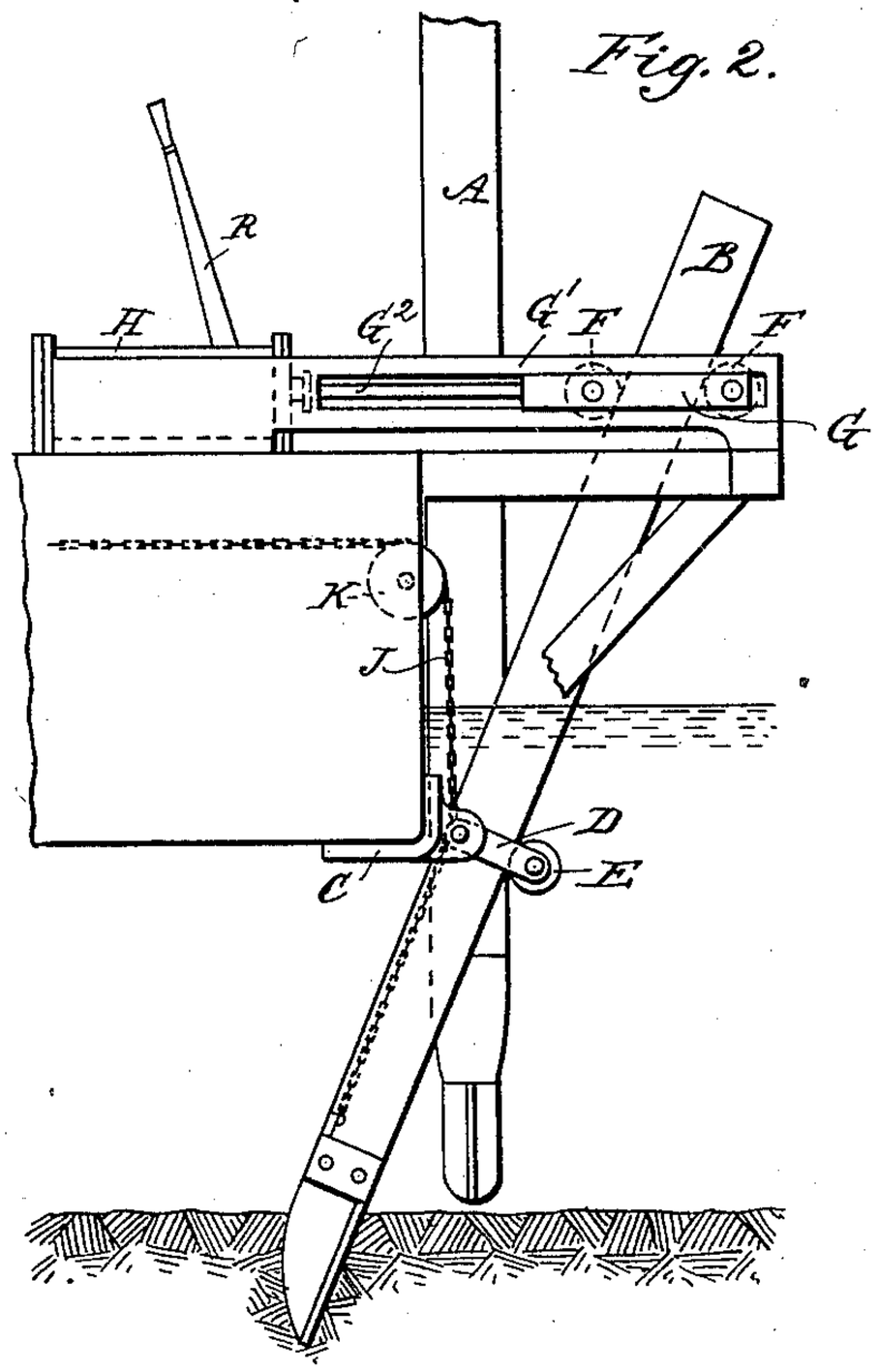

Fig. 1.

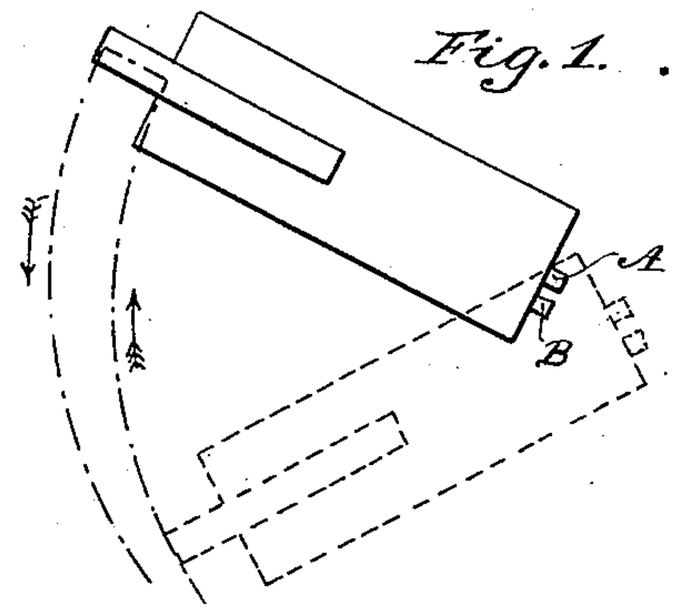

Fig. 4.

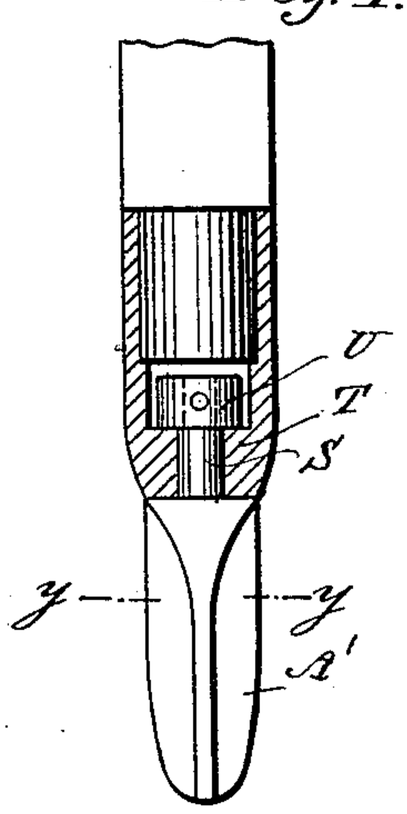

Fig. 6.

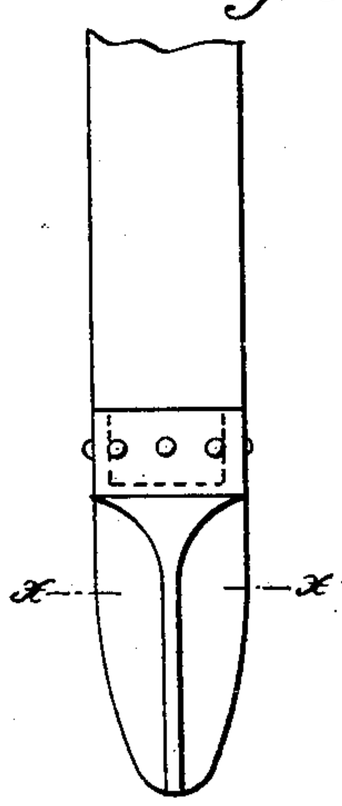

Fig. 3.

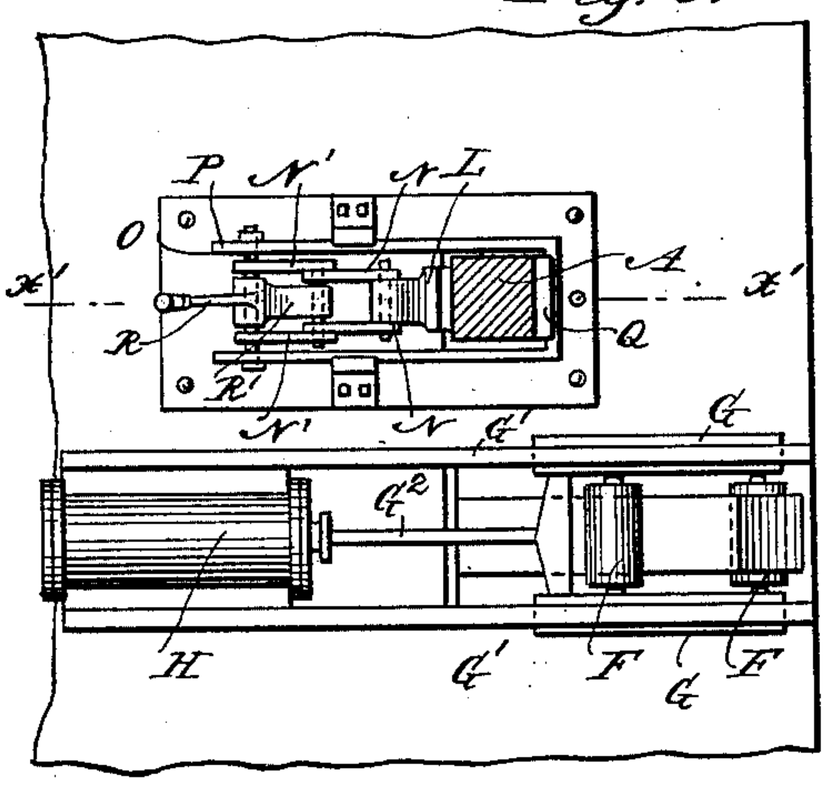

Fig. 8.

Fig. 7.

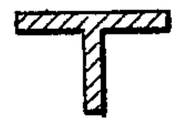

Fig. 5.

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ARTHUR W. ROBINSON, OF BUCYRUS, OHIO.

DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,141, dated May 20, 1890.

Application filed January 20, 1890. Serial No. 337,512. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. ROBINSON, a citizen of Canada, and a resident of Bucyrus, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Dredging-Machines, of which the following is a specification.

My invention relates to improvements in spuds for holding or anchoring and advancing dredging-machines; and it relates, primarily, to that class of dredging-machines in which a radial cut is taken by the digging apparatus in front—such as revolving cutters of a suction-dredge or endless chain of buckets, &c.—one of the spuds serving as a pivot about which the whole machine swings or revolves; but the improvements are obviously adapted to any class of dredge in which periodical advances are desired.

In the drawings the same reference-letters indicate the same parts in all the figures.

Figure 1 is a plan of a dredge in diagram form, showing the radial movement in dotted lines. Fig. 2 is a longitudinal section of the rear end of the dredge, showing the spuds in side view. Fig. 3 is a plan view of the apparatus shown in Fig. 2. Fig. 4 is a section of the point of one of the spuds. Fig. 5 is a sectional view of one of the frictional spud-holders shown in plan in Fig. 3, and taken on the line x' x' of that figure. Fig. 6 is a view of the end of the stepping-spud. Fig. 7 is a cross-section of the stepping-spud on the line x x of Fig. 6, and Fig. 8 is a cross-section of the spud shown in Fig. 4 on the line y y of that figure.

A is the stationary or pivotal spud, having vertical movement only, and is held in place by suitable guides, as usual.

B is an oscillating or "stepping" spud, which is used to propel the machine ahead a limited distance during the time that the pivotal spud A is raised, which is then dropped into a new position. The spuds are preferably made of iron of double channel or other suitable section. They may, however, be made of other material and of any preferred cross-section. The spud B is preferably fitted with a bladed point, having its broad surface normal to its direction of motion in order to hold well in the bottom. (See Figs. 6 and 7.) The spud A is fitted with a revolving point, to be hereinafter described. The oscillating spud B is confined to the hull of the dredge by a casting C, against which it bears, and the two links D, which, together with a roller E, encircle the spud and hold it in place, yet permitting it to oscillate and rise and fall freely. The upper portion of the spud B passes between two rollers or guide-pieces F F. These are mounted on a sliding carriage G, running in suitable guides G′ and attached to the piston-rod G^2 of the steam-cylinder H, by which the sliding carriage is drawn back and forth and the oscillation of the spud effected.

J is a chain running over a sheave K and attached to the lower part of spud B, and by which it is raised. A similar chain is used for the spud A. The spuds are held up when not in use either by the lifting-chains or other suitable means, but preferably by the frictional holders, Figs. 5 and 3, to be hereinafter described.

The action of the dredge with this arrangement of spuds is as follows: At the ends of each traverse, or when the dredge is in either of the positions shown in Fig. 1, the spud B is dropped into its inclined position, as shown in Fig. 2. Spud A is then raised and steam is admitted to the cylinder H, which brings spud B to a vertical position, (or as near to it as the operator desires,) thus causing the dredge to advance a distance depending upon the length of the spud and its angle of oscillation. The spud A is then dropped and the spud B raised and another traverse is made, which will be on an arc of a circle nearly parallel with the previous one. Consequently the digging apparatus can take a cut the whole width during the length of each traverse, whereas in systems of stepping-spuds heretofore used, in which an oscillating or propelling spud is not employed, either the curves are eccentric to a great degree, impairing the uniformity of the cut, or an entire traverse has to be made without digging in order to make the advance by change of spuds.

The grip or holding device shown in Figs. 5 and 3 consists of a cam L, with its eccentric face bearing against the spud and connected by the links N N and N′ N′ (which are pivoted together, as shown) to a pin O. The pin O is held in the strap-frame P, which encir-

cles the spud, and the links N N N′ N′ form a toggle-joint. It will be seen that when the cam is in the position shown in dotted lines in Fig. 5, the toggle-links being aligned with each other, the tendency of the spud to descend draws down the cam L, as shown in full lines, Fig. 5, until the friction caused by the pressure between the cam L and its opposite bearing-block Q is sufficient to hold it. The spud is released by the lever R opening the toggles and allowing the cam to recede. The lever R is integral with a lifting-lever R′, which has a bifurcated extremity, which engages with the pin R^2, on which the toggle-links N N and N′ N′ are pivoted, whereby the central ends of these links may be lifted. The bifurcated ends of the lifters are separated considerably, so as to avoid shock to the arm or waist of the operator consequent on the jump of the toggle-arms when first thrown off the center. It is obvious that the cam offers no resistance to hoisting the spud, whether the toggles are aligned or not.

The pivotal spud A is shod with the swiveling point shown in Figs. 4 and 8. The point consists of three or more radial blades A′, arranged so that they will penetrate the bottom readily and offer lateral resistance in every direction. The bladed point is attached to the spud by the short shaft S, which is free to turn in the metallic socket T, into which the end of the spud enters, as shown. The shaft S is secured in place by the collar U. The purpose of the swiveling point is to allow of the swinging movement of the dredge without revolving the spud in the ground, which would have a tendency to cause it to slip back under the strain. If it were made with a plain sharpened end, it would necessarily be round to permit it to revolve in the ground, and this form is ill adapted to furnish the necessary resisting surface in the ground. Furthermore, when withdrawn from the bottom the common spud-point leaves a hole into which it is liable to slip again if the new position is near to the old one, whereas the diminished section of the blades in my improved point does not leave such a cavity on being withdrawn.

I do not broadly claim the oscillating spud, as such has been used to guide the movement of the dredging-machines, nor the system of swinging the dredge radially, as such is old; but

I do claim—

1. The combination, in a dredge, of an oscillating or stepping spud having a bladed point, the broad surface whereof is normal to its direction of motion, for engaging the bottom, and means whereby the spud is oscillated, substantially as set forth.

2. The pivotal spud having a bladed point to embed in the ground and having a joint above the point, whereby the spud may turn upon its axis, but the point remain stationary, substantially as set forth.

3. A frictional spud-holding cam mounted upon a sliding axis and provided with a lever and intermediate parts, substantially as shown, whereby the cam may be moved against and retracted from the spud, substantially as set forth.

4. The combination, in a dredge, of a stepping-spud adapted to a vertical and also an oscillating motion, and means whereby the spud may be elevated, and a steam-cylinder and piston which actuate a carriage, said carriage engaging with the upper part of the spud whereby it is oscillated, substantially as set forth.

5. The pivotal spud provided with a joint whereby the spud may turn upon its axis, but the point remain stationary, substantially as set forth.

6. The combination, in a dredge, of a stepping-spud adapted to a vertical and also to an oscillating movement, and a steam-actuated carriage provided with rollers between which the spud rests, whereby it may be given an oscillating movement, substantially as set forth.

Signed at Bucyrus, in the county of Crawford and State of Ohio, this 14th day of January, A. D. 1890.

ARTHUR W. ROBINSON.

Witnesses:
R. V. SEARS,
M. V. BRUST.