(No Model.)

A. W. ROBINSON.

EXCAVATOR.

No. 471,246. Patented Mar. 22, 1892.

Fig. 1.

Fig. 2.

WITNESSES:
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EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 471,246, dated March 22, 1892.

Application filed September 22, 1891. Serial No. 406,480. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. ROBINSON, a citizen of the United States, and a resident of Bucyrus, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Dredges, Excavators, and Like Apparatus, of which the following is a specification.

My invention relates to improvements in boom-swinging and bucket-lifting devices in dredging-machines, steam-shovels, and the like mechanisms; and it consists in constructing the apparatus in such manner that one and the same pair of chains, ropes, or cables perform the dual functions of lifting the bucket and also of swinging the boom, carrying the bucket either to the right or to the left, and the apparatus is so constructed that I do away with the turn-table heretofore frequently used, substituting in place thereof a large idler-wheel placed upon the mast, which serves as a guide simply for the draft-chains which come in contact with its edge, and in my improved apparatus I not only use a single pair of chains or ropes to perform both the lifting and swinging operations, but I as well simplify the winding apparatus, because two drums adapted to independent rotation are all that are necessary to operate the chains, and my idler-wheel is so arranged in conjunction with certain sheaves fixed upon the float or frame of the machine that I can secure the same power and accuracy of operation in the machine throughout substantially one hundred and eighty degrees of swing.

In the drawings hereof, Figure 1 is an elevation of an excavator adapted to use upon a track of any kind embodying my invention. Fig. 2 is a plan of the forward portion of the same as shown in Fig. 1.

A is the base or platform of a car or other device mounted upon wheels, as shown, if designed to be used upon tracks or otherwise. Of course a float or any other structure or platform may be substituted.

B is a mast supported by the frames C and D, respectively, in any desired manner.

F is a boom fulcrumed at F in a suitable shoe G, made rotatable upon the platform in any of the many well-known ways.

H is a large idler-wheel mounted upon a hub or other suitable bearing I, which may be supported upon a collar J upon the mast, and it rotates in either direction upon the mast as its axis, turning, of course, in a horizontal plane, as shown.

K K are two sheaves which are fastened to any suitable part of the frame. They rotate upon vertical axes. L L are two other sheaves fastened to the boom E. The lower part of the periphery of the sheaves L L and the sheaves K K are placed in a horizontal plane which, approximately at least, coincides with that of the edge of the idler H. M M are two other sheaves placed at or near the extremity of the boom. All of these sheaves and also the idler H are preferably grooved on their peripheries, so that they may receive and hold the chain or rope N in a manner well understood.

O is the dipper or tong frame, and P is the dipper or dredge tongs.

Q is a stay-rod connecting the top of the mast and outer end of the boom, whereby the boom is maintained in its proper position.

The operation is as follows: The chains N N pass at their inner ends around drums having independent movement, as well understood. Both of these drums are reversed and both of the chains running out the dipper or dredge P is lowered to its proper position, the load being received by the dipper or dredge. Both of the drums are rotated equally and both chains lift the load for a short distance. Then, assuming that the load is to be swung to the right, the right-hand chain is hauled upon, but the left-hand chain is slackened. This of course is accompanied by suitable manipulation of the drums over which these chains respectively pass. The right-hand chain, owing to the presence of the idler H, and aided and directed by the sheaves K and L, over which it passes, hauls tangentially upon the boom, and consequently swings it in its direction, or, in other words, to the right, until the right-hand chain entirely leaves the idler H, the other or left-hand chain of course being meantime caused to come in contact with a larger arc of the periphery of the idler, and ultimately the parts assume a position substantially at right angles, as seen at *a*, Fig. 2, to the primary or initial position. It is manifest that after the load has been de-

posited the parts are easily drawn back again to their initial position by a reversal of the operation—*i. e.*, by slackening the right-hand chain and hauling upon the left-hand one—which, having an extensive bearing upon the idler-wheel, quickly and easily swings the boom back again. It is apparent that the parts can be swung to the left as well as to the right, and that the extent of movement may be such as desired throughout substantially one hundred and eighty degrees.

I do not broadly claim the method of swinging the boom by varying the pull of two hoisting-chains, as such is old. As commonly used, however, the spread of the chains necessary to create side draft decreases as the boom swings each way from the central position, becoming zero at right angles. A device to partially overcome this difficulty has been heretofore patented. It consists of a number of sheaves suitably fixed upon a revolving table attached to the base of boom. By my improved device a uniform side draft is obtained in a simpler and more perfect manner, and such that the spread of the chains is practically uniform throughout one hundred and eighty degrees of swing.

I do not limit myself to the details of construction shown and described, because it will be evident to those who are skilled in this art that certain modifications may be made in the details and yet my invention be embodied.

I claim—

1. The combination of a boom, a mast, an idler, two dipper-hoisting chains, and sheaves which guide the chains upon the idler, substantially as set forth.

2. The combination of a boom, a mast, an idler mounted upon the mast as its axis, two dipper-hoisting chains, and sheaves which guide the chains upon the idler, substantially as set forth.

3. The combination of a boom, a mast, an idler supported upon the mast as its axis, four vertically-arranged sheaves upon the boom, two horizontally-arranged sheaves upon the frame or platform, and two dipper-hoisting chains, the whole being constructed and arranged in such manner that the chains are guided by the sheaves upon the opposite sides of the idler, substantially as set forth.

4. In a dredging apparatus, an idler placed at or near the face of the boom, two dipper-hoisting chains, and sheaves constructed and arranged to guide the chains upon the idler, substantially as set forth.

5. The combination, in a dredging apparatus, of a boom, a horizontally-arranged idler at or near the base of the boom, sheaves upon the boom, and two dipper-hoisting chains in the same horizontal plane as the idler, substantially as set forth.

6. The combination, in a dredging-machine, of a boom, a horizontally-arranged idler at or near the base of the boom, two dipper-hoisting chains, two sheaves upon the boom, and two upon the frame or platform of the apparatus, all of them arranged in substantially the same horizontal plane, substantially as set forth.

7. The combination, in a dredging apparatus, of two chains each connected at one end with the dipper or bucket and at the other with independently-moving drums and which chains are located at opposite sides of the boom, said boom itself, an idler at or near the base of the boom, and sheaves to guide the chains, respectively, at opposite sides of the idler, substantially as set forth.

Signed at Bucyrus, in the county of Crawford and State of Ohio, this 15th day of July, A. D. 1891.

ARTHUR W. ROBINSON.

Witnesses:

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