

March 15, 1960

G. R. WILKIN

2,928,560

AIR-CHARGED HYDRAULIC UNLOADER

Filed Jan. 6, 1958

5 Sheets-Sheet 1

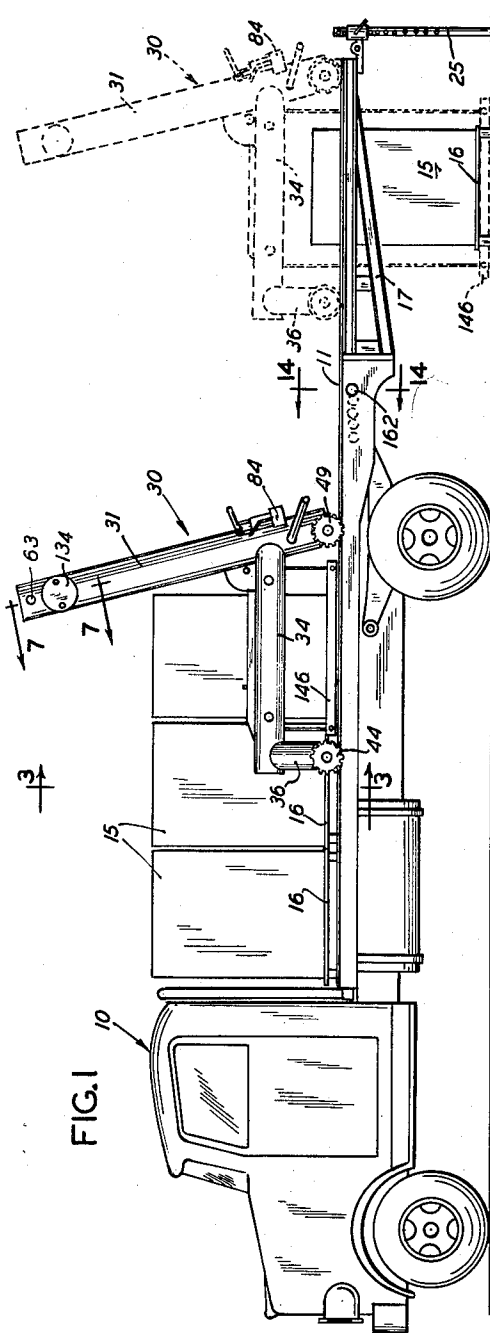


FIG. 1

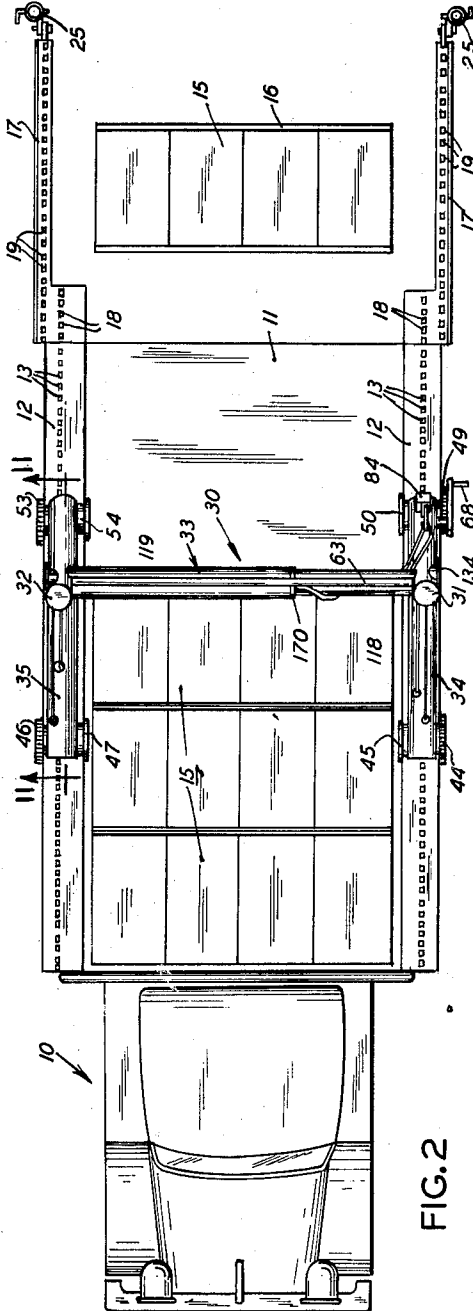


FIG. 2

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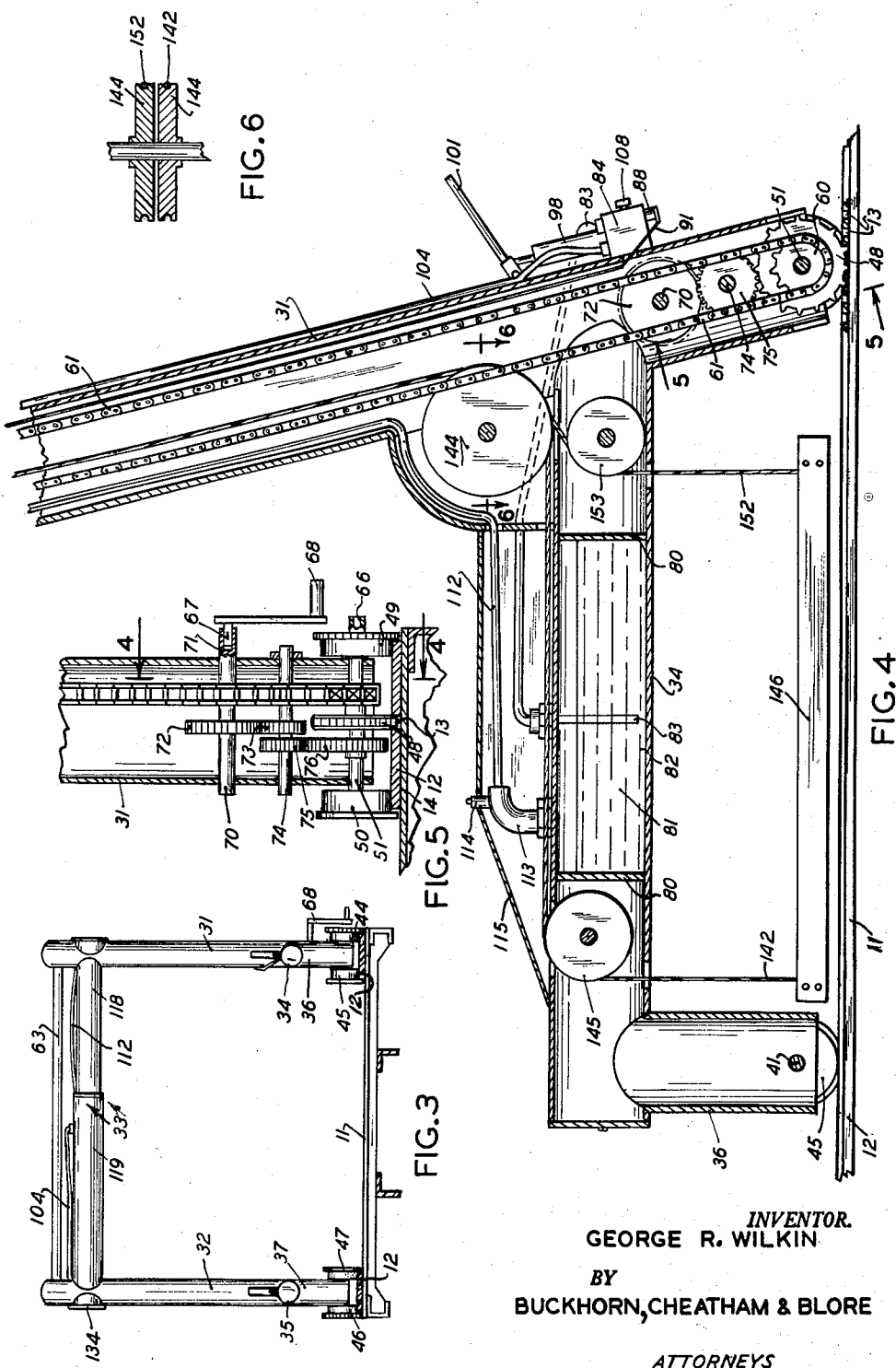
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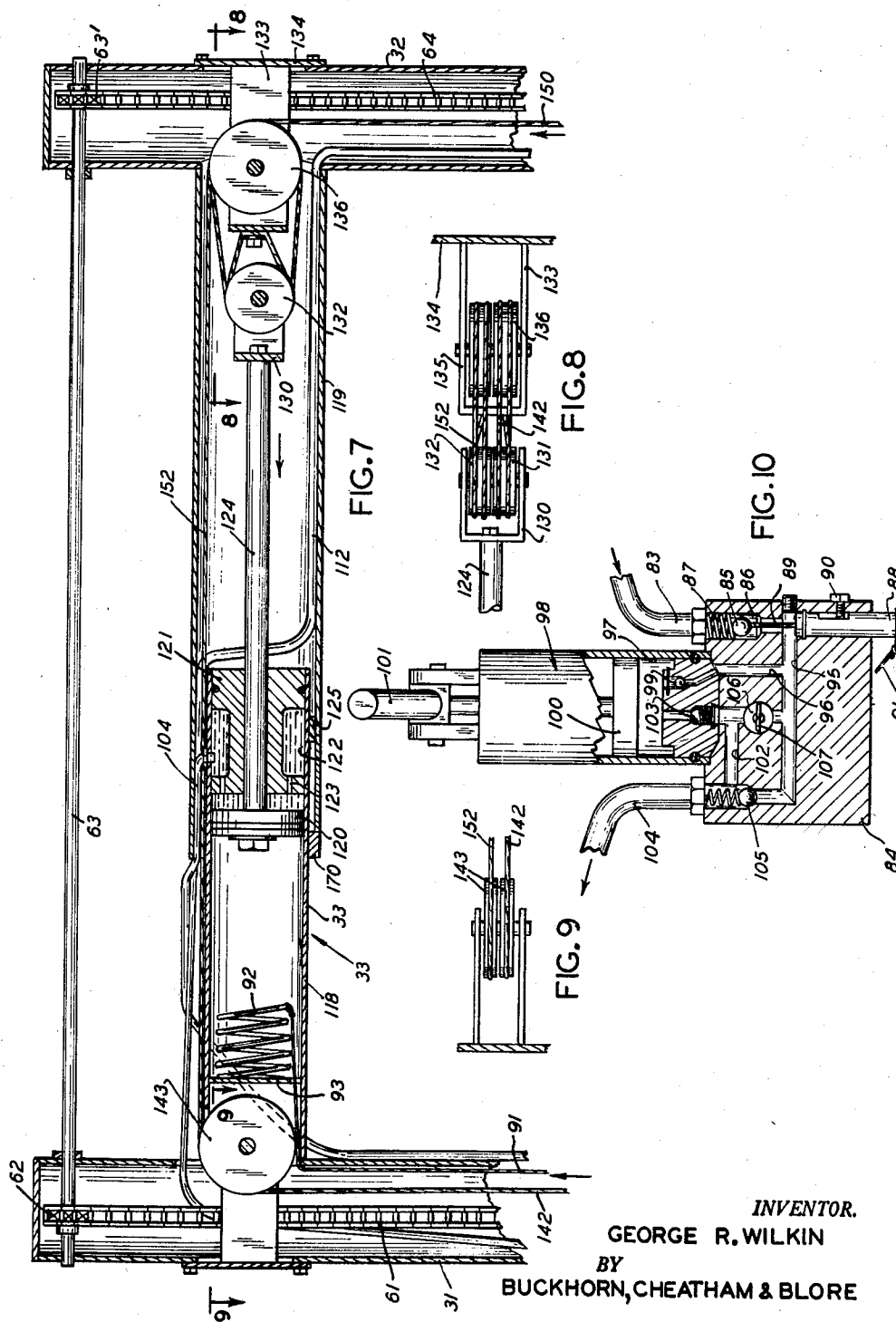
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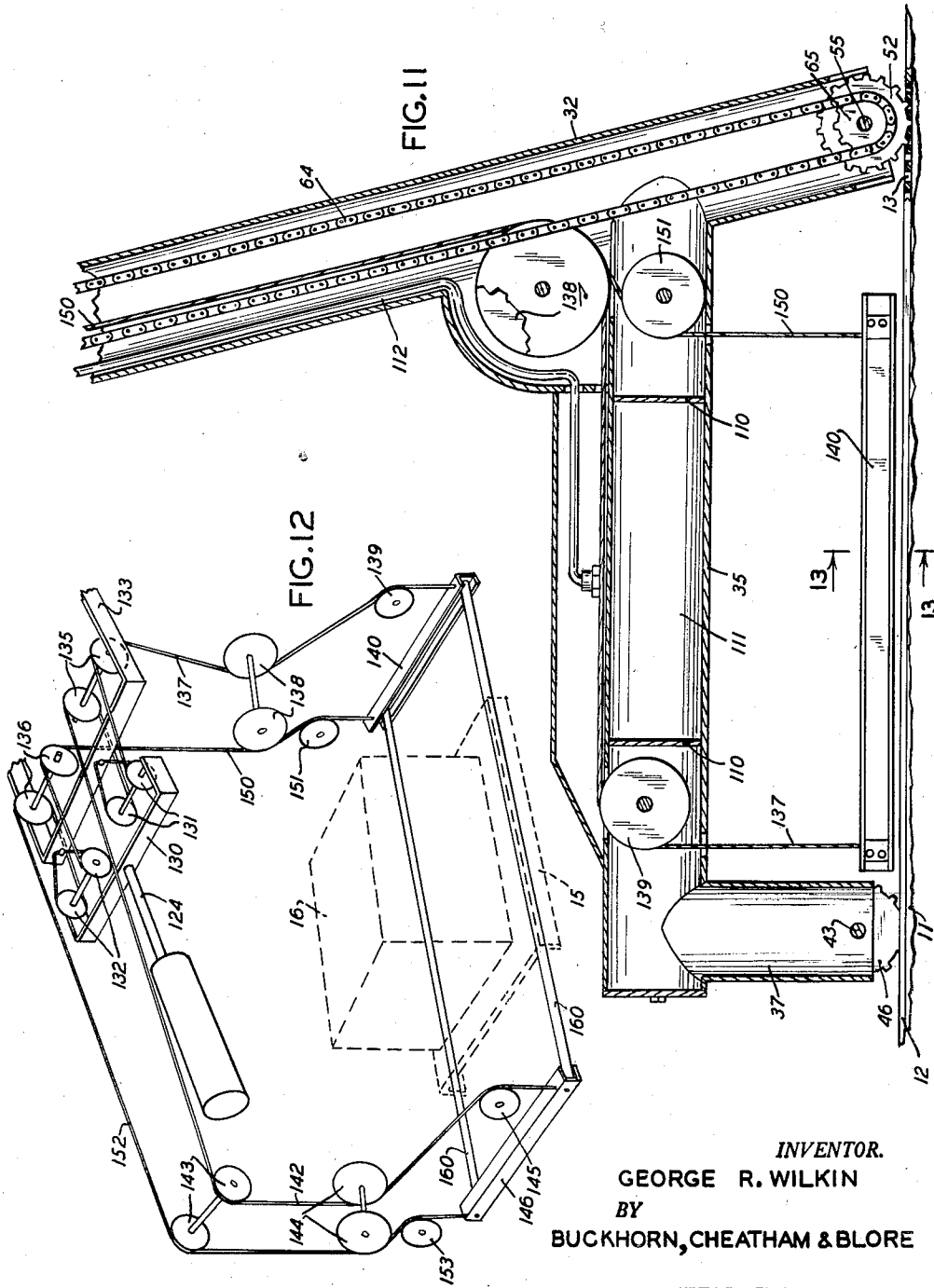
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FIG. 16

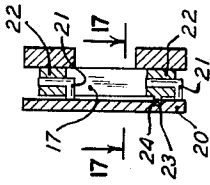


FIG. 17

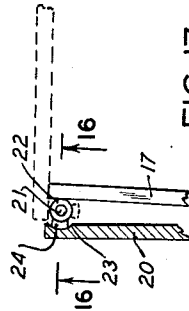


FIG. 13

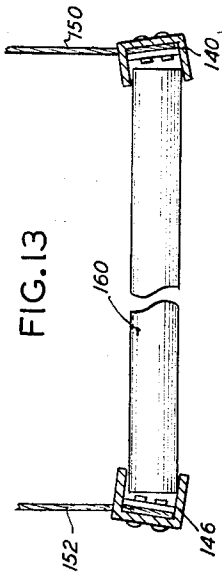


FIG. 14

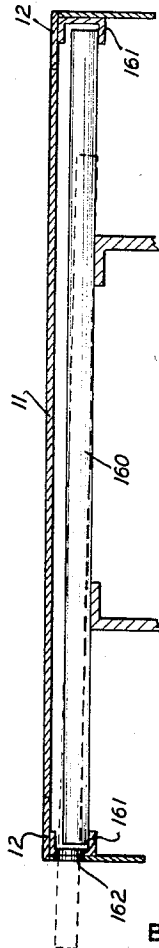
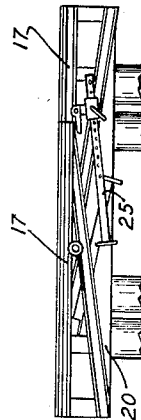


FIG. 15



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2,928,560

AIR-CHARGED HYDRAULIC UNLOADER

George R. Wilkin, Portland, Oreg.

Application January 6, 1958, Serial No. 707,273

5 Claims. (Cl. 214-75)

My present invention relates to unloading devices for unloading trucks, being particularly useful for unloading stacked, rectangular articles such as concrete, brick and hollow tile, or heavy crates, and the like.

My present invention comprises an air-charged hydraulic unloader particularly adapted for operating the lifting cables of a traveling crane unloader associated with a truck. However, in the broader sense the present invention comprises an air-charged hydraulic system for operating lifting cables, regardless of the mechanism or apparatus with which the lifting cables are associated.

The principal object of the present invention is to provide a traveling crane associated with rails which may be attached to any flat-bed truck, which traveling crane is capable of following distortions of the truck bed as the truck traverses uneven surfaces whereby the crane will remain in position regardless of the roughness of the road. In connection with this object of the invention the traveling crane comprises a pair of side frames each of which is supported upon four flanged wheels, and which are connected together by a trunnion device extending across the truck at a height above the bed whereby the opposite sides of the traveling crane may assume various angular positions with respect to each other. In connection with this object of the invention I have devised a sturdy traveling crane comprising a light weight, easily constructed frame assembly.

A further object of the present invention is to provide means whereby heavy loads may be unloaded from a truck by a single operator. It is quite common for a truck to be loaded with heavy articles, either on pallets or skids, or crated, or by themselves, in a terminal, manufacturing plant, or other locality where loading devices are available, such as fork trucks, overhead cranes, or the like. At least, the loading point for many commodities will have a number of men available to lift heavy objects onto the truck. However, when the truck arrives at its destination, there may be no equipment or men available to unload the truck, necessitating the dispatching of a work crew or lift trucks or other equipment to accomplish the unloading. The present invention surmounts this difficulty by providing means whereby a single operator, such as the truck driver, may unload heavy loads by himself.

A further object of the present invention is to provide means whereby an unloading device of the foregoing character may be regulated to unload loads of various weights.

A further object of the present invention is to provide means of the foregoing character whereby the hydraulic system for operating the unloader may be charged with air at a controllable pressure, and whereby the air pressure may be regulated to compensate for temperature rises. The latter object is particularly necessary where a load may start out in the cool of the morning and arrive at its destination when the temperature is at a maximum.

The foregoing objects and advantages will be more particularly apparent from inspection of the following specification taken in connection with the accompanying drawing wherein like numerals refer to like parts throughout.

In the drawings,

Fig. 1 is a side elevation of a truck provided with the

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present invention, palletized loads thereon being shown in full line in connection with a full line showing of the unloader in its traveling position, the view also showing tail rail mechanism to provide an unloading position and the unloader illustrated thereat in dash line;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a vertical section taken along line 3-3 of Fig. 1;

Fig. 4 is a vertical section on an enlarged scale through a portion of the mechanism taken substantially along line 4-4 of Fig. 5;

Fig. 5 is a vertical section taken substantially along line 5-5 of Fig. 4;

Fig. 6 is a horizontal section taken substantially along line 6-6 of Fig. 4;

Fig. 7 is a vertical section, on an enlarged scale, taken substantially along line 7-7 of Fig. 1;

Fig. 8 is a horizontal section taken along line 8-8 of Fig. 7;

Fig. 9 is a horizontal section taken along line 9-9 of Fig. 7;

Fig. 10 is a view in end elevation, partly in section, through the pump and valve assembly of the present invention;

Fig. 11 is a partial vertical section, on an enlarged scale, taken substantially along line 11-11 of Fig. 2;

Fig. 12 is a schematic view showing the arrangement of the lifting cables and the operating mechanism therefor;

Fig. 13 is a partial vertical section taken substantially along line 13-13 of Fig. 11;

Fig. 14 is a partial vertical section taken substantially along line 14-14 of Fig. 1;

Fig. 15 is a rear view of a truck having the tail rail sections folded against the end of the truck for traveling;

Fig. 16 is a partial vertical section taken substantially along line 16-16 of Fig. 17, showing the tail rail hinge and lock; and

Fig. 17 is a horizontal section taken substantially along line 17-17 of Fig. 16.

The invention is herein illustrated in combination with a flat bed truck, indicated generally at 10, having a flat bed 11. At each side of the bed there is positioned a rail 12, each rail being rigidly fastened to the surface of the truck bed. By reason of the construction of the traveling crane, as will presently appear, I am able to utilize a very simple form of rail, comprising an elongated, flat strip of sheet metal such as cold rolled steel in the order of 3/8" in thickness, which may be readily attached to the surface of any flat-bed truck by suitable fastening means such as screws (not shown). Each rail is provided with longitudinally aligned cog openings 13. The truck is shown loaded with a plurality of palletized loads 15 mounted upon pallets 16 of the type having provision for the insertion of the forks of fork lift trucks. Pivotaly mounted at the rear end of the truck are a pair of tail rails 17, each of which is provided with a few cogwheel openings 18 in alignment with the cogwheel openings 13 when the tail rails are swung rearwardly, and a long, parallel row of tail rail cogwheel openings 19 which are offset outwardly from the cogwheel openings 13. Each tail rail is pivotaly mounted at an outer corner of the end board 20 of the bed of the truck, upon a pair of vertically aligned, upwardly extending hooks 21 which engage journals 22 at the inner end of the tail rail. The end board is provided with a pair of arcuate slots 23 which engage arcuate lugs 24 on the journals 20 when the tail rails are folded against the end board, thereby preventing accidental loss of a tail rail while the truck is traveling. The tail rails may be lifted slightly in order that the inner portion bearing the cogwheel openings 18 may rest upon the rear end of the rail 12 when the tail

rail is folded back against the end board of the truck. Each tail rail is provided with a pivotally mounted, adjustable, landing jack 25 which is fixed upright beneath the end of the tail rail when the tail rail is extended rearwardly, so as to support the same against the weight of a load thereon.

A traveling crane unloader generally indicated by the numeral 30 is positioned upon the flat bed truck, the same being removable so that one crane may be utilized with any number of trucks provided with rails, or so that the truck may be utilized without a crane when desired. The crane comprises a pair of substantially upright frame tubes 31 and 32, one at each side of the crane, connected together near their tops by a journal means 33, and a pair of side tubes 34 and 35 extending longitudinally forward in alignment with the tubes 31 and 32 respectively, being attached thereto and communicating therewith. The side tubes lie horizontally and fairly close to the bed of the truck, in position to embrace a palletized load between them. The forward end of each side tube is connected with a vertical, front leg tube 36 and 37 respectively. The frame construction thus described is preferably made of large pipe sections, five inches in diameter for example, thus forming a rigid, sturdy construction of light weight. The side tubes 34 and 35 being close to the truck bed, there is no necessity for lateral bracing of the structure, as would be the case if the side tubes were above the palletized loads.

A transverse shaft 41 extends across the lower end of the leg tube 36, and a transverse shaft 43 extends across the lower end of the leg tube 37, the shafts 41 and 43 projecting laterally beyond each side of the leg tubes. Shaft 41 supports at its outer ends a flanged cogwheel 44 at the outside, and a flanged wheel 45 at the inside. Similarly, shaft 43 projects laterally and supports a cogwheel 46 at the outside and a flanged wheel 47 at the inside. The flanges of wheels 44 to 47, inclusive, engage the edges of bed rails 12. The lower end of the tube 31 supports a central cogwheel 48, a flanged cogwheel 49, and a flanged wheel 50, on a transverse shaft 51, and the lower end of tube 32 supports a central cogwheel 52, a flanged cogwheel 53, and a flanged wheel 54, on a transverse shaft 55. Thus, the traveling crane unloader is supported above the flat bed of the truck by four flanged wheels 45, 47, 50 and 54 engaging the inner edges of rails 12, and by four flanged cogwheels 44, 46, 49 and 53 engaging the outer edges of rail 12. When the traveling crane unloader is above the tail rails 17 it is supported by the four flanged cogwheels 44, 46, 49 and 53 engaging the cog openings 19 in the tail rails. All of the cogwheels and flanged wheels are fixed to their respective shafts.

A sprocket 60 fixed to shaft 51 drives a sprocket chain 61 extending upwardly through tube 31 and a sprocket 62 at the top of the tube. Sprocket 62 is fixed to a cross shaft 63 which extends from tube 31 into tube 32 and has a sprocket 63' fixed thereto within the tube. Sprocket 63' drives a sprocket chain 64 which extends around a sprocket 65 fixed to shaft 55, thereby transmitting any movement of shaft 51 to coextensive movement of shaft 55 whereby both sides of the unloader move in unison. The outer end of shaft 51 is provided with a square socket 66 which may be engaged by a square lug 67 on a hand crank 68 whereby the crane may be caused to move longitudinally of the truck bed and side rails. A transverse gear shaft 70 mounted in tube 31 is provided with a square socket 71 which may also be engaged by the lug 67. A gear 72 fixed to shaft 70 drives a gear 73 meshing therewith and fixed to a second transverse shaft 74. Shaft 74 is also fixed to a gear 75 which meshes with a gear 76 fixed to shaft 51. A reduction gear drive is thereby provided which may be selectively used to drive the unloader crane longitudinally at a slow speed. This is desirable when the crane is supporting a heavy load, which might cause the mechanism to be immovable by direct drive through the shaft 51.

A pair of transverse partitions 80 are fixed within the side tube 34, thus providing a fluid tank 81 within which a supply 82 of hydraulic fluid is contained. A liquid supply line 83 extends downwardly into the tank 81 and is connected to the inlet of a valve housing 84 mounted upon the lower portion of the tube 31. A first ball check valve 85 is seated in the inlet cavity 86 of the valve housing and is urged downwardly by a spring 87 against a valve seat in the bottom thereof. A plunger 88 mounted vertically beneath the inlet 86 is normally in raised position, the plunger having a ball lifter extension 89 which engages the ball 85 and lifts it from its seat so that fluid may flow into the valve housing. The plunger is retained by a limit screw 90 engaging a slot in the plunger and permitting limited vertical movement thereof. The plunger is normally held in raised position by a cable 91 fixed to its lower end, extending upwardly through tube 31 and laterally into the journalling means 33, with its other end fixed to the outer end of a buffer spring 92 mounted upon a partition 93 in the journalling means. When the buffer spring is expanded the plunger 88 is lifted and the first ball check valve 83 held open.

The first ball check valve cavity 86 communicates with a passage 95 within the valve body, which passage is constantly open to a first bypass passage 96 within the valve body. This passage normally communicates with the cylinder space 97 of a manually actuated pump 98 mounted upon the valve body, there being a pump inlet check valve 99 to prevent return flow of the fluid when the pump is actuated. The pump comprises a piston 100 operating within the cylinder and pivotally connected to a manual lever 101 whereby the piston may be reciprocated. Fluid is forced from the cylinder space 97 into passage 102 in the valve body, having a pump outlet check valve 103 therein. Fluid is forced from the passage 102 into a discharge line 104 which leads to the lifting mechanism which will be later described. The first bypass passage, including portions 96 and 102, is connected into the fluid supply line comprising the tubes 83 and 104 between the first check valve 85 and a second spring-pressed check valve 105 comprising a ball and spring to prevent backflow of fluid into the passage 95, with its other end connected into the supply line beyond the second check valve 105. The pump 98 is connected into the first bypass passage.

A second bypass passage extends from the first bypass passage 102 into the passage 95, this second passage 106 having a manually controlled butterfly valve 107 therein, the stem of which extends outwardly to a valve handle 108 conveniently adjacent the pump handle 101. The second bypass passage provided by the passage 106 is connected into the supply line at one end between the check valves 85 and 105 and at its other end beyond the second check valve 105, but it does not include the pump 98. The arrangement is such that, when the valve 107 is closed and the first ball check 85 held open, fluid may be forced by the pump from tank 81 into the tube 104. On the other hand, when valve 107 is closed and the first ball check valve 85 is also closed, the fluid cannot be drawn from the tank 81. Likewise, under this set of conditions fluid is prevented from returning through line 104 by the check valves 105 and 103, and the manual valve 107, blocking both bypass passages. However, when the manual valve 107 is opened fluid may freely flow through passages 102 and 95, lifting the ball check valve 85 if there is sufficient force applied through the fluid, and returning to the supply tank 81.

A pair of partitions 110 is provided in side tube 35, thus providing a compressed air supply tank 111. An air supply tube 112 leads therefrom up through vertical tube 32, then partially through the journalling means 33, then into and down through the vertical tube 31, then laterally above the horizontal side tube 34 and into the liquid supply tank 81. The connection of tube 112 to liquid supply tank 81 comprises an elbow 113 supplied with

a pneumatic tire valve 114 whereby the system may be charged with air at a controlled pressure. The tubes 112 and 83 are protected by a shield 115 through which the valve stem projects so that the operator may bleed off air when desired, such as when the mechanism is to be disassembled for shipment. The tube 112 is constantly open between tank 111 and tank 81 so that the liquid supply in tank 81 is constantly under the desired pressure.

The portion of journalling means 33 connected to vertical tube 31 comprises a cylinder 118 within which a piston 120 reciprocates horizontally, crosswise of the truck. The cylinder mounts a guide block and seal 121 provided with an annular recess 122 from which extend longitudinal openings 123 so that fluid supplied to the recess 122 through tube 104 may exert force against the piston 120. The piston rod 124 connected to piston 120 extends into a tube 119 having one end telescoped over the end of cylinder 118 and its other end connected to the vertical tube 32. The journalling means therefore comprises two telescoped tubular members which are free to rotate or move laterally apart with respect to each other. The piston rod 124 is connected to the cable system to be described, and when moved to the left in Fig. 7 will raise the lifting cables. The pressure in the system is so set that the cables are normally raised, the piston 120 normally being extended to the left and partially collapsing the buffer spring 92. As a result the first check valve lifting plunger 88 is normally retracted so that the first check valve 85 normally prevents further flow of fluid against the piston. However, the plunger 88 may be manually raised, whereupon operation of the pump 98 by a few strokes of the handle 101 will further collapse the buffer spring 92 to a limited extent, for a purpose to be described. The air pressure charge in the system is such that the piston will compress the buffer spring 92 to a limited extent when a load is being supported, and manual actuation of the pump 98 is required to compress the buffer spring to its full extent.

The piston rod 124 supports a clevis 130 in which are mounted a first pair of pulleys 131 and a second pair of pulleys 132. A bracket 133 fixed to a removable cover 134 for an opening in the wall of the tube 32 supports a third pair of pulleys 135 and a fourth pair of pulleys 136. A first lifting cable 137 is fixed to the bracket 133 and successively passes over one of the pulleys 131, the opposed one of the pulleys 135, and down through the upright tube 32. The lifting cable 137 then passes over one of a pair of pulleys 138 at the lower end of tube 32, a pulley 139 at the rear end of the side tube 35, and is attached to a lifting bar 140 at its rearward end. A second lifting cable 142 is attached to the bracket 133, and successively passes over the other pulley 131 and the other pulley 135. The cable then extends laterally through the enlarged portion of the crosshead tube 33 and through an opening in the welding ring 125 and alongside the upper surface of the remainder of the crosshead tube 33. It is then trained over one of a pair of pulleys 143 at the top of upright tube 31, downwardly through the tube and over one of a lower pair of pulleys 144, then over pulley 145 at the rear end of the side tube 34 and is attached to the rearward end of an opposed lifting bar 146. A third lifting cable 150 is attached to bracket 133, then passes successively over one of pulleys 132, one of the pulleys 136, the other pulley 138, and a pulley 151 at the front end of side tube 35, and is attached to the front end of bar 140. A fourth lifting cable 152 is attached to the bracket 133, then passes over the second pulley 132, the second pulley 136, through the crosshead tube 33 and over the second pulley 143, then downward through the vertical tube 31, over the second pulley 144, and over a pulley 153, and is attached to the front end of the lifting bar 146. Thus, extension of the piston rod 124 causes separation of the clevis 130 from the bracket 133 and simultaneous, coextensive raising of the lifting cables 137, 142, 150 and 152, and vice versa.

The lifting bars 140 and 146 are channel bars with their flanges facing inwardly, and the cables are connected to the vertical surfaces thereof. A pair of pipes 160 may be inserted crosswise beneath a pallet with their ends inserted into the channel bars as illustrated in Fig. 12. When a lifting force is exerted the channel bars are canted inwardly as shown in Fig. 13, thereby pinching the ends of the pipes to secure them firmly to the lifting bars. The pipes 160 are stowed during traveling of the truck in a receptacle formed by a pair of channel bars 161 welded inside the bed frame, the pipes being insertable therein through an opening 162 in the side skirt of the frame.

The crane travels at a position such as illustrated in Figs. 1 and 2, with the lifting bars substantially at the level of the truck bed. When it is desired to unload a load, a pair of the pipes are removed from their storage places, inserted beneath a load, and their ends engaged by the lifting bars. The operator then manually opens the first check valve and operates the pump handle several times further to compress the buffer springs 92, which lifts the load a short distance from the truck bed. The operator may then apply the crank handle to the reducing gear train and rotate the crank handle to cause the crane to roll rearwardly, transporting the load off the truck bed and onto the extended tail rails. When the load is in the clear space behind the truck bed, the operator can open the manual valve 107 to the desired extent to permit return of fluid into the fluid supply tank, the speed of return, and hence the speed of lowering of the load to the ground, being controlled by the extent of opening of the valve 107 and the weight of the load, as well as the charge pressure of the system against which the load exerts force. When the load rests upon the ground the operator, by stepping upon the outer, upper edges of the lifting bars, disengages the lifting bars from the pipes. Fluid may now return to the space 122 due to the air pressure charge until the buffer spring 92 is partially compressed, at which point the bars will remain at an elevation slightly above the truck bed. The unloaded crane may now be cranked at high speed by direct engagement of the crank with the wheel shaft back to a position to pick up another load.

The cylindrical sections 118 and 119 of the journalling means 33 are only partially telescoped as illustrated in Fig. 7. The weight of the lifting bars 146 is multiplied through the cable and pulley system so that sufficient force is exerted to maintain the end of the larger tubular section 119 against an abutment 170 fixed to the outer surface of the smaller tubular section 118. The abutment 170 is so arranged as not to restrict relative rotation of tubular sections 118 and 119. Therefore, when one edge of a truck bed becomes skewed with respect to the other edge during rough travel, one side portion of the frame may assume an angular position with respect to the other side of the frame as permitted by the journalling means. It will also be observed that each side section of the frame rests upon four flanged wheels and that the cables extend downwardly within the quadrangles defined by each set of four wheels. Therefore, any force exerted by load on the frame does not exert a lateral force against either side of the frame, with the result that the relatively light tension on the cable system is all that is needed to hold the two frame sections together. As a result, the traveling crane is much lighter than any construction heretofore devised for a similar purpose. The slight amount of skewing which may occur between the two side sections of the crane does tend to place a distorting force on the cross-shaft 63; however, the movement of one end of the cross-shaft 63 relative to the other is so slight that no binding occurs. The traveling crane thus is light, sturdy and remains on the rails regardless of rough treatment.

Having illustrated and described a preferred embodiment of the present invention, it should be apparent to

those skilled in the art that the same permits of modification in detail and arrangement. I claim as my invention all such modifications as come within the true spirit and scope of the appended claims.

1. An air-charged hydraulic system for operating the lifting cables of an unloader comprising a cylinder, a piston in said cylinder connected to the lifting cables, a fluid supply tank containing a supply of fluid, a compressed air tank containing a supply of compressed air and openly connected to said fluid supply tank constantly to exert pressure on the fluid in said fluid supply tank, a fluid conduit extending from said fluid supply tank to said cylinder, a first check valve in said conduit which when opened permits fluid to flow into said cylinder whereby said piston is extended to raise the lifting cables, a buffer spring in said cylinder engaged by said piston when extended, said buffer spring being partially compressed thereby due to the force exerted by the compressed air against the fluid, a check valve opening plunger engaging said first check valve, means connecting said buffer spring and said plunger to hold said first check valve open until said buffer spring is partially compressed by said piston, a second check valve in said conduit between said first check valve and said cylinder and arranged to prevent the return of fluid from said cylinder to said supply tank, a first by-pass connected to said conduit at one end between said check valves and at its other end between said second check valve and said cylinder, a manually actuated force pump in said first by-pass, said plunger being manually engageable whereby said first check valve may be manually reopened and said pump operated to force further extension of said piston in order to raise a load slightly, a second by-pass connected to said conduit at one end between said check valves and at its other end between said second check valve and said cylinder, and a manually actuated bleed valve in said second by-pass which when opened permits the return of fluid to said fluid supply tank, whereupon the load will descend, the air pressure in the system automatically re-extending said piston when the load is released from the lifting cables whereby the lifting cables are raised in readiness for engagement with a succeeding load.

2. An air-charged hydraulic system for operating the lifting cables of a traveling crane truck unloader comprising a cylinder, a piston in said cylinder connected to the lifting cables, a fluid supply tank containing a supply of fluid, a compressed air tank containing a supply of compressed air and openly connected to said fluid supply tank constantly to exert pressure on the fluid in said fluid supply tank, a fluid conduit extending from said fluid supply tank to said cylinder, a first check valve in said conduit which when opened permits fluid to flow into said cylinder whereby said piston is extended to raise the lifting cables, a buffer spring in said cylinder engaged by said piston when extended, said buffer spring being partially compressed thereby due to the force exerted by the compressed air against the fluid, a check valve opening plunger engaging said first check valve, mechanical means connecting said buffer spring and said plunger to hold said first check valve open until said buffer spring is partially compressed by said piston, a second check valve in said conduit between said first check valve and said cylinder and arranged to prevent the return of fluid from said cylinder to said supply tank, a first by-pass connected to said conduit at one end between said second check valve and said cylinder, a manually actuated force pump in said first by-pass, said plunger being manually engageable whereby said first check valve may be manually reopened and said pump operated to force further extension of said piston in order to raise a load slightly from a truck bed whereupon the load may be transported by the traveling crane to an unloading position, a second by-pass connected to

said conduit at one end between said check valves and at its other end between said second check valve and said cylinder, and a manually actuated bleed valve in said second by-pass which when opened permits the return of fluid to said fluid supply tank, whereupon the load will descend to the ground at the unloading position, the air pressure in the system automatically re-extending said piston when the load is released from the lifting cables whereby the lifting cables are raised in readiness for engagement with a succeeding load on the truck bed.

3. An air-charged hydraulic system for operating the lifting cables of a load handling device comprising a cylinder, a piston in said cylinder connected to the lifting cables, a fluid supply tank containing a supply of fluid, a compressed air tank containing a supply of compressed air and openly connected to said fluid supply tank constantly to exert pressure on the fluid in said fluid supply tank, a fluid conduit extending from said fluid supply tank to said cylinder, a first check valve in said conduit which when opened permits fluid to flow into said cylinder whereby said piston is extended to raise the lifting cables, a buffer spring in said cylinder engaged by said piston when extended, said buffer spring being partially compressed thereby due to the force exerted by the compressed air against the fluid, a check valve opening plunger engaging said first check valve, a cable connecting said buffer spring and said plunger to hold said first check valve open until said buffer spring is partially compressed by said piston, a second check valve in said conduit between said first check valve and said cylinder and arranged to prevent the return of fluid from said cylinder to said supply tank, a first by-pass connected to said conduit at one end between said check valves and at its other end between said second check valve and said cylinder, a manually actuated force pump in said first by-pass, said plunger being manually engageable whereby said first check valve may be manually reopened and said pump operated to force further extension of said piston in order to raise a load slightly from its resting place, a second by-pass connected to said conduit at one end between said check valves and at its other end between said second check valve and said cylinder, and a manually actuated bleed valve in said second by-pass which when opened permits the return of fluid to said fluid supply tank, whereupon the load will descend, the air pressure in the system automatically re-extending said piston when the load is released from the lifting cables whereby the lifting cables are raised in readiness for engagement with a succeeding load.

4. The structure set forth in claim 1 wherein said compressed air tank is provided with a releasable charging valve whereby the compressed air supply tank may be controllably charged with air under pressure.

5. The structure set forth in claim 2 wherein said unloader comprises a cable supporting structure including a pair of sheave supports closely adjacent the bed of the truck, one at each side, said structure being open at one end whereby said structure may extend around three sides of a load on a truck.

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