A. S. HECKER.

LOADING AND UNLOADING APPARATUS.

APPLICATION FILED MAY 26, 1917.

1,409,715.

Patented Mar. 14, 1922.

2 SHEETS—SHEET 1.

Fig. 1

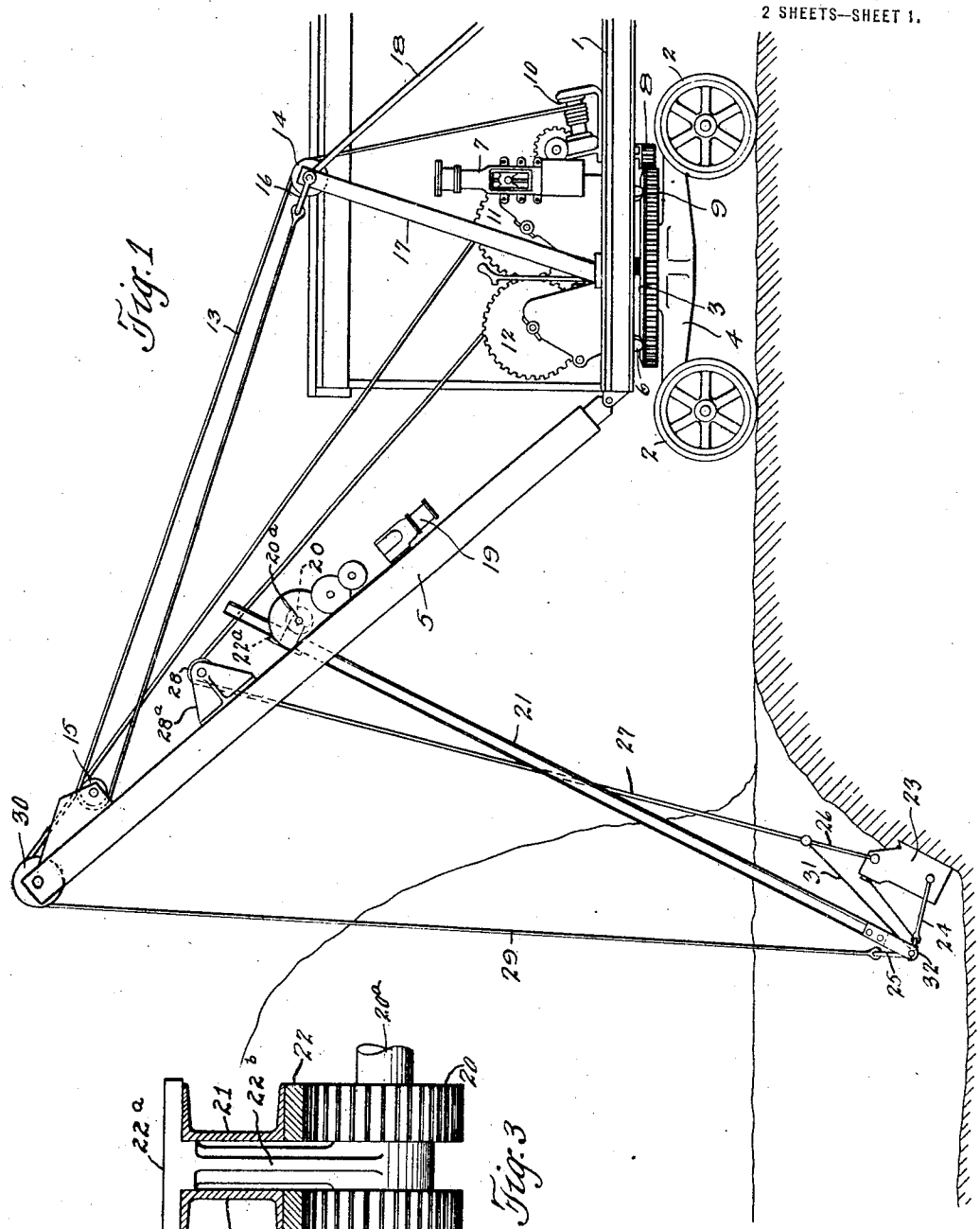


Fig. 3

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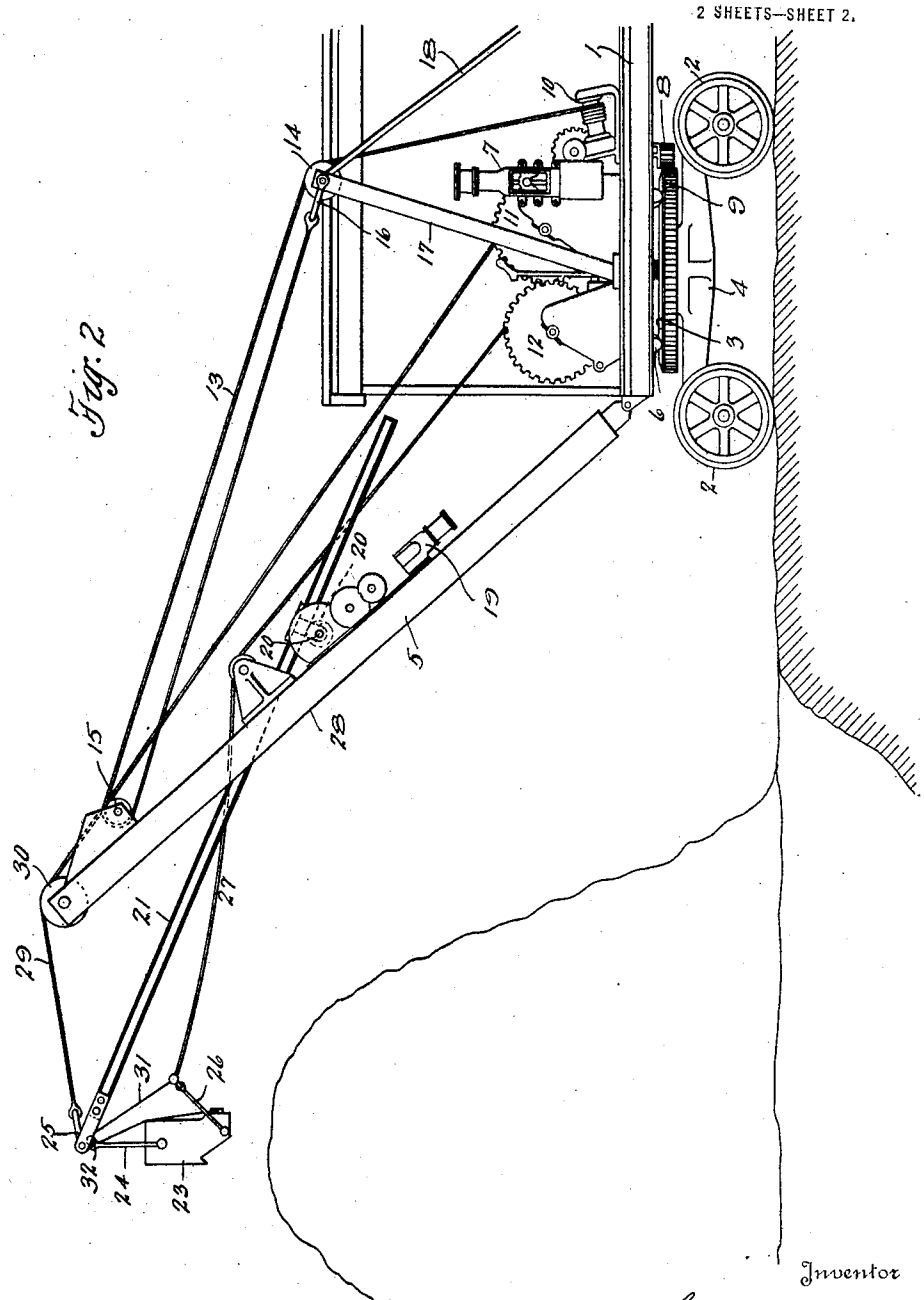
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2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

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LOADING AND UNLOADING APPARATUS.

1,409,715. Specification of Letters Patent. **Patented Mar. 14, 1922.**

Application filed May 26, 1917. Serial No. 171,107.

To all whom it may concern:

Be it known that I, ARTHUR S. HECKER, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Loading and Unloading Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to loading and unloading apparatus, and has for its general object to provide an apparatus of this character having a wide range of operation and one which will render more positive and direct the control of the load carrying device. A further object of the invention is to enable the apparatus to be operated in an extremely efficient and convenient manner. Further and more limited objects of the invention will appear hereinafter.

In the drawings forming part hereof, Fig. 1 represents a side elevation of my apparatus showing the parts in the positions assumed when the load carrying device is taking its load; Fig. 2 a similar view showing the positions of the parts when the said device is in its unloading position; and Fig. 3 a detail in section of the connections for operating the rigid members to which the load carrying device is connected.

Describing by reference characters the various parts illustrated herein, 1 denotes the deck or platform of a carriage of the "steam-shovel" type. This carriage is shown as provided with wheels 2 and a turn table 3 mounted on a truck 4. 5 denotes a boom on the deck or platform, which is rotatably mounted on the turn table by means of the wheels 6, in the usual manner. 7 denotes an engine which, through standard suitable connections (not illustrated) is adapted to rotate the pinion 8 meshing with the gear 9 on the platform 3, thereby to rotate the deck or platform 1; 10 denotes a drum on the platform 1 driven by the engine 7 in any suitable manner, and 11 and 12 denote the geared heads of two other drums mounted on said platform. 13 denotes a lifting line for the boom 5, said line being wound upon the drum 10 and extending over a sheave 14, thence around a sheave 15 near the outer end of the boom. The end of this line is shown as fastened to a bail 16, which may be conveniently pivoted to the shaft of the sheave 14, said shaft being journaled in a suitable strut 17 having a guy 18 secured at one end thereto, the opposite end being led and secured to the carriage.

19 represents a crowding engine on the boom 5, said engine being adapted, by suitable standard driving connections (not shown) to operate a pinion 20. The boom 5 is preferably of forked construction and is adapted to receive between the side members thereof a longitudinally adjustable rigid member 21, said member being constructed in substantially the same manner as the ordinary "dipper stick" of a steam-shovel. The member 21 is provided with racks 22 adapted to mesh with the pinions 20.

Attached to the outer end of the member 21 is a load carrying device. The device shown herein is a drag-line bucket 23 which is pivotally suspended by a chain sling 24 from the end of the dipper stick, as by means of a bail or clevis 25. To the front or load receiving portion of the drag-line bucket is attached a chain bridle 26. The bridle 26 is connected at its forward end to a pulling or loading line 27 which extends substantially parallel with the dipper stick 21 around a sheave 28 carried by a bracket 28^a above the side members of the boom 5 and thence to one of the winding drums on the carriage platform, the drum shown herein being provided with the geared head 12. Connected to the outer end of the dipper stick is a lifting line 29 which passes over a sheave 30 on the end of the boom 5 and thence to another winding drum on the carriage, the drum shown being the one provided with the geared head 11. In Fig. 3 there is shown the pivotal driving connection between the member 21 and the boom 5. This connection includes the racks 22 and the pinions 20. A saddle block 22^a having a central projection 22^b extending between the sides of the member 21 and pivoted on the pinion shaft 20^a serves to maintain a driving connection between the racks and the pinions notwithstanding the swinging of the member 21 about such shaft.

In operation, the boom 5 may be set at any desired vertical angle by operating the drum 10. The dipper stick may be moved inwardly and outwardly, as desired, by operating the drum 20 through the crowding engine 19 and may be quickly and conveniently placed in operative relation to the work by reason of such adjustment and by means of the line 29. In the drawing, the bucket is

shown as operating upon the side of an excavation. In practice, the excavating may proceed to such point as will bring the wall of the excavation in extremely close proximity to the carriage, the adjustability of the member 21 permitting this action; and this action may, if desirable, be further facilitated by elevating the boom 5. Furthermore, in practice, I will make the rigid member much longer than that employed for the ordinary dipper stick, whereby the range of action may be correspondingly increased.

The bucket 23 having been placed in operative relation to the work by means of the member 21, the loading line 27 is wound upon a suitable drum and the crowding engine is operated at the same time to move the member 21 so that the bucket 23 is free to be dragged along the ground and to take its load in the usual manner. When the member 21 and the line 27 have been taken in to the desired extent, the crowding engine may be stopped and the pull upon the line 27 will then tilt the bucket to its load-carrying position, this tilting being accomplished through the dumping line 31. This line is fastened at one end to the line 27, or the bridle 26, and extends about a sheave 32 on the end of the member 21 and is connected at its fixed end to the front of the bucket. With this arrangement it will be evident that, by tautening the line 27 with reference to the member 21, the bucket 23 will be caused to assume an upright or load-retaining position. The member 21 may then be swung in a vertical plane about its pivot by means of the line 29. The boom 5 may then be rotated in the usual manner until the member 21 and bucket 23 are at the desired unloading station, whereupon the bucket may be dumped by slacking off the line 27, allowing the bucket to pivot upon the slings 24 to dumping position.

It will be noted that the loading line 27 extends substantially parallel to the member 21. This enables me to handle the bucket in an extremely efficient manner. Furthermore, it has the advantages over leading the line directly to the drum on the carriage platform in that the line operates more nearly parallel to the lifting line 29 and that it does not form an appreciable angle with the member 21 whereby there will be any tendency to buckle or break the said member through setting up on the line. A further and important advantage of my invention resides in the fact that, by the construction shown, the bucket may be quickly and positively placed in both its loading and unloading position, the bucket being controlled by means of the member 21 and said member being adjusted by the operator in charge of the crowding engine. Ordinarily it will be unnecessary to raise and lower the boom 5, and the adjusting of the dipper stick will be sufficient to accommodate all ordinary ranges of operation. However, should it be desirable to increase somewhat the outer limit of such operation, the boom 5 may be lowered, thus bringing the pivotal point for the member 21 further away from the carriage. Also, by elevating the boom 5 to a nearly vertical position, this pivotal point may be brought nearer to the carriage, and the dipper stick or member 21 may operate close to the platform without requiring its lower end to be swung inwardly beyond a vertical line. Because of the length of the member 21 and the convenience of operating the same, vertical adjustment of the boom 5 will ordinarily be unnecessary.

The member 21 may be run inwardly by operating the pinions 20 in the appropriate direction from the crowding engine 19. The operation in the reverse direction may be accomplished either by reversing the crowding engine or by the employment of a clutch whereby the driving connection between the pinion 20 and the engine may be broken, thereby to enable the said member and the bucket or other load-carrying device supported therefrom to be run outwardly by gravity, merely slacking off the lines 27 and 29.

For the purpose of guiding the lines 27 and 29, sheaves are preferably employed; but I do not contemplate limiting the guiding means to the particular elements shown herein or otherwise to limit the scope of the invention except as such limitation may be rendered necessary by the state of the prior art.

Having thus described my invention what I claim is:

In an apparatus of the character described, the combination, with a platform, of a swinging boom, a rigid member pivotally supported by said boom, power means on said boom for moving said member in the direction of its length, a drag line bucket, a sling suspending said bucket from the outer end of said member, a loading line connected to said bucket and extending over a sheave located adjacent to the pivotal connection between said member and said boom, a dumping line connected at one end to the loading line and at its opposite end to the bucket and extending around a sheave on said member, a lifting line connected with said member and guided by said boom, and means for taking in and slacking off the loading and lifting lines.

In testimony whereof, I hereunto affix my signature.

A. S. HECKER.