

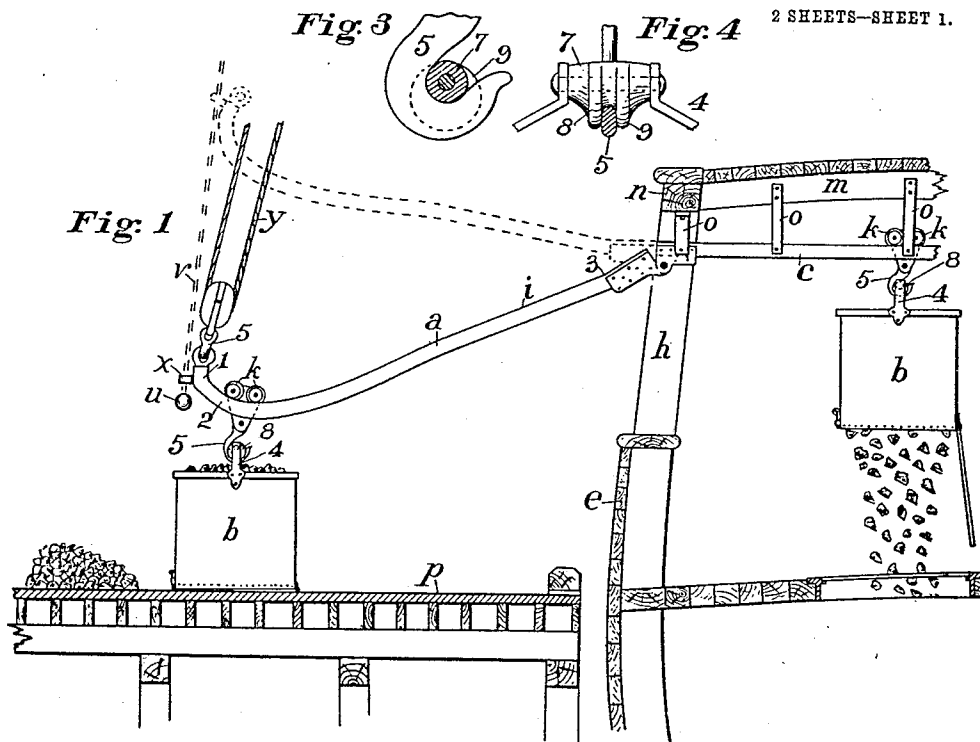
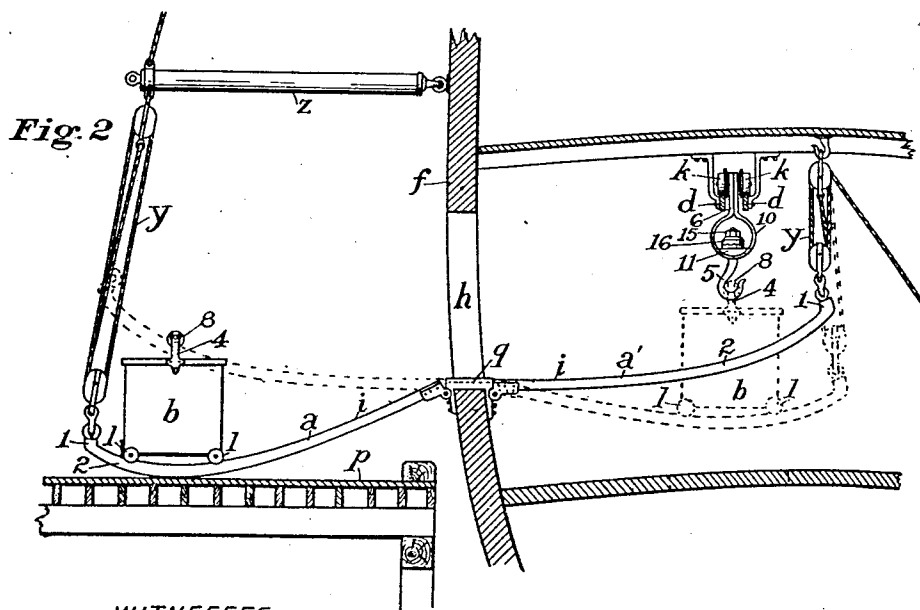
No. 809,618.

PATENTED JAN. 9, 1906.

A. W. KEECH.
LOADING AND UNLOADING DEVICE.

APPLICATION FILED OCT. 15, 1903.

2 SHEETS—SHEET 1.



WITNESSES:
P. H. Lander,
J. M. Kallach

INVENTOR,
A. W. Keech,
by A. H. St. Marie
atty

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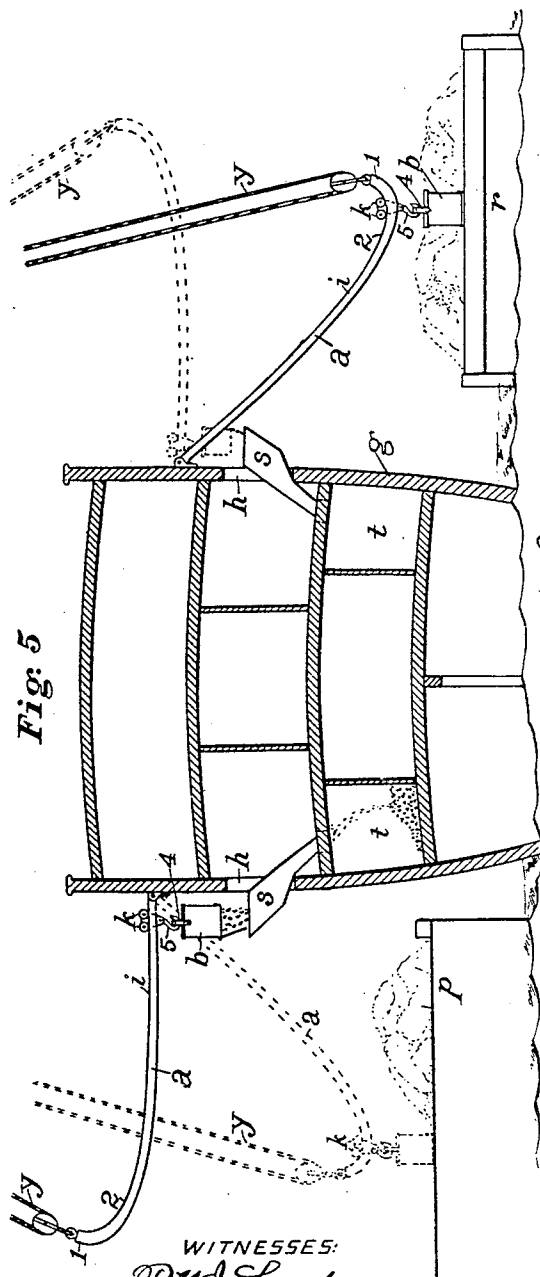


Fig. 5

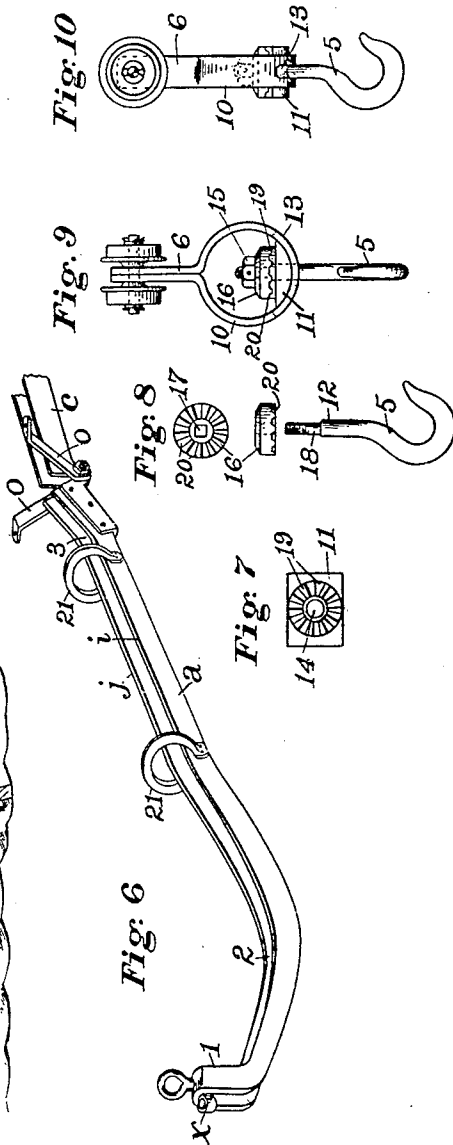


Fig. 6

Fig. 10

Fig. 9

Fig. 8

Fig. 7

WITNESSES:
P. W. Lender
J. M. Kallcock

INVENTOR.
A. W. Keech,
by A. H. Ste Marie
att'y

UNITED STATES PATENT OFFICE.

ALVIN WELTY KEECH, OF HILO, TERRITORY OF HAWAII.

LOADING AND UNLOADING DEVICE.

No. 809,618.

Specification of Letters Patent.

Patented Jan. 9, 1906.

Application filed October 15, 1903. Serial No. 177,205.

To all whom it may concern:

Be it known that I, ALVIN WELTY KEECH, a citizen of the United States of America, residing at Hilo, in the county of East Hawaii and Territory of Hawaii, have invented certain new and useful Improvements in Loading and Unloading Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to the art of and to appliances for handling and transferring loads. It is thought to be capable of general application. However, it was primarily designed as a coaling device for vessels, and in order to be clear and concise the present statement will be restricted to this single application considering that all its uses can be inferred therefrom and that the character of the load handled or transferred has no bearing either on the construction or on the operation of the device.

It is of common knowledge that steamships which are bound upon long voyages or are constantly in service must carry a large supply of coal wherewith to generate their steam and that the time and labor spent in putting this coal aboard (like the cost of the fuel itself) are wholly chargeable to the expense account. Anything, then, that will operate to reduce the time and labor thus consumed will effect just so much of a clear saving on the capital invested; but so far as I am aware nothing better for the purpose has hitherto been devised than the sling or rope and bucket and chute contrivance with which some wharves and lighters are equipped. To take in coal with such facilities where the same exist is a slow process under the most favorable conditions and oftentimes masters of vessels prefer or are compelled to resort to the primitive method of coaling with baskets and wheelbarrows in order that their coal may be run in through all available ports at once, a method of coaling which necessitates the employment of an army of toilers trooping up and down narrow planks and who are not all endowed with a placid disposition nor all addicted to the use of the most refined language. Delays cannot be avoided even by following the same and similar methods, and it is no infrequent occurrence for a vessel to quit coaling and leave with a short supply for want of time.

My invention has for its especial object to supplant "basket-coaling" and the like or any known substitute by providing an efficient device whereby a ship can be coaled quickly,

quietly, and at comparatively small expense and withal consisting of but few parts whose functions can be comprehended without effort by the dullest intellect and the operation whereof will not be fraught with danger for nor be impeded by the careless or the idiotic.

This device is intended to do away with every form of irksome manual labor usually connected with the loading of a ship with coal, except what is strictly necessary to put the coal into carriers and to trim the bunkers into which they are emptied. It therefore includes suitable carriers and means for transferring them from the place of supply to the ship's hold, means for guiding them on their line of travel, and means for swaying them off their normal course to clear obstacles, and generally it consists of the construction, arrangement, and combinations of parts set forth in the following detailed description and further pointed out in the subjoined claims.

In the accompanying drawings, Figure 1 shows an elevation of one form of the device that is suitable for steamers of the middle and smaller classes, the view showing also part of such a steamer in diagrammatic cross-section and a like section of a wharf from which the supply of coal is supposed to be taken. Fig. 2 is a similar view illustrating a modified form of the invention. Figs. 3 and 4 are details of a bail attachment specially designed to enable the carriers to be hooked and suspended in such a way that they will not turn while in transit. Fig. 5 illustrates the invention applied to a steamship of the largest class, the latter being shown in cross-section diagrammatically and represented as being coaled at once from both sides. Fig. 6 is a detailed view in perspective of a hinged arm used in connection with the said carriers or any of them and shows the preferred construction thereof when the same is to be applied as in Figs. 1 and 5. Figs. 7 to 10, inclusive, are details pertaining to the most complete form of carrier comprised in the invention.

Similar letters of reference wherever they occur indicate corresponding elements.

This coaling device may be said to consist of an arm *a* in hinge connection with the ship to be coaled and of a carrier *b*, combined therewith, the latter receiving the coal and the former transferring it from the loading-point to the place of deposit in the ship. Connecting lines or tracks, as *c d*, Figs. 1 and 2, arranged to traverse the vessel abeam and also to run through it lengthwise in the di-

rection of the keel are added to complete the invention and adapt it to various conditions. The different forms of ships or vessels (shown in Figs. 1, 2, and 5) are respectively lettered *e*, *f*, and *g*, and their several coal-ports are designated by *h*. By preference one arm *a* is provided for each port *h* and likewise one carrier *b* will be allotted to each arm, usually. The aforesaid arm and carrier can be conveniently operated together in either of the two ways illustrated in the drawings—that is, by suspending the carrier from the arm, as represented in Figs. 1 and 5, or else having the arm support the carrier from under, as Fig. 2 shows. In either case the arm is preferably made double, as detailed at Fig. 6, that the carrier may have a proper and secure bearing thereon and may always be correctly positioned with regard to the port which it is destined to reach or enter. Fig. 6 accordingly shows the said arm composed of two flat metal bars facing each other and kept parallel at a suitable distance apart, so that their upper edges *i*, *j* will constitute a pair of rails and afford a track or railway either for an upper truck *k* or an under truck *l* of the carrier. Both these trucks are used with the carrier illustrated in Fig. 2. The two said bars of the arm *a*, it will be seen, are united at the outer end, and at the inner end they are adapted to be hinged to, at, or by the side of the vessel in various ways, three of which are exemplified in the drawings, and will now be briefly explained.

First, in accordance with the plan disclosed in Fig. 1, wherein the ship *e* appears as lying alongside of and coaling from a wharf *p*, the double arm *a* is hinged by its two said bars or members that make up the track just spoken of to the outer end of the previously-mentioned inside track *c*, which is of corresponding gage and projects into the upper part of the port *h* to which the arm belongs. The track *c* is suspended from a deck-beam *m* and adjoining timber *n* by lateral hangers *o*. The hinge-joint is such that when *a* is fully raised at its outer end it is somewhat inclined inward and downward, as indicated by the dotted lines, and forms with *c* a continuous track or railway for the upper truck *k* of the carrier to ride on. This arrangement, therefore, allows the carrier to be hung on the arm and when sufficiently elevated to slide by gravity through the port *h* and into the ship *e*, where it can be emptied anywhere along the line *c*, its branches, or connections.

Having reference next to the system exposed in Fig. 2, (in which the ship *f* is shown as coaling also from the wharf *p* on one side,) the hinging of the double arm *a* here is to the outer end of a short corresponding track *q*, laid across the sill of the port *h*. A duplicate arm *a'* is likewise hinged to the inner end of this track *q* in line with the first arm, so that the two arms and interconnecting track

will form together a continuous railway for the carrier *b* from the wharf *p* to a convenient point between decks in the vessel *f*. The carrier in the present instance is entirely on or above the railway on which its under truck *l* bears, and upon the arm *a* being elevated the said carrier will roll off it onto the track *q*, past the port *h*, and onto the arm *a'* inside the ship. The coal may then be dropped into the bunker from the arm *a'* or farther in by switching the carrier onto the overhead track *d*, before mentioned, by using the upper truck *k* and appliances thereto appertaining. The track *d*, it will be observed, is supported from a deck-beam by hangers *o* analogously to the aforesaid track *c*. As illustrated, the arm *a* with the carrier thereon may rest on the wharf while a charge of coal is being taken, the hinge connection of the arm having sufficient play to allow it notwithstanding the sway of the vessel by the side of the wharf. This construction, (represented in Fig. 2,) permits the use of a carrier of greater height and consequent capacity than where the carrier is hung from the arm—that is to say, with ports of same size. It, therefore, would expedite the coaling through small ports, and if the upper deck be low, as shown, the switching to the over head track *d* can easily be effected after lowering the arm *a'* and carrier supported thereby, as the dotted lines suggest.

Passing to Fig. 5 where the ship *g* is supposed to be coaling simultaneously on both sides from a wharf *p* and a lighter *r*, this view shows arms *a* *a'* hinged each above its respective port *h*, and having each a suspended carrier discharging into a chute *s*, located in the port and leading down into a pocket *t* in the ship's hold. It is evident that by providing one arm for every port and working the two sides of the vessel at the same time, as indicated, the largest steamship afloat can take in her supply of coal quite speedily and satisfactorily, much more so than can be accomplished by pursuing the old-fashioned method hereinbefore referred to. The operation of arm and carrier in Fig. 5 is like that in the preceding Figs. 1 and 2, excepting that the carrier discharges at the side of instead of within the vessel.

Usually, as in the three examples herein given, the arm *a* will be hinged centrally of its port, either above or below or within or opposite the same, and in each case it will reach down from the ship's side to the dock or wharf, or sufficiently near thereto to admit of the carrier being readily attached or detached or mounted and dismounted. When the carrier is suspended from the arm, the downward movement of the latter may, if desired, be limited so as to simply allow the carrier to be conveniently hung or unhung by providing an adjustable stop, which may consist of a ball *u*, Fig. 1, fastened to the lower end of a rope or chain *v* that is passed up

wardly through an eye *v* on the arm and is secured by its upper end to a boom above. (Not shown.) The stop *u* is adjustable, in that its suspending rope or chain *v* can be lengthened or shortened or the boom to which the latter is hitched can be raised or lowered, so that when the carrier touches the wharf or other resting-place the stop will yet be some suitable distance below the eye *v* and permit a proportionate downward movement of the arm relatively to the carrier, the connection between which can then be severed or restored easily and without impediment. This is not, however, an indispensable feature of the invention, which may be used with or without it. As to the raising of the arm with the filled carrier, that can be effected in various ways by power within or without the system. I have shown only rope-tackles *y*, which may be hanging from a boom, as *z* in Fig. 2, and operated in any suitable manner. The inside arm *a'* in the said Fig. 2 is lowered and raised with similar tackle secured to the under side of the deck above it.

An upward bend 1 and adjoining downward curve 2 are provided at the outer end of the arm *a* to properly hold the carrier *b* and its attachments when the said arm is lowered and again when it is raised previously to the hinge-joint being closed. Another similar curve 3 may also be formed at the inner end of the arm, as shown in Figs. 1 and 6, if it be desired to momentarily retain the carrier as it is about to enter the port *d*, so that its safe passage therethrough can be insured, and, generally, it may be stated that such curves and bends in the arms *a* and *a'* are contemplated as will respectively adapt them to high and low positions.

The aforesaid carrier comprises the following-named parts, to wit: a box-like or bucket-like receptacle or other suitable form of container, the one shown being lettered *b*, and having a bail numbered 4, the aforementioned upper and under trucks *k* and *l*, a hook 5, adapted to grasp the said bail of the container, and an intermediate hanger 6 between the said hook and the container's upper truck. A few words only need be said relatively to the construction or function of these respective parts.

As above intimated, this invention is not concerned with any particular form of container. The form shown, however, has been found serviceable and satisfactory. It is provided with a drop-bottom and will work well whether suspended from the hinged arm or wholly mounted upon it. The trucks *k* and *l* have flange-wheels, (best seen in Figs. 2 and 9,) and thereby are adapted to maintain the container in a straight line as it moves on or along the arm *a* or *a'* or the tracks *c*, *d*, or *g*, the connections between the said container and trucks being made properly rigid at all times. Upon the middle portion of the bail

4 is formed or provided a boss 7, having two parallel pendants or drooping cheeks 8 and 9, between which the lower curved part of the hook 5, flattened at this point, is inserted and snugly fitted. The arrangement is such, as will be seen by referring particularly to Figs. 1 to 4, that the bail remains fixed relatively to the hook, and consequently the suspended container cannot turn with respect to the other parts of the device only in so far as the hook itself is caused to turn. The intermediate hanger 6 is rigidly fastened to the truck *k* and extends downward from between the parallel members of the arm *a*. Its lower portion is made into a ring 10, in which a segmental block 11 is seated. The shank 12 of the hook 5, which shank is made round, passes through a longitudinal slot 13 in the bottom part of the said ring and also through a round hole 14 in the center of the said block in such a way that the hook may turn axially within the said hole and also oscillate with the segmental block in the direction of the said slot. (See Figs. 2, 7, 8, 9, and 10.) Now the hook is held to the hanger by a nut 15 and a second block 16, placed upon a centrally-raised part of the segmental block 11 and having a square hole 17, in which a correspondingly-squared portion 18 of the hook's shank is fitted. The said block 16 and centrally-raised part of the block 11 have matching radial corrugations 19 20 on their respective faces and are superimposed face upon face. As the hook cannot be turned without the block 16, owing to its being fitted or socketed in the square hole thereof, it will be understood that neither will turn without sufficient force being applied to cause the corrugations 19 and 20 to rise over one another and admit of the said block 16 being rotated upon its sublying companion block 11. Therefore it is apparent that the hook, whose position determines that of the container, will remain normally as these blocks may be set one upon the other and that if it be swung sidewise either way along the slot 13 the container can be held and steered at any required angle to turn a corner, clear a post, or avoid an obstacle. The hook, it need hardly be remarked, stands with the slot when hooking onto the container—that is to say, in the position indicated in Fig. 2 or at right angles to that given it in Figs. 9 and 10. In some cases the hook may be connected directly to the truck *k* and the intermediate hanger left out, as suggested in Figs. 1 and 5; but when both are employed (combined as described) they coact and mutually contribute in making the device more complete and capable of being successfully worked under most unfavorable conditions. Arched braces 21, Fig. 6, are used to strengthen the arm *a*, on which the upper truck *k* is made to run. As to the arm that carries the under truck *l*, its parallel members may be tied directly one to the other for a like purpose.

I have illustrated three ways of coaling a ship with the aid of my invention, which manifestly are based on the same fundamental principle, and although the conditions prevailing on different vessels may demand further modifications of the original plan I believe such will ever be found to have the one common foundation. No limitation therefore is intended concerning the number or nature of these modifications, which may be of, in, or to the various structural parts of the device, their location, mode of attachment, direction of motion, &c. No restriction either is made as to the uses to which the invention can be put, since the carrier in any event can be easily altered to suit the nature of the raw or manufactured product to be handled, and it is really immaterial whether the hinged arm be employed in connection with a ship or floating structure or with a building or even a movable object on land. For the sake of clearness and brevity the invention has been described and will be specifically claimed herein as a coal-loader for vessels; but it is no stress of mind to conceive of its adaptation to the storing of goods in a warehouse or the loading of a certain category of cars or land-vehicles—such, for instance, as may be used for transporting sugar-cane from the field to the mill or for other special or general purposes, and while thus far I have referred to the loading only it is obvious that the invention is just as much applicable to the unloading, which simply involves the reversal of the operations hereinabove set forth. Let then the language of the following statement of claim and the several clauses thereof be accordingly interpreted.

I claim—

1. The combination with a structure or conveyance to be loaded or unloaded, of an arm hinged exteriorly of the structure, means for raising and lowering the arm, a second arm pivotally secured within the structure and forming a continuation of the external arm and a carrier adapted to be supported by the arms.

2. A device of the kind described comprising a carrier designed to enter or come out of a structure or conveyance, through a suitable port therein, and a hinged arm adapted to transfer said carrier to or from the structure or conveyance and momentarily retain it in proximity to said port, substantially as described.

3. A loading and unloading device comprising a track within the structure or conveyance to be loaded or unloaded, an arm hinged to said track, and a carrier adapted to be transferred by said arm to or from the track and structure or conveyance, substantially as described.

4. A device of the kind described comprising a hinged arm, a carrier adapted to be

transferred thereby, means for raising and lowering the arm, and an adjustable stop for limiting the downward movement of the arm relatively to the carrier, substantially as described.

5. A device of the kind described comprising one or more arms or tracks, and a carrier adapted to travel along the same, including a truck, a container with a bail having pendants, a hook grasping said bail between its said pendants, and an intermediate hanger permitting a rotary and an oscillatory movement of said hook with relation to said truck and adapted to maintain them rigidly connected after adjustment, substantially as described.

6. A device of the kind described comprising an arm having parallel members, arched braces interconnecting said members, a track in hinge connection with said arm, and a suspended wheeled carrier adapted to ride on the members of the arms and the connected track, and means for oscillating the arm on its hinge connection, substantially as described.

7. A loading and unloading device comprising a pivotally-supported track-arm, a stop located at the outer free end of the track-arm, the track-arm being substantially U-shaped at a point near its outer end, means for raising and lowering the track-arm and a carrier supported by and traveling on the arm, the contact of the carrier and stop being cushioned owing to the U-shaped portion of the arm.

8. A loading and unloading device comprising a pivotally-supported track-arm, means for raising and lowering the track-arm and a carrier supported by and traveling on the arm, the carrier provided with a bail, a boss secured to the bail, corresponding enlargements on the boss and spaced apart from each other and a hook having a contour conforming to the contours of the enlargements, the hook received between the enlargements.

9. A loading and unloading device comprising a pivotally-supported track, a carrier supported and traveling upon the arm, means for raising and lowering the arm, a guide member loosely engaging the arm and a stop carried by the guide member and impinged by the arm for limiting the movement of the arm in one direction.

10. A loading and unloading device comprising a suitably-supported movable track-arm, consisting of a single piece of material bent at its outer end, to form parallel rails, braces connecting the rails, means for raising and lowering one end of the arm and a carrier traveling on the arm.

11. A loading and unloading device comprising a track-arm pivotally supported at one end, a truck adapted to travel on the arm, the truck comprising wheels, a slotted hanger connected to the wheels, a suspending device secured to the hanger and projecting through

the slot, a carrier supported upon the truck and means for raising and lowering the arm.

12. A loading and unloading device comprising a suitable track, a truck traveling thereon, the truck consisting of wheels, a circular hanger connected to the wheels, a segmental block seated therein, a suspending device passing loosely through the hanger and block and an adjusting member to which the suspending device is secured within the hanger.

13. A loading and unloading device comprising a track-arm, a truck traveling thereon, the truck consisting of wheels, a circular hanger connected to the wheels, a segmental block seated in the hanger, a corrugated block resting upon the segmental block, a suspending device passing loosely through the hanger and blocks, and a corrugated adjusting member rigidly secured to the suspending device and engaging the corrugated block.

14. The combination with a structure, of a track pivotally supported externally of the structure, a track pivotally supported interiorly of the structure and forming a continuation of the external track, means for adjusting the interior track at a variety of different elevations and a carrier adapted to travel the tracks.

15. The combination with a structure, of a track pivotally supported exteriorly thereof, a second track supported interiorly of the structure and forming a continuation thereof, an elevated railway secured adjacent one of the tracks, the track movable toward and from the railway, a carrier adapted to be received on the tracks and means on the railway for

engaging the carrier to support it independently of the track.

16. The combination with a structure, of a track secured exteriorly of the structure, a second track secured interiorly of the structure, a rail-section stationarily secured to the structure to connect the track-sections and means for adjusting at least one of the tracks at various elevations.

17. The combination with a structure having an opening therein, of a rail-section rigidly secured to one wall of the opening, a track-section pivotally secured to one end of the rail-section and extending exteriorly of the structure, a second track-section pivotally secured to the opposite end of the rail-section and extending interiorly of the structure, a carrier supported by the tracks and means for adjusting at least one of the tracks at various elevations.

18. The combination in a loading and unloading device, of a suitably-supported track, a carrier adapted to be supported by the track, a railway supported upon a different plane from that occupied by the track, means on the railway adapted to engage and support the carrier independently of and previously or subsequently to the track, and means for moving the one relative to the other.

In testimony whereof I affix my signature in presence of two witnesses.

ALVIN WELTY KEECH.

Witnesses:

FRANK NEDALF,
THOS. C. RIDGWAY.