

March 31, 1931.

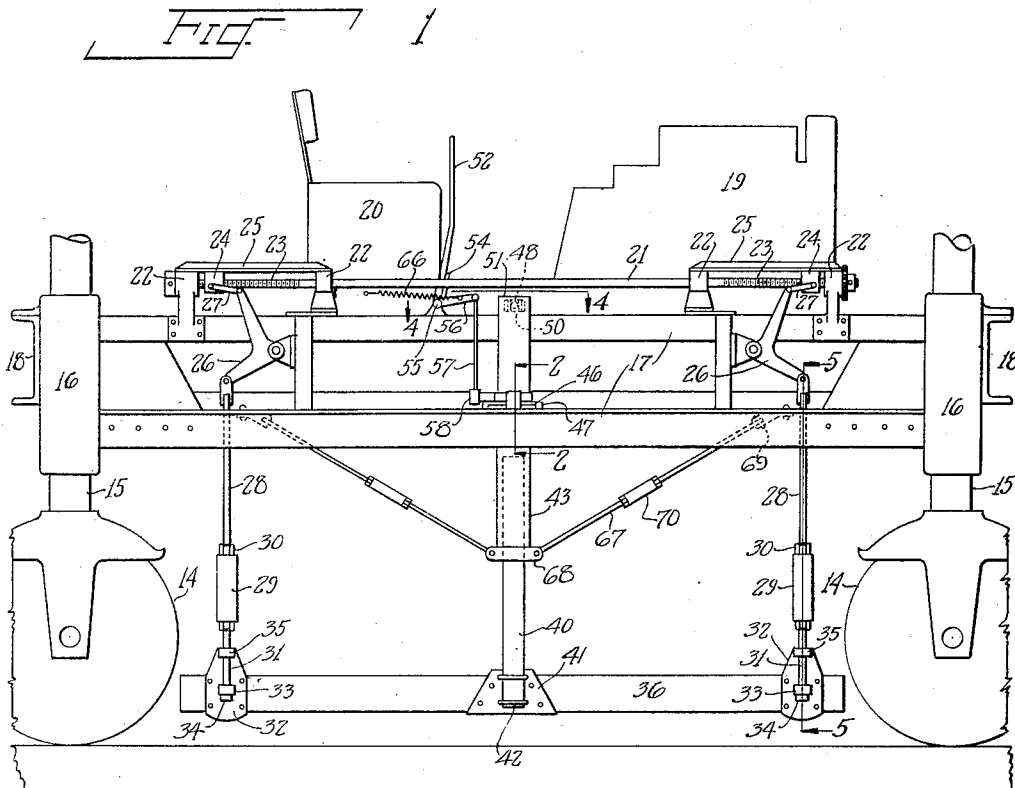
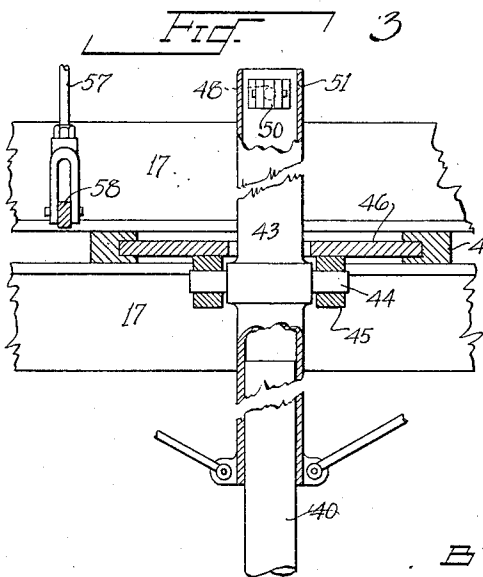
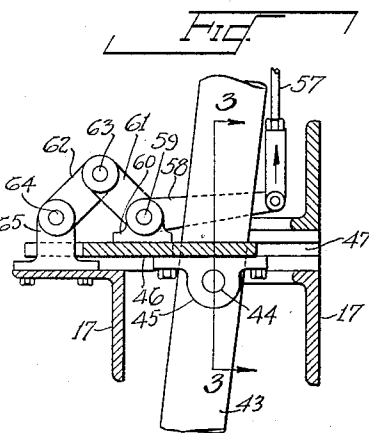
G. A. GRAB

1,798,412

FLEXIBLE GRAPPLING BAR FOR LUMBER CARRIERS

Filed Feb. 1, 1928

3 Sheets-Sheet 1



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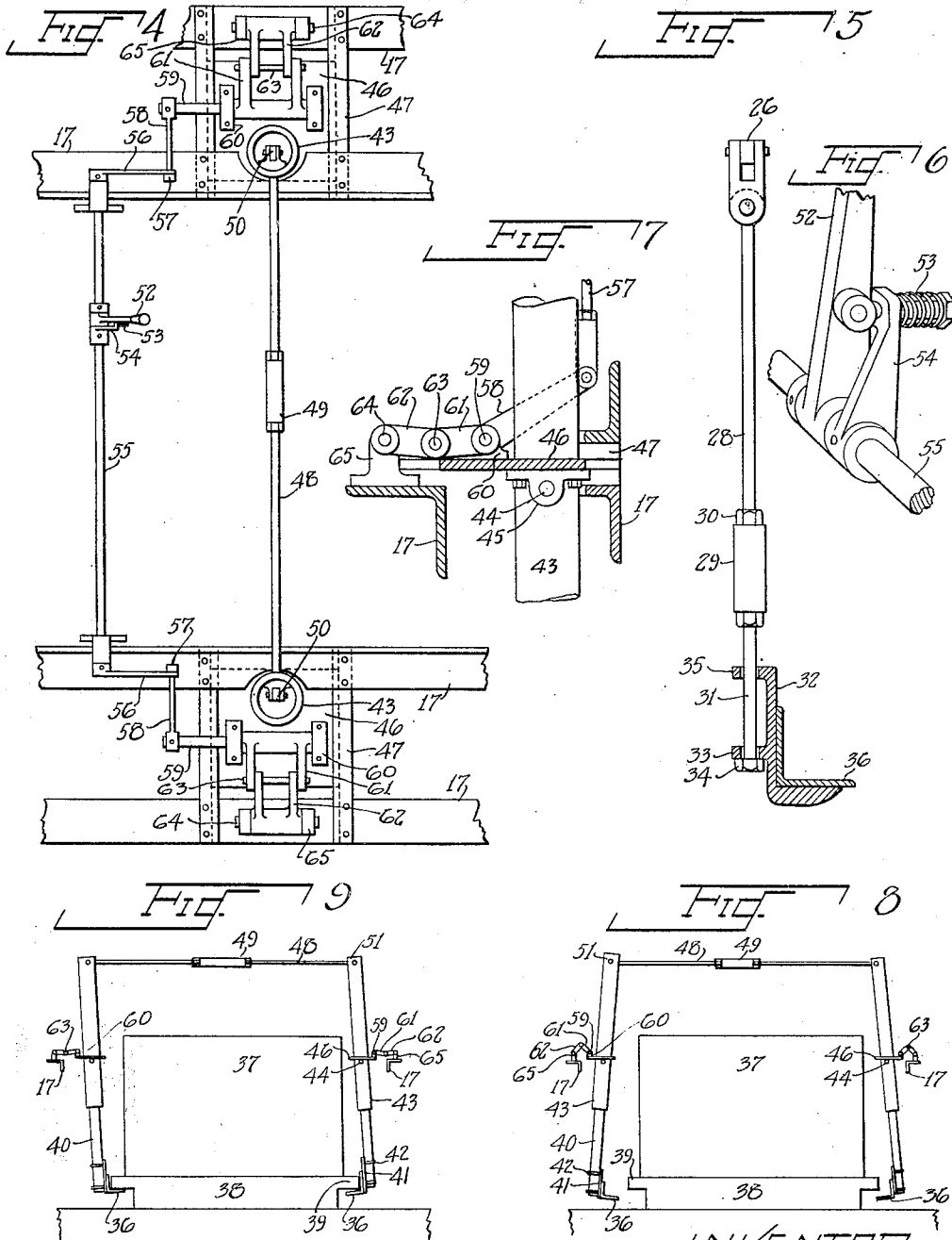
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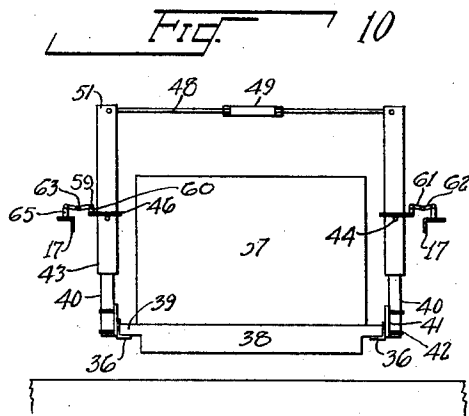
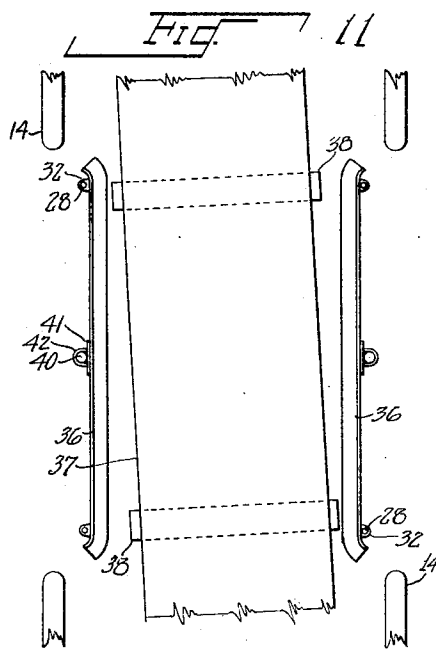
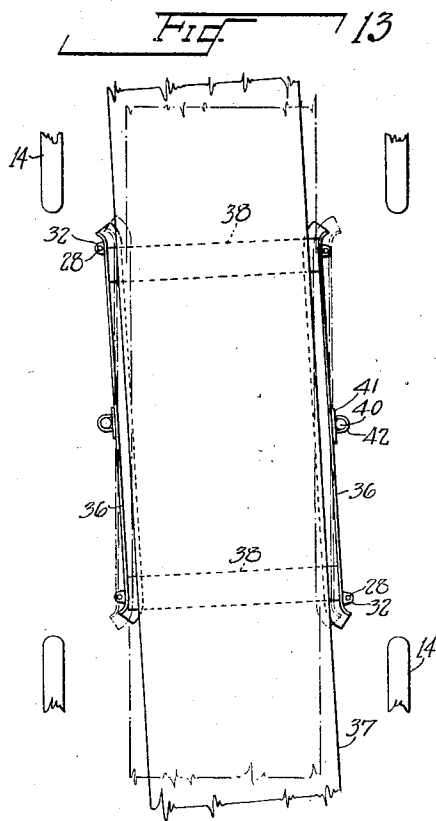
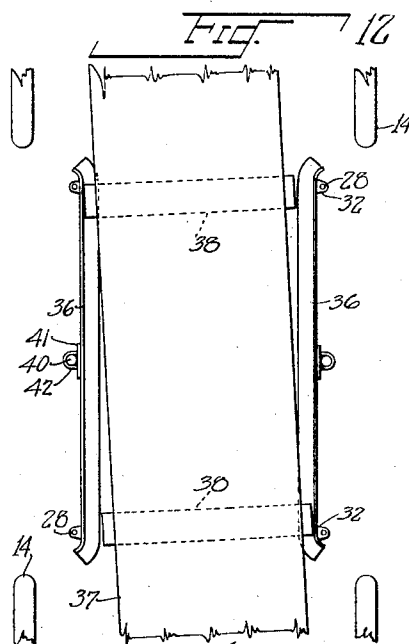
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3 Sheets-Sheet 3



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FLEXIBLE GRAPPLING BAR FOR LUMBER CARRIERS

Application filed February 1, 1928. Serial No. 251,009.

This invention relates generally to lumber carriers, and especially to the straddle type of vehicles adapted to travel upon the ground and peculiarly designed for the handling of piled lumber.

The main object of this invention is to provide special forms of flexible grappling bars for lumber carriers which will properly engage any load over which the carrier can be driven, assuming that the load is piled on suitable bolsters.

The second object is to secure a great reduction in weight in the building of lumber carriers by the elimination of numerous slides and guides hitherto regarded as indispensable.

The third object is the construction of grappling bars adapted to swing laterally with relation to the carrier and to have means for providing limited rotation in a horizontal plane on an upright operating lever.

The fourth object is to provide laterally yieldable grappling bars which will be positively locked, as far as lateral movement is concerned, when the load is properly engaged, but which will fail to lock if the load is improperly engaged, regardless of physical exertion on the part of the driver.

The fifth object is to provide a holdover mechanism which will tend to urge the grappling bars toward either a load-engaging or load-releasing position.

The sixth object is to provide relative lateral movement between the carrier frame and the load-engaging bars, as well as relative angular movement between these elements without the employment of complicated and expensive equalizing devices.

The seventh object is to provide a longitudinal grappling bar having end supports directly connected to the lifting mechanism, and to employ a single telescopic lever for moving said bars laterally and for permitting same to rotate in an approximately horizontal plane.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of a lumber carrier omitting unrelated parts. Figure 2 is a section taken along the line 2—2 in Figure 1. Figure 3 is a section taken along the line 3—3 in Figure 2. Figure 4 is a horizontal section taken along the line 4—4 in Figure 1. Figure 5 is a vertical section taken along the line 5—5 in Figure 1. Figure 6 is a perspective view of the spring connection between the operating lever and the telescopic lever. Figure 7 is a view similar to Figure 2 except showing the parts in a locked position. Figure 8 is a diagrammatic transverse section of the grappling bars with the telescopic levers showing an off-center load. Figure 9 is similar to Figure 6 showing the grappling bars engaging the bolsters. Figure 10 is similar to Figure 9 showing the load lifted clear of the ground and moved to a central position by gravity. Figure 11 is a diagrammatic plan view showing the carrier over a diagonally set load. Figure 12 is similar to Figure 11 showing the grappling bars brought into contact with the diagonal corners of the load-supporting bolsters. Figure 13 is similar to Figure 12 showing the grappling bars in full engagement with the bolsters.

Similar numbers of reference refer to similar parts throughout the several views.

It must be borne in mind that the device about to be described deals particularly with traversing hoists for carrying lumber which has previously been piled upon transverse bolsters. The object of the hoist is to pick up the load bodily and to transport it to a different location at a relatively high rate of speed and set it down on the ground, or other support, after which the hoist is driven away from the pile. At the same time it must be kept in mind that these hoists weigh in the

neighborhood of five or six tons and will carry from eight to ten thousand feet of green lumber, and in the case of dimension lumber will many times exceed the capacity for which the hoists are designed.

Referring in detail to the drawings, there is illustrated certain portions of the hoist, including the wheels 14, steering spindles 15 and corner posts 16 which are united by the horizontal frame ties 17 and the transverse ties 18. The usual engine 19 and operator's seat 20 are also indicated.

The load lifting mechanism consists of a horizontal threaded shaft 21 whose ends journal in the bearings 22 between which are the threaded portions 23 of the shaft 21. Each threaded portion 23 is provided with a nut 24 which is prevented from turning by the bar 25 extending across the bearings 22.

Below each threaded portion 23 of the shaft 21 is mounted a bell crank lever 26 whose upper end is joined by a link 27 to a nut 24. To the lower arm of each bell crank lever 26 is attached a connecting rod 28 which is provided with a turn buckle 29 and locking nut 30. On the lower end 31 of the connecting rod 28 is loosely mounted a bracket 32 whose lower end 33 normally rests against the head 34 of the member 31, and whose upper end 35 extends some distance upwardly along the member 31.

Underneath each longitudinal tie 17 and normally parallel therewith is a load grappling bar 36 whose rearward and forward ends are securely fastened to the bracket 32. The connecting rods 28 become in effect swinging frames and the upper ends of each rod 28 move in an arc following the bell crank lever 26; whereas the lower ends of the rods 28 swing in arcs transversely with the hoist frame.

This construction results in a complete load-supporting unit which is in itself capable of supporting the load. This load normally consists of a pile of lumber 37 which has been piled upon a pair of cross members 38, commonly known as bolsters, whose ends 39 project slightly above the lower side thereof to afford a suitable point of engagement with the grappling bar 36. In order to move the bar 36 into and out of engagement there is provided a telescoping lever consisting of a cylindrical upright 40 whose lower end is rigidly secured to the grappling bar 36 by means of the bracket 41 and the U bolts 42. The upper end of the member 40 is slidably and rotatably mounted in the telescoping lever 43 and is provided with trunnions 44 which journal in the bearings 45 on the under side of a horizontal slide 46 which is mounted in the guides 47 on the longitudinal ties 17.

Transversely across the hoist is placed the tie rod 48 provided with the turn buckle 49 whose ends 50 are hinged to the upper ends 51 of the telescoping lever 43. Lateral move-

ment is supplied to the trunnions 44 of the telescoping levers 43 by a hand lever 52, which, through a spring 53, acts on a stub lever 54 on the cross shaft 55, at each end of which is secured a lever 56 each of which is joined by a connecting rod 57 to a lever 58 on the shaft 59 which journals in the bearing 60 on the slide 46. On the shaft 59 is mounted a pair of inner toggle levers 61 which are joined to the outer toggle levers 62 by means of a pin 63. The outer ends of the levers 62 are joined by means of a pin 64 to the standards 65 mounted on the tie 17.

It is preferable to provide a spring 66 for the lever 56 and so fasten same that it will tend to urge the lever 56 toward its uppermost or lowermost positions. It is also desirable to provide diagonal braces 67 for the telescoping lever 43 to which they are attached by means of a clamp 68. The opposite ends of the braces 67 are hinged to the ties 17 on the pins 69. Turn buckles 70 are also provided for the diagonal braces 67.

The operation of the device is as follows: The hoist is driven over a pile of lumber 37 and when in correct longitudinal position the operator stops the hoist and by pulling the lever 52 toward him yieldingly urges the toggle levers 61 and 62 toward the position shown in Figure 7. If the load grappling bars have not been sufficiently lowered to pass under the ends 39 of the bolsters 38, or some other obstruction is encountered, the lever 52 may be moved its full distance but will only compress the spring 53 which will return the lever 52 to its original position as soon as the hand is removed therefrom. If, however, the grappling bars 36 properly engage the bolster ends 39 then the levers 61 and 62 will move to the position shown in Figure 7, after which the spring 53 has no function to perform.

In other words—the trunnions 44 are now rigidly locked in relation to the ties 17. In practically every instance it will be found that the hoist has not approached the load and straddled it directly over its center line; in fact, it will in most instances be laterally as well as angularly misplaced. Since this position is inevitable provision is made to accommodate the hoist to extremes of such conditions. In Figure 8 the load is shown to one side of the lateral center line of the hoist whose arms are capable of swinging laterally sufficiently far to properly engage the bolsters 38, after which they are locked, as far as spreading is concerned, but are still capable of moving laterally in unison with each other which permits same to occupy the position shown in Figure 9 as soon as the load is lifted free of the ground.

The condition of angular misplacement is shown clearly in plan in Figure 11. The correction for this error involves an angular or rotative movement on the part of the grap-

pling bars 36 (as shown in Figure 13) where they have been moved parallel with the load 37, which movement is accomplished by certain ends of the grappling bars coming in contact with the load first, after which the continued application of power, through the medium of the telescoping levers 43, swings the opposite ends of the grappling bars 36 into their proper load-engaging position.

It can thus be seen that by an exceedingly simple arrangement of parts a load-grappling mechanism has been constructed which will adapt itself to lateral as well as angular misplacement of load, but which will be locked against lateral separation of the grappling devices, although the devices themselves are capable of moving laterally in unison, which produces an ideal condition for traversing hoists adapted for lumber carrying.

I am aware that many forms of traversing hoists have been constructed in the past; it is therefore not my intention to cover such devices broadly, but I do intend to cover all such forms and modifications thereof as fall fairly within the appended claims.

I claim:

1. A lifting frame for traversing hoists having in combination a pair of upright connecting rods having fastenings at the upper ends thereof connectible directly to a load lifting mechanism, a load grappling bar joining the lower ends of said connecting rods, the connections between said load grappling bar and connecting rods providing independent lateral movement of either end of said bar with relation to the opposite end thereof, and an equalizing means directed against the middle portion of said bar for the purpose of urging same toward the load about to be engaged.

2. In a lumber carrier, a pair of laterally swinging load supporting frames having a load lifting mechanism attached to the upper end thereof, the lower corners of said frame having flexible connections permitting a substantial independent lateral movement between the rearward and forward ends of said frame, the lower end of said frame comprising a grappling bar having a telescoping lever secured to the middle thereof forming an upright pivot around which said grappling bar can rotate, and means for actuating said telescoping lever in a manner that said grappling bar may move laterally with relation to an associated grappling bar for the purpose of engaging or disengaging a load or may be held to prevent relative movement with said associated bar when said bars are in a load engaging position.

3. In a lumber carrier the combination of two laterally spaced longitudinal grappling bars each having a pair of laterally swinging pendent end supports, an operating lever slidably attached to each of said bars, each of

said levers having a laterally floating fulcrum, the connection between said operating levers and their respective grappling bars and floating fulcrums permitting said grappling bars to swing in an arcuate path as when the two bars swing in parallelism with their points of support and to permit said grappling bars to swing laterally in a helical path when said bars are swung in opposite directions or out of parallelism with their points of support.

4. In a traversing hoist the combination of a pair of laterally spaced load lifting longitudinal grappling bars provided with pendent end supports having hinged joints at each end thereof, said bars being capable of laterally swinging movements independently when not engaging a load and in unison when in a load supporting position and a transversely disposed equalizing device operating between the midsections of said bars.

5. In a traversing hoist the combination of a pair of horizontal longitudinal grappling bars with upright tension rods hinged at both ends between the ends of said bars, and a supporting member adapted to permit independent laterally swinging motion for the opposite ends of said bars for the purpose of facilitating load engagement, bar operating arms connected intermediate said tension rods, locking means adapted to prevent relative movement of said bars and to permit lateral swinging of said bars in unison consisting of horizontally slidable fulcrums for said arms, and toggles connecting said slidable fulcrums to a fixed support, and means for actuating said toggle bars together with a connecting tie between said arms at the upper end thereof.

6. In a lumber carrier the combination of a straddle vehicle including a frame, supporting wheels and load lifting mechanism with a pair of longitudinal grappling bars hingedly suspended from the load lifting mechanism at their forward and rearward ends, an upright pivot near the middle of each grappling bar consisting of a telescoping lever the lower portion of which is rigidly secured to its grappling bar and the upper portion of which is hingedly mounted and slidably supported upon said frame, a fixed tie rod joining said levers above their hinge mountings, toggle levers reacting between said frame and said lever hinges in a manner to vary the lateral spacing of said grappling bars, said bars having laterally swinging and horizontally rotating motions.

7. In a traversing hoist the combination of a pair of laterally opposed longitudinal load grappling bars having longitudinally rigid and laterally flexible supports for the ends thereof, an upright telescoping lever at the middle of each grappling bar rigidly secured thereto, the upper portion of each telescoping lever having trunnions thereon, a

horizontally slidable support for each trunnion, and locking means for holding said trunnions in fixed relation when said grappling bars are in a load engaging position.

8. In a traversing hoist the combination of a pair of laterally opposed longitudinal load grappling bars having swinging load lifting elements attached thereto, a pair of levers for swinging said elements having fulcrums between the upper and lower ends thereof, a tie rod between the upper ends of said levers, and means for varying the spacing between the lever fulcrums.

9. In a lumber carrier the combination of a traversing hoist including a frame, supporting wheels and having a load-lifting bell crank lever near each corner of the hoist frame, screw means for operating said bell crank levers, a connecting rod swinging downwardly from each lifting element, a longitudinal grappling bar along each side of said hoist pivotally attached to said connecting rods on vertical axes, said connections providing a limited upward movement for the ends of said grappling bars independently of their supporting rods, an upright pivot near the middle of each of said grappling bars consisting of a telescoping lever having its lower end rigidly attached to the bar and having its middle portion laterally slidable and hingedly mounted on said frame, toggle levers on said frame for operating said slidable lever hinges, a hand lever for actuating said toggle levers, a spring interposed between said hand lever and toggle levers providing a yielding connection for operating said toggle levers, and a second spring adapted to hold said toggle levers toward or away from a locking position.

10. In a lumber carrier the combination of a traversing hoist, having ground-engaging wheels, a straddle frame supported thereby adapted to be driven over a pile of lumber, a bell crank lever mounted at each corner of the frame, a connecting rod attached to each bell crank lever, a longitudinal grappling bar along each side of said frame having vertically slidable pivotal connections to two of said connecting rods, said connecting rods comprising the load lifting frame the connections between said connecting rods and grappling bars permitting horizontal rotation of said bar, an upright swinging pivot for each bar consisting of a telescoping lever having its lower end rigidly attached to said grappling bar and its upper end hingedly and laterally slidably swung from said frame, a transverse tie rod between the upper ends of said telescoping levers, and means for operating said telescoping levers in a manner that said grappling bars may be permitted to move with relation to each other and to swing laterally when not in a load engaging position and to swing only in unison when in a load-engaging position.

11. A lumber carrier the combination of a wheeled vehicle with a pair of spaced normally parallel load supporting grapples suspended from said vehicle, means for lifting both of said grapples in unison, each of said grapples having a central upright axis around which it can rotate, and means for varying the angular relation between the opposite axes.

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