March 11, 1941. C. H. HUNSAKER 2,234,255

LOAD TRANSFER APPARATUS

Filed April 9, 1938 2 Sheets-Sheet 1

FIG. 1.

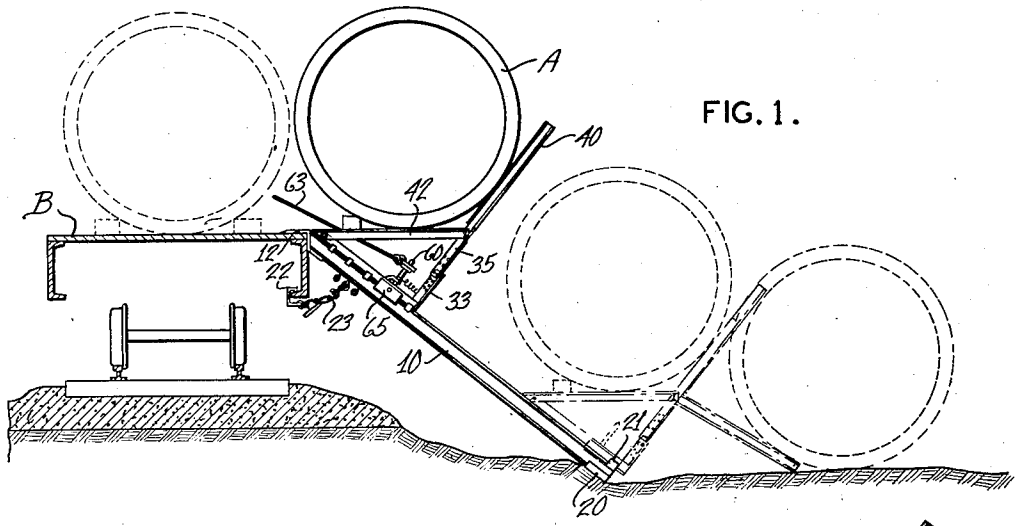



FIG. 2.

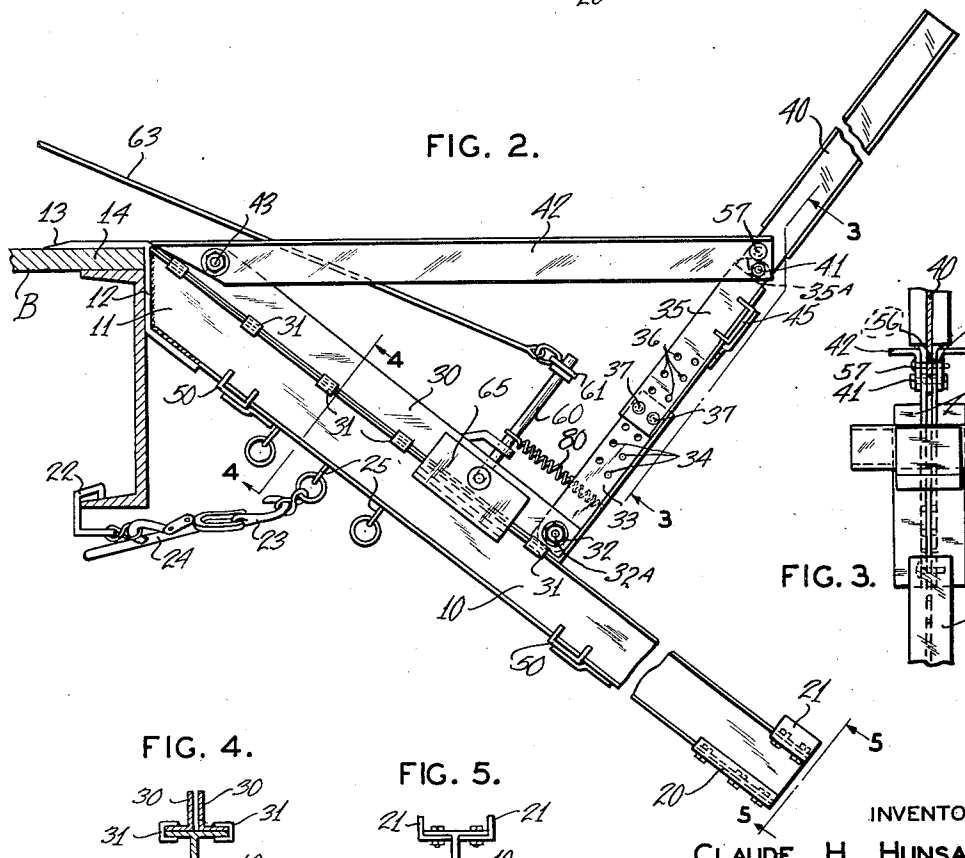



FIG. 3.




FIG. 4.

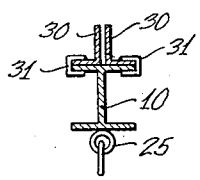
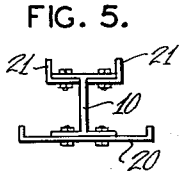



FIG. 5.




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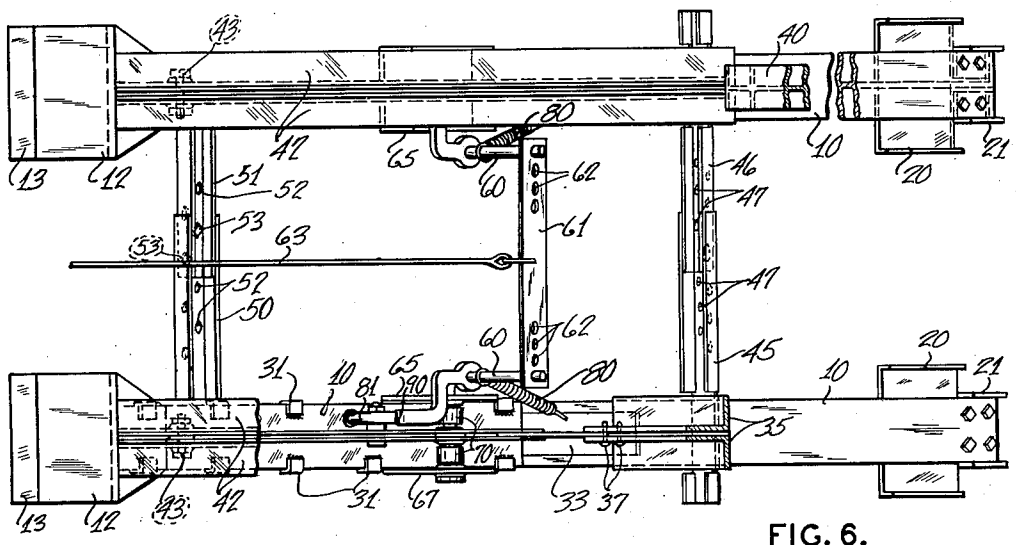


FIG. 6.

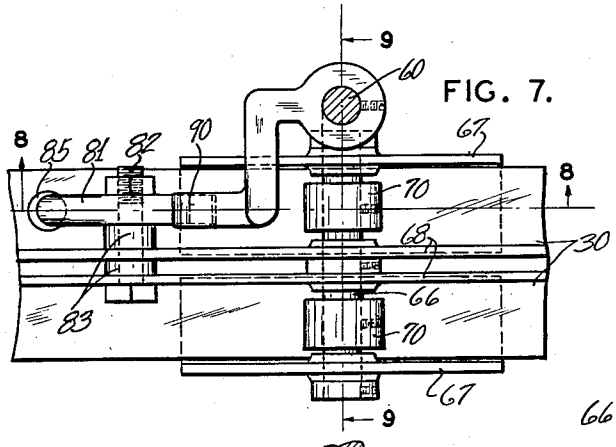


FIG. 7.

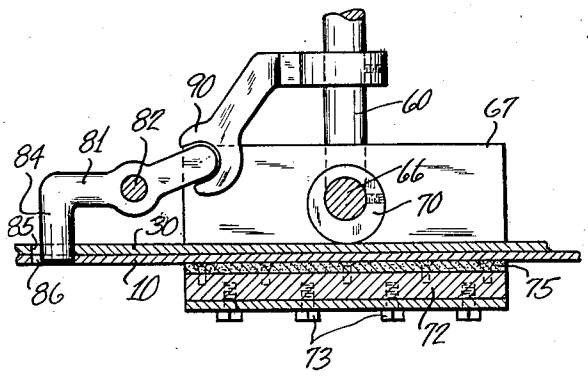


FIG. 8.

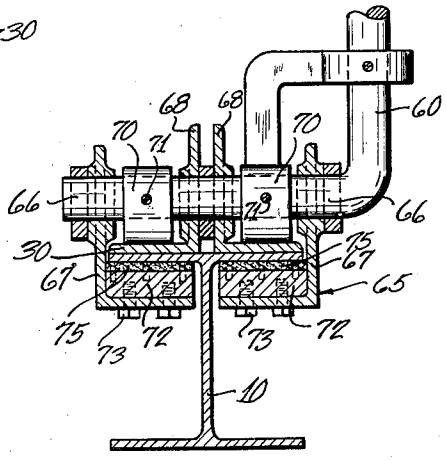


FIG. 9.

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# UNITED STATES PATENT OFFICE

2,234,255

## LOAD TRANSFER APPARATUS

Claude H. Hunsaker, University City, Mo.

Application April 9, 1938, Serial No. 201,033

7 Claims. (Cl. 214—100)

This invention relates to load transfer apparatus, and more particularly to an improved, easily portable appliance for unloading heavy frangible articles from railway cars, motor trucks and other freight vehicles, as well as from platforms, warehouse docks and the like.

The moving and unloading of certain types of relatively fragile or frangible products, such as large-diameter concrete pipe, large culvert pipe, sewer pipe and the like, frequently offer many practical difficulties in handling the materials upon arrival at the situs of the job, or specific point of unloading. Even though able to withstand a substantial impact without complete breakage, tubular concrete and ceramic products are still liable to small fractures, chipping, etc., in the event of merely minor impacts. Accordingly, it has heretofore been the prevailing practice to handle material of this kind from cars or trucks by the use of cranes, thus entailing considerable expense for equipment, or in the case of railroad work, a substantial expense for a work train and crane, often with considerable delay as well as expense. It is accordingly a general object of the present invention to obviate a substantial part of the expense heretofore attending the unloading of products of the type mentioned, as well as to minimize breakage hazards and personal injury to attendant workmen.

Yet another object of the invention is attained in an easily portable and easily demountable load-transfer appliance which requires no special skill either to assemble or to use, and which may be easily fabricated in any structural steel shop at a moderate expense, and practically entirely out of stock material, such as structural steel shapes.

A still further object of the invention is attained in a device which may be utilized as a gravity unloader, and, when so employed, requires no source of power such as an engine, but which depends only on the force of gravity, under full operator control, entirely to accomplish its preferred purpose.

A still further object of the invention is attained in apparatus or appliances for use as gravity unloaders, and which are readily adaptable for unloading heavy frangible objects such as concrete pipe, onto uneven ground as along railway right-of-ways, the devices being readily adaptable to compensate for differences in the terrain onto which the pipe or the like in being unloaded.

Yet a further object of the invention includes an improved means for controlling the gravity descent of the material-receiving portion of an unloader device, in the example presently to be disclosed, this object being realized in an improved friction-brake mechanism, whereby the descent of the material during unloading, may be surely and accurately controlled at all times, and in a manner to assure personal safety of the workers incident to the unloading process.

The foregoing and many other objects will appear from the following detailed description of a presently preferred embodiment of the invention, particularly when considered in connection with the accompanying drawings, in which:

Fig. 1 is a side view of a load-transfer appliance constructed in accordance with the present invention, and illustrating certain successive stages in the unloading process; Fig. 2 is a somewhat enlarged and more detailed side elevation of the unloader assembly; Fig. 3 is a fragmentary rear elevation of a portion of the load-cradle structure of the device of Fig. 2, as viewed from line 3—3 of Fig. 2; Fig. 4 is a transverse section as viewed along line 4—4 of Fig. 2; Fig. 5 is an end elevation of one of the track or skid elements of the device of Fig. 2, this figure being considered as viewed along line 5—5 thereof; Fig. 6 is a top or plan view of the device of Fig. 2; Fig. 7 is a fragmentary top or plan view, showing parts of the braking mechanism; Fig. 8 is a longitudinal section of the device shown in Fig. 7 and as viewed along line 8—8 thereof, and Fig. 9 is a transverse section of the braking assembly showing portions thereof as they would appear when viewed along line 9—9 of Fig. 7.

Referring now by characters of reference to the drawings, there is illustrated by Fig. 1 a preferred manner of usage of the unloader, wherein it appears that the device is adapted, for example, for the unloading transfer of concrete pipe sections A, from the deck of a flat car B. The device includes preferably at least a pair of track-forming structures 10 located parallel to each other, and lateraly spaced somewhat less than the length of the pipe sections A, or other articles to be unloaded. Since the two track structures 10 are or may be substantially identical in construction, a description of one thereof will suffice for both. As will appear from the section of Fig. 4 and the end view of Fig. 5, the element 10 is preferably of structural steel, and for economy, although not necessarily, is of H section. The upper or leading end 11 of the element 10 is cut off at an angle as shown (Fig. 2) and secured, as by welding, to this end of the track member is a substantially Z shaped toe

member 12 provided with a bevelled nose 13. The Z shaped member serves firmly to support the upper or loading end of the element 10, upon an edge 14 of the deck of the car. The opposite end of the element 10 is provided, as best appears in Fig. 6, with a widened base member 20 projecting somewhat laterally of, and secured as by bolts or rivets, to the lower flange of the track element 10. The member 20 obviously serves to increase the area of the support of the lower end of the stringer or track-forming element, and is particularly valuable when such end is resting in soft soil. The opposite flange of the H bar 10 is provided at its outermost end, with angular stop elements 21, secured as by bolts or rivets, and serving to limit the downward movement of the cradle supporting the load, all as hereinafter more fully described.

As a means for retaining the trackage element in unloading position and in definite adjacence to the car, there is provided a hook 22 adapted to engage a portion of the underframe of the car. This hook is connected to a tie chain 23 which may be provided with a toggle closing device 24, and engages one of a series of hooks 25 secured to and carried by the lower flange of H bar 10. This tie chain arrangement will, as clearly appears from Fig. 2, serve to prevent any displacement of the unloader assembly, due to the weight of the object placed upon it in the course of unloading.

As will have appeared from the drawings, the paired spaced trackage members 10 serve collectively to form a runway for paired cradle-forming structures, each of which is substantially of inverted A shape, or may be referred to as of upright L shape, and since the two cradle-forming members are substantially identical, a description of one thereof will suffice for a description of both.

A cradle base stringer 30 may be conveniently formed of a pair of angle bars placed back-to-back and suitably assembled as by welding or riveting in such manner that they extend parallel to and operate upon the associated trackage element 10. The base stringers 30 serve to carry a plurality of spaced U clips 31, one leg of each clip preferably being securely welded to the lower angle of the adjacent piece 30, whereby the U clips serve to receive opposite marginal portions of the upper flange of the adjacent element 10 and enable the cradle to operate sildably thereupon, yet constrain the cradle to movement definitely along the track. The outermost end 32 of the member 30 serves to carry, at about a right angle, an element 33 which serves as a back element for the cradle, and is preferably pivoted to the element 30 as by a pivot bolt 32A. The element 33 is provided with a plurality of spaced perforations 34 for a purpose later appearing. This back portion of the cradle is extended upwardly of the element 33 as by a steel section 35, provided with a plurality of apertures 36 which are substantially the same in size and arrangement as those indicated at 34 in the member 33. A pair of holding pins 37 are provided to extend through apertures 36 and 34 when selectively brought into register, whereby to provide for adjustment in the length of the two-part cradle back consisting of elements 33 and 35. Pivotally secured to the element 35 is a tiltable or pivoted extension piece 40, the pivot for which is conveniently formed as by a bolt 41 extending through both pieces 40 and 35, this pivotal connection serving an unloading purpose, as hereinafter more clearly appears. There is provided as a connection between the portions 35—40, and the normally upper end of the stringer 30, a load-receiving platform element 42. This conveniently consists of a pair of angle bars, assembled in spaced, opposed relation, so that the flanges are uppermost, the load-receiving end of the member 42 being pivotally connected to the upper end of element 30 as by a pivot bolt 43.

Provision is made, in connection with the length-adjustment of parts 33 and 35, for a slight variation in angularity thereof, necessitated by the constant length of element 42. This provision consists in locating the rows of apertures 34 and 36 out of parallelism with the major axes of members 33 and 35, and by preference, locating the lines of apertures along arcs drawn approximately on pivot bolt 43 as a center. Thus as the member 35 is extended, it is brought somewhat, although only slightly, out of parallelism with member 33.

It will have been noted as a distinct preference to employ the trackage elements 10 in pairs, and since one of the cradle-forming structures is carried by each track element, the frames of the cradle are also utilized in pairs. Due to this fact it is of course desirable to provide for a variation in spacing of the two cradle frames in order best to care for different lengths of the articles to be unloaded, such as concrete pipe sections A. To this end, a pair of nesting channel members are provided, each detachably secured to one of the members 35, and the distance bar resulting from the overlapping of the two channels 45 and 46 serves to maintain the two parts of the cradle in definitely spaced relation. Adjustment between the members 45 and 46 may be cared for by a series of adjustment apertures 47 in the two elements, and cooperating bolts (not shown) extending through these apertures.

To assure the definite spacing and parallelism of the track-forming elements 10, any suitable number of spacer bars may be provided therebetween, it being a distinct preference that these spacers be detachable from the elements for ease in dismantling the parts of the device. A satisfactory arrangement consists of the two channel elements 50 and 51 provided with apertures 52 and securing bolts 53, whereby the spacers are extensible in nature.

It will have appeared from the foregoing description that the load abutment arm shown at 40, is pivotally connected to the element 35 by which it is supported, the pivot member being exemplified by a bolt 41, serving also to provide a pivotal connection between the platform member 42 and the riser element 35. The advantage of pivoting the member 40 will be apparent from Fig. 1, wherein the piece 40 is shown as constituting a rigid extension of the piece 35 for retention of the pipe section of the loading platform. When, however, the cradle has attained its lowermost position as shown in dotted lines (Fig. 1), the arm 40 is released to pivot about the axis element 41 and thus serve as an unloading trackage or auxiliary ramp or skid, leading from the platform 42, to the adjacent earth or other surface of load deposit. Retention of the member 40 in its normally upright position is accomplished through the provision of opening 55 in the web of the member 42, and opening 56 in the web of the member 40. A holding pin 57, which is adapted to extend through openings 55 and 56, but which may be easily removed, serves with the pivot 41 to keep the abutment arm 40 in upright position when desired, but when the pin is re-

moved, this arm may be easily tilted back to constitute the unloading skid extension of the platform **42**. It will be noted that the upper end **35A** of element **35** is so shaped or cut away, that it is free of pin **57**, whereby to permit of angular adjustment between members **35** and **42**.

The manner of assembly and usage of the transfer device or unloader is thought to have been apparent from the foregoing description of the parts and their relation, but it may be noted that when the car has reached its destination, the paired track members **10** are set up with their extension elements **12** overlying the edge of the car deck **14**; the tie chains **23** with hooks **22** are applied and taken up; the spacers **45—46** and **50—51** applied respectively to the cradle frames and to the track elements. Following this the cradle constituted by the companion frames is first adjusted so as to bring the elements **42** to a substantially horizontal position. This is done by raising or lowering the elements **35** with respect to the members **33**, through removal of the pins **37** and the reinsertion of these pins in the appropriate adjustment openings **34** and **36**. It will be noted that the different length adjustments provided for between members **33** and **35** permit adjustment of the platform **42** of each cradle frame to the horizontal, irrespective of whatever angle the trackage elements **10** are compelled to assume by reason of differences in terrain adjacent the road bed. After the cradle frames are adjusted, they are brought to a level such that the platform members **42** constitute virtually a continuation of the car deck **14**. The pipe sections or other elongate articles may, upon removing their car blocking elements, be easily rolled to the position shown in full lines as element A (Fig. 1). It will be noted that with the parts in this relation, the pipe section or other heavy object, virtually forms, in coaction with the two spaced L frames of the cradle, the major portion of the cradle itself, and due to the weight of the article unloaded, the article serves to maintain the frames in their intended spacing throughout the controlled descent of the chair or cradle to the position where the article is fully unloaded.

To the end of controlling the descent of the cradle by gravity, there is provided a brake mechanism on each of the cradle frames, the braking devices each being arranged to coact with the upper flange portion of the H bar forming the associated element **10**. The braking mechanism, to be hereinafter described in detail, is controlled through a lever **60**, and the paired brake levers **60** are related as through a tie bar **61**, this being provided with a plurality of openings **62** which serve to permit adaptation of the bar **61** to the different spacings of the trackage elements **10**. In engagement with the common operating bar **61** is a control cable **63**, which is by preference, directed rearwardly or upwardly of the cradle for actuation by an operator on the car deck or therebeyond. The braking mechanism is such that braking actuation of the levers **60** takes place by movement thereof toward the car, as the assembly appears in Figs. 1, 2 and 6. In this manner the operator controlling the descent of the load, is at all times above the same and entirely beyond any zone of hazard in the event of breakage or slippage of any of the parts. The cable **63** and the leverage afforded therethrough and through the lever **60** is such that the cable may be easily actuated by hand, but if desired, may be controlled through a small hand or power winch (not shown).

It will have appeared from the arrangement of the braking system described that the operator may, once the pipe section is loaded onto the cradle frame, without any difficulty whatsoever and in a minimum of time permit the frames and load to come to rest with the cradle at the lower end of the track, following which it will appear obvious from the foregoing description of elements **40**, that the pipe section or other load element may easily be rolled off the arms **40** to its position of rest.

Referring now to the brake mechanism per se, this is best illustrated by Figs. 7, 8 and 9, wherein is shown a brake frame indicated generally at **65** (Fig. 2) which serves as a bracket for a horizontal portion **66** of the brake control shaft **60**, the horizontal part of the shaft being journalled in suitable bushings or the like (not shown), which may be welded into apertures in the short angle elements **67**. A pair of these are provided in opposing relation, so that one side of each of these angles projects beneath the flange of the associated element **10**. A similar and reversely related pair of angle elements are disposed back-to-back and entirely above the flange of the H bar **10**, being provided with journal portions or bushings to receive the shaft **66**. The latter pair of angles are or may be the elements comprising the base portion **30** of the cradle frame, the specific elements of the frame thus coacting to form the member **30**, and serving to position the brake assembly, being designated at **68**.

For the purpose of actuating the brake shoes (later described), shaft portion **66** carries a pair of eccentrics or cam elements **70**, which may be identical, and which are secured to the control shaft portion **66** as through set screws **71**, engaging, if desired, a flat part of the shaft. The brake blocks are secured to the inturned parts of the angles **67**, being indicated at **72**, and secured as by screws **73** to the associated angles. A friction facing **75** is provided on each of the blocks **72**, and secured thereto in any suitable manner.

It will appear obvious that as shaft **66** is rocked through its lever extension portion **60**, the rotation of cams **70** to a position where they begin to bear tightly against the upper flange of the H bar **10**, will serve to lift the entire brake frame structure **65** in a manner to bring the friction facing **75** into braking engagement with the under surfaces of the upper flange of the H bar of the trackage. The leverage provided by the cams and the lever arm **60**, will at once appear as providing a positive and quickly controlled brake mechanism.

The angular relation of the cam **70** with respect to shaft portion **66** is preferably such that the maximum possible braking effect is attainable as the lever **60** nears the vertical position, but also such that there is no possibility of the operator, through actuation of the cable **63**, drawing the lever **60** beyond the vertical. It is advisable particularly in the event the control levers **60** are actuated through a cable, to provide therefor a return spring indicated at **80** (Figs. 2 and 6), one end of the spring being coiled about the arm **60**, and the opposite end being secured as to the element **33** of the cradle frame. Other suitable forms of return spring may of course be provided.

It has been found advisable, in order to relieve the operator of continued attention to the cable **63** and the brake mechanism, to provide a positive lock between the cradle frames and the

trackage elements when the chair is in its load-receiving position as shown in Figs. 1 and 2. The detail of the locking mechanism best appears in Figs. 7 and 8 as including a pivoted rocker **81**, the pivot **82** for which conveniently consists of a bolt (Fig. 7) provided with spacers **83** and carried as by the angles **68**. The rocker **81** is provided with a downturned end **84** which is adapted, when in locking position, to enter a pair of then-registering apertures **85** in the cradle base member and **86** near the upper end of the flange of the cooperating track element **10**. Actuation of the rocker **81** may either be directly manual, or effected through a jaw **90**, adapted when the cradle is in load-receiving position, to cooperate with the end of rocker **81** opposite its locking lug **84**. In this manner suitable actuation of the brake lever **60** will serve to actuate the rocker about its pivot so as to release the member **84** from the openings **85** and **86**. When the cradle is again brought to load-receiving position, the locking pin **84** on the rocker **81** may be either inserted manually in the openings **85** and **86**, or may be thus restored by a quick instantaneous action of the brake lever **60**.

The manner of use of the brake mechanism is thought to be obvious from the description of its parts, but it may be noted that, with the cable **63** slackened, the return springs **80** will tend to actuate lever **60** in a direction to release the brakes. When however it is desired to permit the cradle to be impelled by gravity, the cable is slackened just sufficiently to cause cams **70** slightly to release the brake blocks **72** from braking engagement, through their linings, with the under surface of the H frame flange of the trackage. It will be obvious that by alternately slackening the cable and taking up thereon as necessitated, the rate of descent of the cradle and load may be regulated as desired and any tendency to an excessive rate of descent may be checked at will.

It will have appeared from the foregoing description that the device as described, as well as the modifications thereof contemplated, will fully attain each of the objects hereinabove specifically enumerated, as well as the many advantages expressed and implied by the more detailed description.

While the invention has been described by making a particular and specific reference to an exemplary embodiment thereof, many changes may be made in the parts, their construction and arrangements, and in the sub-combinations utilized, all without departing from the full intended scope of the invention as defined by the appended claims.

I claim as my invention:

1. In a load supporting chair for a gravity-operated load-transfer appliance, a substantially L-shaped chair frame, a load-supporting structure connecting the legs of the frame and pivoted thereto, means associated with one leg of the frame permitting adjustment of the length thereof by extension of the leg, said adjustment means coacting with pivotal connection of the load support, to enable an adjustment of angularity of the load support with respect to the legs of the frame.

2. In a load transfer appliance of a type adapted for use as a gravity unloader for heavy materials to be removed from freight vehicles, a ramp structure adapted to bridge the deck of the vehicle and the surface of deposit upon unloading, a load chair operable on the ramp structure, and including an angularly adjustable platform and a base, to which the platform is pivoted, a pivoted back stop on the chair to which the platform is pivotally related, means permitting adjustment of the length of the back stop, and the angularity of a part thereof with respect to the ramp structure, whereby to vary the angularity of the platform, a stop on the ramp structure arranged to limit the movement of the load chair in one direction, the mounting of said back stop on the chair, being such as to enable its use in one position as a secondary or auxiliary ramp for unloading objects from the chair to the surface of deposit.

3. A gravity unloading ramp assembly including a pair of rails or skids, a load chair operable along the tracks or skids and including a rail-engaging base, a load platform pivoted at its forward end to the base, a two-piece extensible back for the chair to which the platform is also pivoted, the upper piece of the back constituting a load abutment bar normally projecting in a generally upright direction from the platform, the abutment bar being pivotally connected to the chair near one end of the load platform, and securement means for the abutment bar enabling its movement to a position to serve as an auxiliary skid or track for movement of the load from the chair to the surface of deposit of the load.

4. A gravity unloading cradle for use with skids, ramps, or trackage therebeneath, said cradle formed of a pair of load frames, each characterized by right-angularly connected structural steel legs, the legs being secured at substantially a right angle to each other so that one thereof is arranged to operate along a subjacent rail or skid, and the other projecting generally in an upright direction, the upright leg being provided with length-adjustment means including in part an extensible portion of such leg, and a load platform element pivoted at one end to the extensible portion of the last said leg, and pivotally connected at its opposite end to the other leg of the frame, the paired load frames being substantially similar, whereby they may be utilized in spaced relation with a load in bridging relation thereto to constitute the cradle.

5. The gravity-actuated load transfer device for use in unloading heavy objects from freight vehicles to a lower surface of deposit, the device including a pair of spaced structural steel track elements, each provided with a widened toe portion adapted to engage and overlie an edge of the vehicle deck, and each including a widened portion at its lower or outer end, a load-receiving cradle arranged to operate on the track-forming elements, and including a pair of substantially L-shaped frames each overlying and being slidably operable along one of the track-forming elements, each of said frames being fabricated of structural steel elements connected at substantially a right angle to form the legs of the frame, a load platform element on each frame, pivoted at its opposite ends to the opposite legs of the associated frame, extension means associated with one of the frame legs, whereby to provide for an angular adjustment of the load platform member, and to maintain a substantially horizontal relation thereof, irrespective of the angle of the trackage elements, an independent brake mechanism carried by each of the cradle forming frames, and including brake shoes adapted to be brought into engagement with the subjacent trackage element, means for actuating the brake mechanisms including a connecting bar

between, and a cable engaging an intermediate portion of the connecting bar, one or more tie bars adjustable in length, and arranged in bridging relation to the track-forming elements, to maintain the track elements in substantial parallelism, and adjustable tie elements connecting the paired cradle frames whereby the frames coact in supporting opposite ends of an elongate object thereon.

6. In a load supporting chair for a gravity-operated load transfer appliance, a pair of substantially L shaped chair frames, each forming one side portion of the chair, one of the legs of each frame constituting a base portion normally parallel to and arranged to operate on a subjacent track element, a load-supporting structure pivotally connected at its forward end to the base-forming leg of the frame, and at its opposite end to the other leg of the frame, means associated with the last said leg of the frame permitting adjustment of the length thereof by extension of the leg, said adjustment means coacting with the pivotal connection of the load support, to enable an adjustment of angularity of the load support with respect to the legs of the frame.

7. In a load supporting chair for a gravity-operated load transfer appliance, a pair of substantially L shaped chair frames, each forming one side portion of the chair, one of the legs of each frame constituting a base portion normally parallel to and arranged to operate on a subjacent track element, a load-supporting structure pivotally connected at its forward end to the base-forming leg of the frame, and at its opposite end to the other leg of the frame, means associated with the last said leg of the frame permitting adjustment of the length thereof by extension of the leg, said adjustment means coacting with the pivotal connection of the load support, to enable an adjustment of angularity of the load support with respect to the legs of the frame, the said adjustable leg of the frame being formed of two slidably related elements, and said adjustment means being provided by a series of correspondingly spaced apertures in said elements, and a locking pin adapted to engage registering apertures in said elements for securement thereof in adjusted relation.

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