

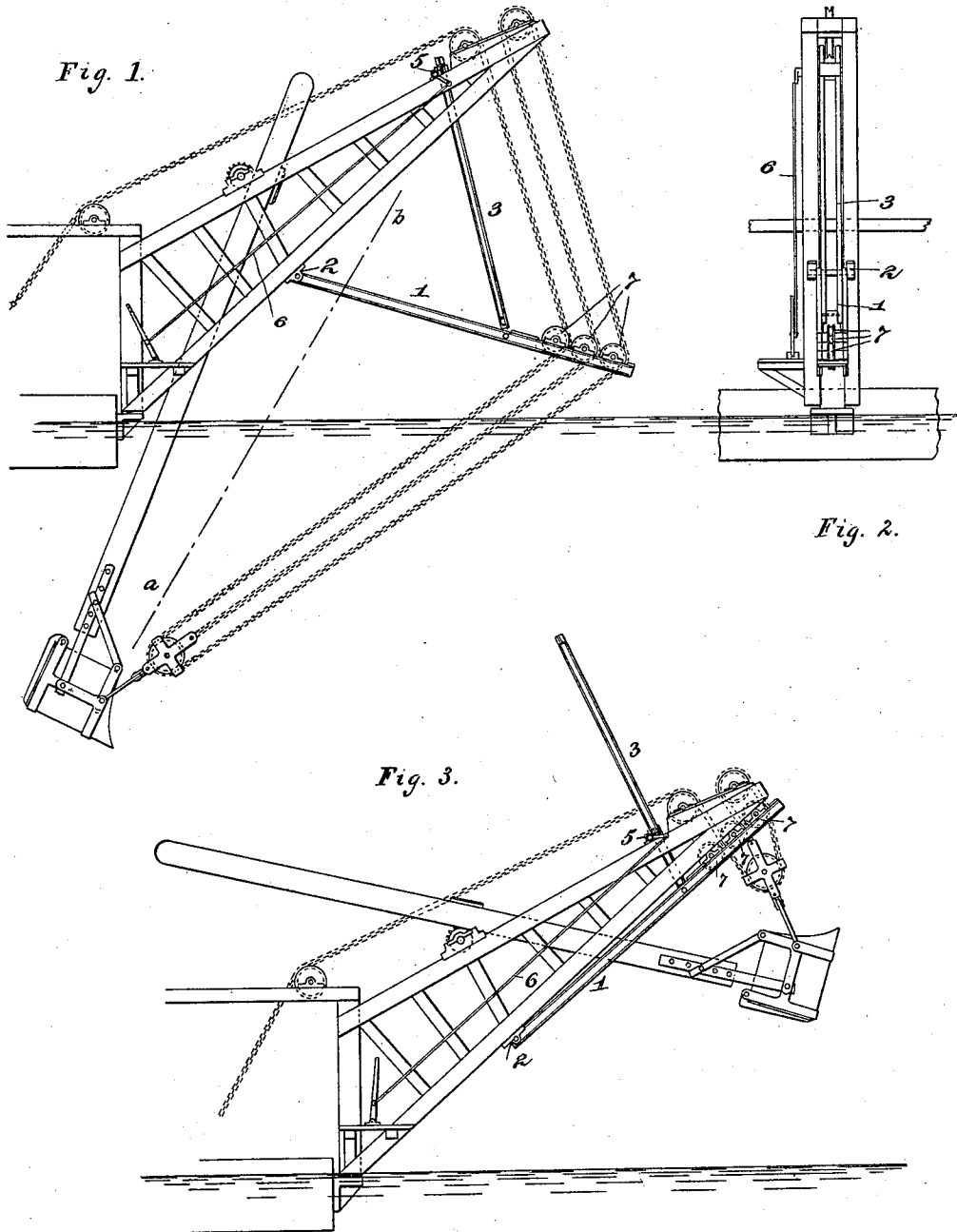
(No Model.)

2 Sheets—Sheet 1.

W. CLIFFORD.
DREDGE CRANE.

No. 578,092.

Patented Mar. 2, 1897.



Witnesses.
Geo. J. Davis
Frank Hayes

Inventor.
W. Clifford
by *Paul L. Dyer*
Attorney

(No Model.)

2 Sheets—Sheet 2.

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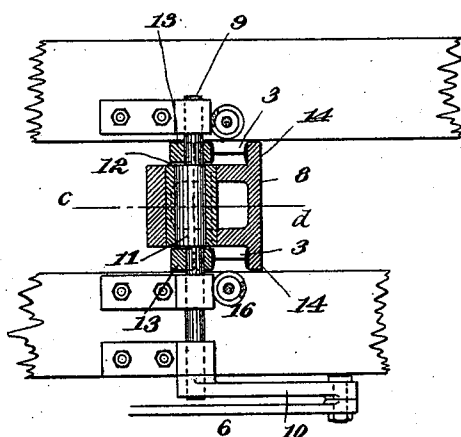


Fig. 4.

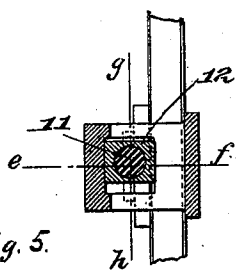


Fig. 5.

Witnesses.

Geo. F. Davis
Frank Hayes.

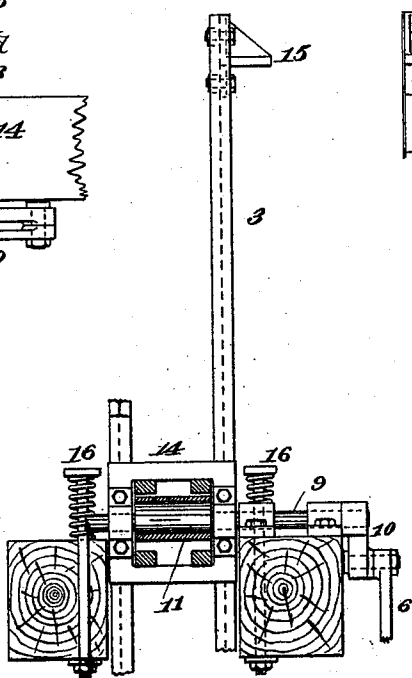


Fig. 6.

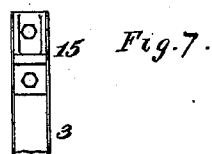


Fig. 7.

Inventor.

William Clifford
by Frank L. Dyer
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM CLIFFORD, OF DULUTH, MINNESOTA.

DREDGE-CRANE.

SPECIFICATION forming part of Letters Patent No. 578,092, dated March 2, 1897.

Application filed April 21, 1896. Serial No. 588,494. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CLIFFORD, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Dredge-Cranes; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in dredges, steam-shovels, and analogous classes of machines in which a bucket or shovel is mounted upon the extremity of a pivoted arm and is moved across the earth to be excavated by means of chains passing over a stationary crane.

In the dredge of this type as now commonly constructed when the bucket is in the lowermost position its supporting-arm is substantially parallel to the axis of the crane. The lead of the operating-chain is therefore at nearly right angles to the path of movement of the load. The power required to operate the bucket must be therefore far in excess of that required to lift the loaded bucket when it assumes a horizontal position, and the lead of the chain is substantially parallel to the path of movement.

The specific type of apparatus to which my invention relates is that wherein the operating-chain from the bucket to the crane passes over sheaves on the extremity of a swinging arm, maintained normally in an approximately horizontal position. This arm is preferably surmounted as to be rigidly locked in its normal position and to remain so secured while raising the bucket until the supporting-arms carrying the bucket are raised into engagement with the guard-arms, when the latter can be released and both rise together.

The present improvements are designed to increase the efficiency of this type of apparatus.

A preferred form of locking device forms a further improvement, and will be described and claimed.

My invention is applicable to all forms of power-operating dredges and shovels of either a marine or terrestrial nature having the characteristics mentioned, but for the purposes of illustration I will describe the inven-

tion as applied to a well-known form of bucket or dipper marine dredge.

The dredge is of the usual well-known construction and is adapted to be pivoted upon one end of a floating scow. The dredge consists of a trestle-framework carrying the dipper-supporting boom in rolling bearings near the inner extremity thereof and sheaves for supporting the operating chains or cables at the outer extremity. The operating-chains pass over a system of sheaves and blocks for multiplying power, the hauling part leading to a winch upon the deck of the scow.

In the ordinary and well-known form of dredges when the dipper is in its lowermost position the lead of the operating-chains is at an acute angle to the boom. This is shown in Figure 1, the broken line *a b* representing the lead of the chain, as is now the common practice; but as I have stated it has been proposed to employ an arm swinging from the crane, by which the most advantageous lead of the chain will be effected.

In order to better understand the nature of the said invention, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Fig. 1 is a side view of a crane with dipper down; Fig. 2, an end view of the same with dipper-arm and dipper removed; Fig. 3, a side view of a dredge with dipper raised; Fig. 4, an enlarged section of the clamp, taken on the line *e f* of Fig. 6; Fig. 5, a sectional view of the same, taken on the line *c d* of Fig. 4; Fig. 6, an end view, partly in section, of same, taken on the line *g h* of Fig. 5; Fig. 7, an end view of the upper portion of the arm shown in Fig. 6.

In all of the above views corresponding parts are represented by the same numerals of reference.

My invention consists in providing the arm 1, pivoted at 2, and maintaining the same in an approximately horizontal position by means of a bar or link 3 of special construction. With this bar or link I can employ a locking device 5 at the upper extremity thereof. This locking device is manipulated by any suitable means, such, for instance, as a hand-lever operating the lock through the intermediary agency of a rod 6, whereby the bar or link 3 may be locked at any position

of its movement. The operating cable or chain passes over sheaves 7 7 7, located adjacent to the outer extremity of the arm 1.

In order to allow the dipper to be elevated to the proper height, it is necessary to provide the arm 1 with means to permit the boom to pass beyond the pivotal point 2 of the arm. This may be accomplished by forming a slot in the inner extremity of the arm sufficiently large to allow the boom to pass within it, or the entire arm may be constructed of two parallel side portions, with an interval between them sufficiently large to permit the boom to swing forward and beyond the arm.

The preferred form of locking devices for holding down the supporting-bar 3 are shown in detail in Figs. 4, 5, and 6. The supporting-bar is preferably constructed in two independent links of double T-iron, arranged parallel and passing between the two members of the crane.

The locking-clamp consists of a block 8, arranged between the sides of the supporting-crane and supported and mounted upon a shaft 9, carrying a lever 10 upon one extremity. The lever engages with and is operated by the rod 6, connecting with the hand-lever. Upon the center of the shaft 9 is formed an eccentric 11, passing through an opening within a block 12, which is mounted within a slot in the block 8, before mentioned. Upon each side of the shaft 9 are also mounted the plates 13 13, bearing against the side faces of the bars 3 3.

The block 8 is formed with projecting ears 14 14, which engage with the opposite faces of the bars 3 3. The oscillation of the shaft 9 will force the ears 14 14 and plates 13 13 into engagement with the opposite faces of the bars 3 3 and firmly lock the same immovably, as will be evident.

In order to prevent the bars 3 3 from passing entirely through the crane, I provide the upper extremities with fingers 15, as shown in Figs. 6 and 7. These fingers may engage with the spring-buffers 16, secured to the upper face of the upper member of the crane, and will thus absorb what shock there may be upon the sudden lowering of the arm.

By means of a clamping or friction lock, as I have described, the bar or link 3 may be securely locked in any position of its movement dictated by the peculiar or special conditions under which the device may be operating.

Having now described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. In a dredge, the crane, boom and dipper thereof, the combination with the operating-chain, of an arm pivoted upon the crane, a link connecting the arm with the crane, and a lock for holding said link in its operative position, substantially as set forth.

2. In a dredge, the crane, boom and dipper thereof, the combination with the operating-chain, of an arm pivoted upon the crane, a link connecting the arm with the crane, and a lock making frictional contact with said link for locking the same in any position of its movement, substantially as set forth.

3. In a dredge, the crane, boom and dipper thereof, the combination with the operating-chain, of an arm pivoted upon the crane, a link connecting the arm with the crane, a stop at the upper end of said link, and a buffer on the crane with which said stop engages, substantially as set forth.

4. In a dredge, the crane, boom and dipper thereof, the combination with the operating-chain, of an arm pivoted upon the crane, a link connecting the arm with the crane, and a manually-operated lock engaging with said link, substantially as set forth.

5. In a clamp for dredges, the combination with the block 8, having ears 14 thereon, an eccentric 11 engaging with said block, and carrying a shaft 9, and the locking-plates 13 in combination with the links 3, 3, passing between said plates and ears, substantially as set forth.

This specification signed and witnessed this 21st day of March, 1896.

WILLIAM CLIFFORD.

Witnesses:

GEO. F. DAVIS,
FRANK HAYES.