No. 863,668. PATENTED AUG. 20, 1907.

A. SUCK.

COAL HOISTING APPARATUS.

APPLICATION FILED DEC. 14, 1905.

4 SHEETS—SHEET 1.

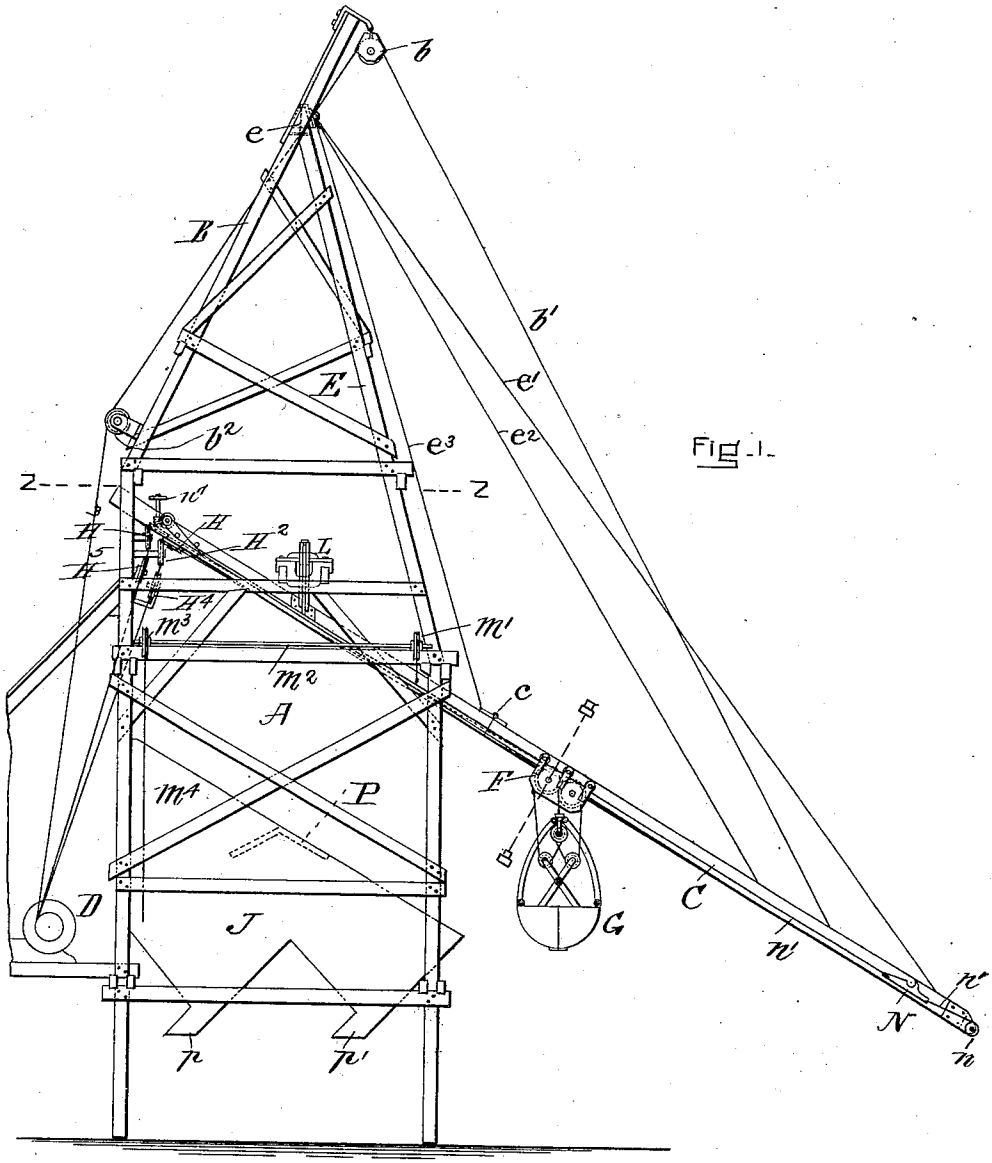


Fig. 1.

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THE NORRIS PETERS CO., WASHINGTON, D. C.

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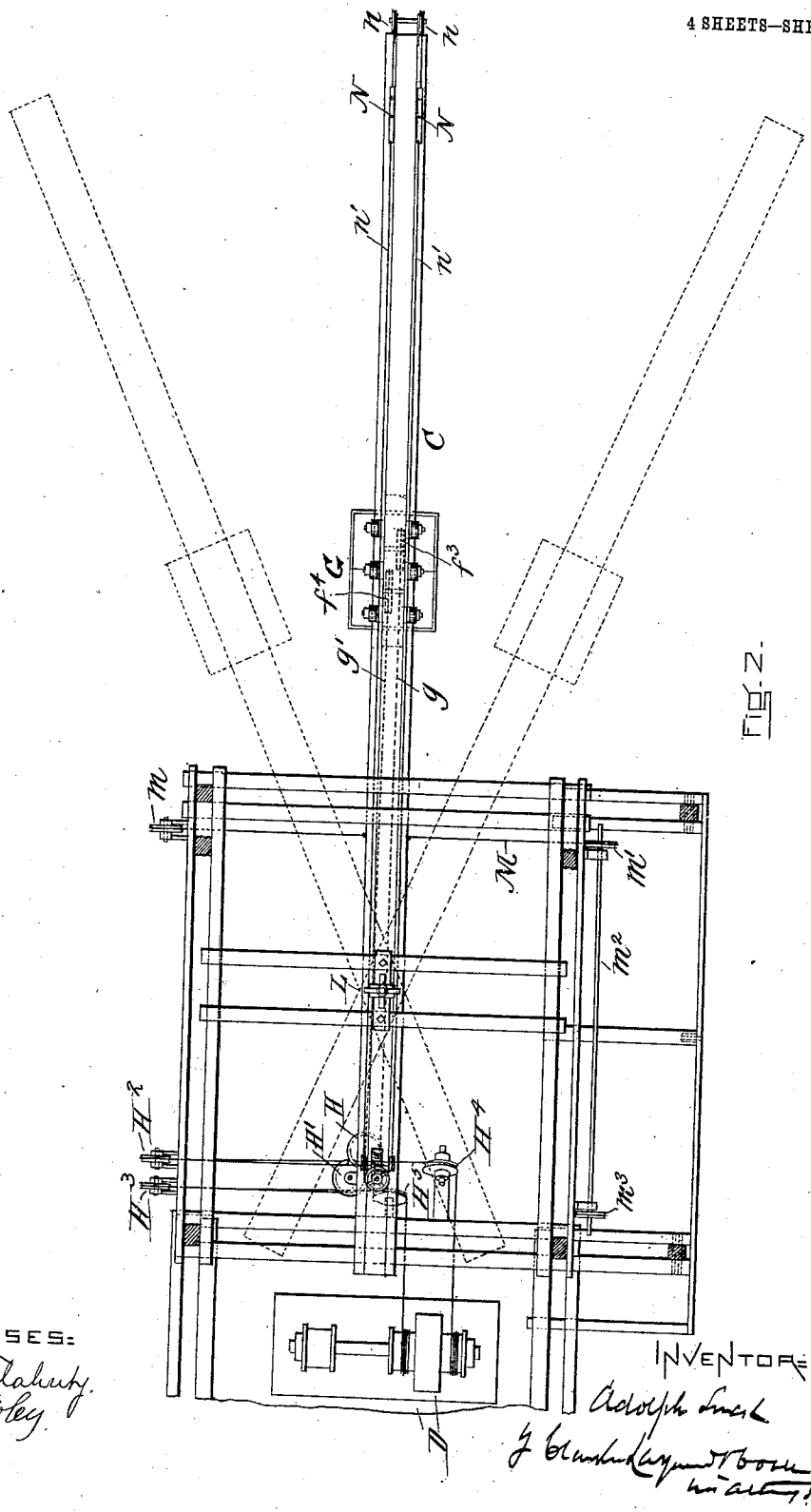


FIG. 2.

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4 SHEETS—SHEET 3.

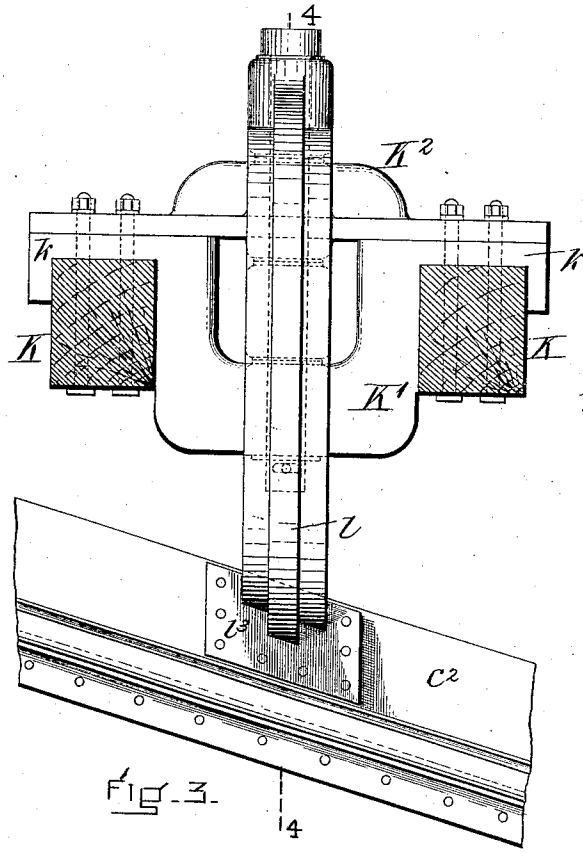


Fig. 3.

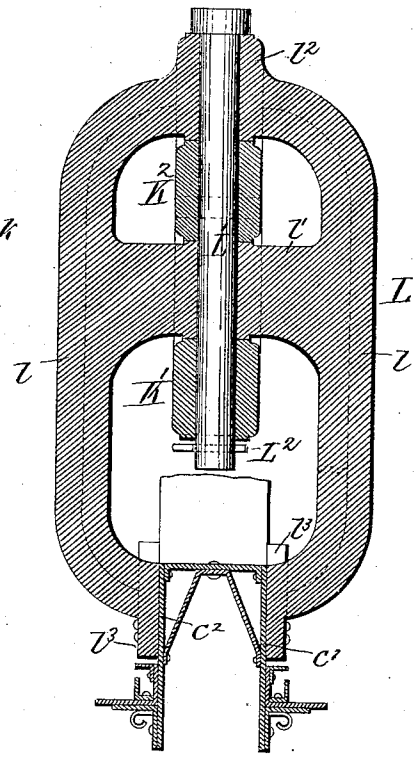


Fig. 4.

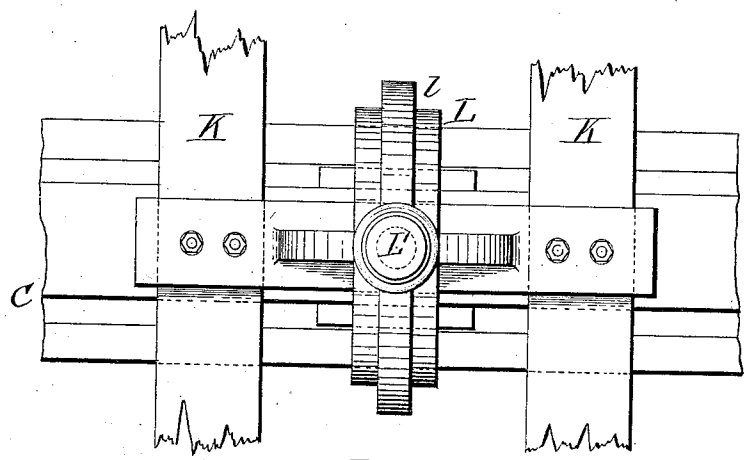


Fig. 5.

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No. 863,668. PATENTED AUG. 20, 1907.

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4 SHEETS—SHEET 4.

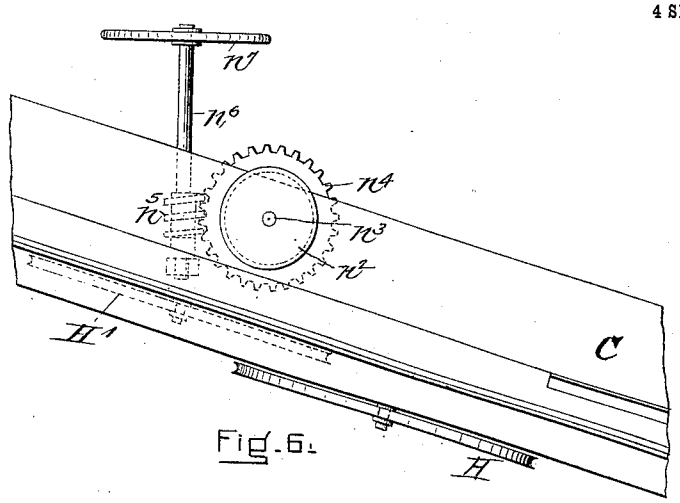


Fig. 6.

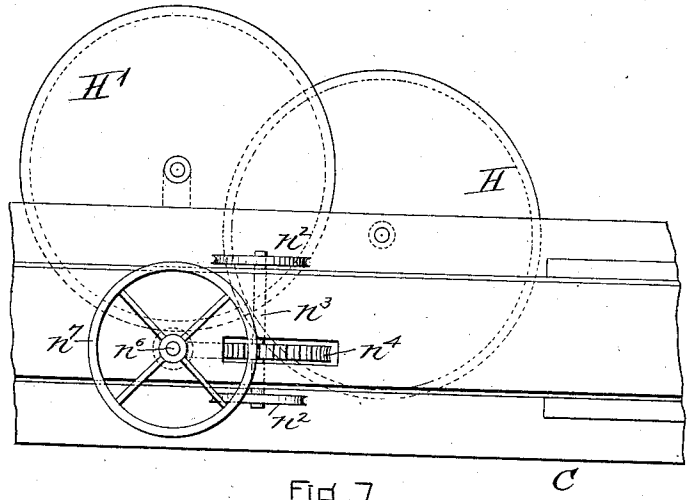


Fig. 7.

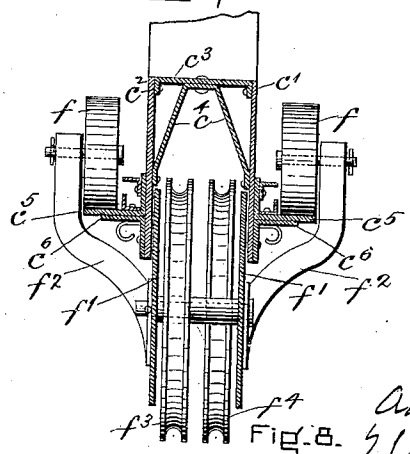


Fig. 8.

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UNITED STATES PATENT OFFICE.

ADOLPH SUCK, OF BOSTON, MASSACHUSETTS.

COAL-HOISTING APPARATUS.

No. 863,668. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed December 14, 1905. Serial No. 291,670.

To all whom it may concern:

Be it known that I, ADOLPH SUCK, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Coal-Hoisting Apparatus, of which the following is a specification.

The invention relates to that class of coal handling apparatus in which the boom is supported to turn about a vertical axis so that the grab carried thereby may be available to unload coal located within a considerable arc without moving the supporting tower. This construction is especially adapted for stationary towers. In such apparatus it is desirable that the pivot by which the boom is supported shall be located within the tower frame and well towards the rear end of the boom, and it is also desirable that the boom shall lie at an angle to the horizontal.

My invention is shown in an apparatus embodying all these features and carrying a hopper or chute by which the coal raised and dumped by the grab may be directed to a cart or other receptacle under the tower.

It consists in an apparatus of the general construction described and in various details of construction to be described below.

The invention will be understood by reference to the drawings in which—

Figure 1 is a side elevation of an apparatus embodying my invention. Fig. 2 is a horizontal section on line 2—2 of Fig. 1. Fig. 3 is an enlarged detail showing the pivoting mechanism in side elevation, its supports being in section. Fig. 4 is a section on line 4—4 of Fig. 3. Fig. 5 is a plan of the mechanism shown in Fig. 3. Figs. 6 and 7 are details, showing, respectively, in side elevation and plan, the stop operating mechanism, and Fig. 8 is a detail, showing the trolley and its position on the boom.

The various parts of the tower proper are indicated by the letter A. It will be noted that it is in ordinary form, except that its upper portion is continued by means of the beam B to carry a sheave b over which passes the rope b^1, one end of which extends down to the end of the boom C and the other over the sheave b^2 to the engine indicated diagrammatically at D. The boom C is hinged at c, and the rope b^1 serves to raise and lower the end of the boom. A beam E extends up from the front of the tower towards the top of the beam B to support it at the point e where the various guy lines e^1, e^2 and e^3 for supporting the boom C, are hung and preferably by a pivotal connection which turns as the boom turns. The boom C may be of any one of the well known constructions for the purpose of furnishing a track upon which a trolley runs. I prefer, however, to make it as shown in Fig. 8, that is, comprising two plates c^1 and c^2, joined at the top by a plate c^3 suitably supported by braces c^4. Upon the side of each plate c^1, c^2, are bolted L-beams c^5 and c^6, the upper one of which serves as a track for the trolley wheels f, the under one c^6 being reversed and serving as an additional brace therefor.

The trolley F comprises two plates f^1, to each of which are bolted arms f^2 each of which carries at its upper end the axle for one of the trolley wheels f. The plates f^1 are arranged to slide within the boom and between its plates, c^1 and c^2, and between the plates f^1 are sheaves f^3, f^4, over which the grab hoisting ropes pass.

G is the grab which may be of any suitable kind, the hoisting and dumping ropes of which g, g^1 pass over the sheaves f^3, f^4 and rearward over sheaves H, H^1, sheaves H^2, H^3, pivoted on the side of the tower, and sheaves H^4, H^5, to suitable drums on the engine D. The sheaves H, H^1 are mounted upon the boom C near its rear end. The other sheaves referred to are suitably mounted to allow the boom to be swung about its pivot without interfering with the draft on the grab ropes. It will be apparent that the sheaves may be otherwise mounted, than as shown in the drawings for this purpose. It will be noted that by this means the grab is not only hoisted vertically but by the proper use of the hoisting rope the trolley is at the same time pulled up the boom to the point from which the dumping is to take place; then by giving an extra draft to the dumping rope g^1 the grab is dumped into the cart or other receptacle. In the form of my invention shown, the trolley and grab will move outward and downward by gravity. If the boom is horizontal, the trolley will be moved outward by means provided for that purpose. Such means are well known in the art.

In the drawings there is shown a hopper J located at the bottom of the tower and provided with suitable chutes, it being intended in this form of my apparatus that the contents of the grab shall be dumped therein.

The boom C is supported to be turned about a vertical pivot in the following manner (see Figs. 3, 4 and 5):—K, K are crossbeams mounted on the frame and supporting the yoke-piece K^1, the arms k of which rest upon the beams K, K. A cap-piece K^2 is bolted through the arms of this yoke-piece to the beams K. L is a pivot support comprising two side arms l joined together by a crossbar l^1 and a head l^2, the parts being integral. The lower ends of the arms l terminate in plates l^3 which are bolted to the sides c^1, c^2 of the boom these plates l^3 being so shaped and proportioned as not to interfere with the movement of the trolley. A headed pin L^1 passes down through a suitable passage in the support L and through the cap-piece K^2 and yoke K^1 and may be held in place by a cotter pin L^2 which passes through its lower end, or in any other desirable way. It will be seen that by this construction the boom may be turned through a very considerable arc about its vertical axis, this turning being accomplished by means located within the tower and in the rear of the pivot, and it will also be noted that as the guys b^3

all run to the point c, which is substantially above the pivot or pin L^1, the boom can be thus turned without changing the length of the guys. The means for turning the boom about this pivot L^1 comprises a chain M, the two ends of which are fastened to the two sides of the boom C, the intermediate portion of the chain passing over sprockets m, m^1, carried in suitable bearings, one on each side of the tower. The sprocket m^1 is on the end of the shaft m^2 running to the rear of the tower and carrying a second sprocket m^3 over which passes an operating chain m^4,—an endless chain extending down within reach of the engineer. By pulling this chain the shaft m^2 is turned thus pulling the chain M in either direction by means of the sprocket m^1 so that the boom may take either one of the positions indicated in Fig. 2, or any other desired position with relation to the work to be done.

It is desirable in work of this kind that the boom should be provided with a stop in order that the trolley shall not overrun the hatch, or other point, over which it is desired that it shall be dropped. Such stops and their relation to the trolley and to the boom itself are well known and therefore the stop shown in the drawings at N is only shown diagrammatically. I have, however, shown means for setting this stop at any desired point upon the boom C, comprising sheaves n at the lower end of the boom and endless chains n^1, the two ends of each of which are fastened to the stop N, one chain running on each side of the boom C. The stop, it will be understood, is double, one stop being located to receive each trolley wheel. The two chains pass up to the upper end of the boom and there each passes around a sprocket wheel n^2, these sprocket wheels being mounted upon a common shaft n^3 carrying a gear n^4 operated by a worm n^5. The shaft n^6 carrying this worm n^5 also carries at its upper end a handwheel n^7 by means of which this mechanism may be operated to move the sprockets n^2 in either direction and so move the chains n^1 to either raise or lower the stop N on the boom.

While I have described these various matters in detail, I do not mean to limit myself to the exact construction shown in my drawings, as I believe it is new to pivot a boom within the tower structure, or over the area of its base and in such a way that the trolley may pass outside the pivot.

I have referred to the hoisting rope b^1. The purpose of this rope is to lift the boom, turning it about its hinge c when the apparatus is out of use.

While I have shown my invention mounted upon a stationary tower, it is evident that it may be embodied as well in a movable tower.

I have shown in Fig. 1, in dotted lines P, a deflector which is located at the edge of the hopper J and serves to deflect the coal received from the grab so that it will be thrown into either one of the two legs of the hopper, p, p^1, and not upon the connection between them.

What I claim as my invention is:—

1. In a coal handling apparatus, a tower, a boom pivoted within the frame of the tower to turn upon a vertical axis and provided with guys also connected with the tower in substantial alinement with the axis of said boom, as set forth.

2. In a coal handling apparatus, a boom pivoted within the frame of the tower to turn upon a vertical axis and provided with guys also connected with the tower in substantial alinement with the axis of said boom, a trolley adapted to run on said boom, a grab movable with said trolley, means for operating said grab, and means independent of said grab operating means for turning the boom about its vertical axis.

3. In a coal handling apparatus, a tower, a boom pivotally mounted within the base of said tower to turn on a vertical axis, guys to support the outer end of said boom, and a support for the upper ends of said guys also located within the base of said tower and substantially in line with the axis of said boom, whereby the strain from said boom is distributed substantially equally over said tower as described.

4. In a coal handling apparatus, a vertically pivoted boom and means whereby it is pivoted, comprising a support attached to said boom, a yoke-piece, supports on said tower for said yoke-piece, and a pin joining said support and yoke-piece as described.

5. In a coal handling apparatus, a tower, a pivotal support suitably mounted and located approximately at equal distances from the sides of said tower, and a boom having trolley tracks located on each side thereof and mounted to hang from said pivotal support, and a trolley adapted to run on said trolley tracks from one end to the other thereof, whereby a loaded grab may be raised and carried diagonally past said pivotal support and through said tower to the further side thereof, as set forth.

6. In a coal handling apparatus, a tower, a boom pivoted within the frame of said tower to turn upon a vertical axis, and means for turning said boom upon said axis comprising a chain attached at each end to said boom, and means whereby said chain may be drawn in one direction or the other to move said boom about said axis, as described.

7. In a coal handling apparatus, a pivot support comprising two arms and crossbars connecting said arms, a yoke, a support for said yoke and a pivot pin passing through said yoke and said pivot support, a boom, connections between said boom and said arms, and trolley tracks for said trolley located on said boom whereby said trolley my run on said tracks past said pivot support without engagement with the arms thereof as described.

8. In a coal handling apparatus, a tower, a boom pivotally mounted therein upon a vertical axis, means for turning said boom about said vertical axis comprising an endless chain, the ends of which are attached to said boom, the intermediate portion thereof running over sprockets, said sprockets, a shaft carrying one of said sprockets, and means for rotating said shaft as described.

9. The coal handling apparatus above described comprising a tower, a boom pivotally mounted within the frame of said tower and provided with guys supported in substantial alinement with and above the pivot of said boom, said boom extending rearwardly from said pivot, a trolley adapted to run on said boom from end to end thereof, a grab carried by said trolley, and means acting upon the rear end of said boom whereby said boom may be turned about its pivot, as described.

10. In a coal handling apparatus, a tower, a boom pivoted within the frame of said tower to turn upon a vertical axis, guys also connected with the tower in substantial alinement with said axis, said boom being hinged and provided with means such as a hoisting rope whereby its outer end may be lifted, a sheave to guide said hoisting rope, said sheave being supported from said tower and within the area of its base whereby the entire strain of the coal handling operation is supported within the frame of the tower, as described.

11. In a coal handling apparatus, a tower, a boom pivoted thereto to turn upon a vertical axis, the pivot of said boom being located between the ends thereof and said axis being supported at substantially equal distances from the walls of said tower, a trolley running upon said boom and adapted to pass from without said tower to a point beyond said pivot and approaching the further wall of said tower, as described.

ADOLPH SUCK.

In presence of—
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M. V. FOLEY.