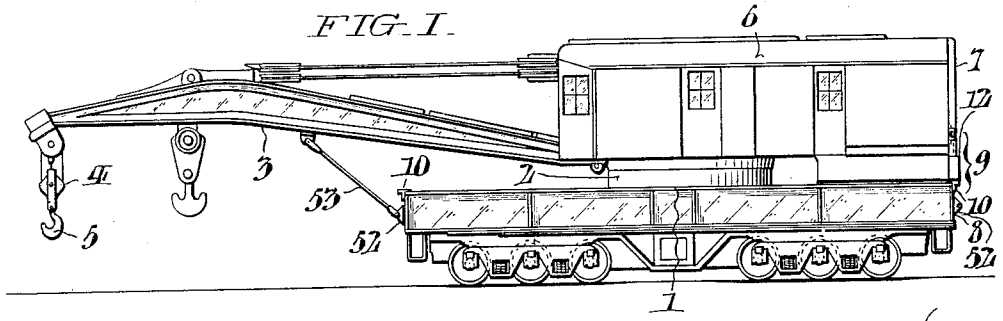
Jan. 17, 1933. F. W. HANKINS 1,894,683

LOCKING ATTACHMENT FOR CRANES

Filed June 1, 1932 3 Sheets-Sheet 1

FIG. I.



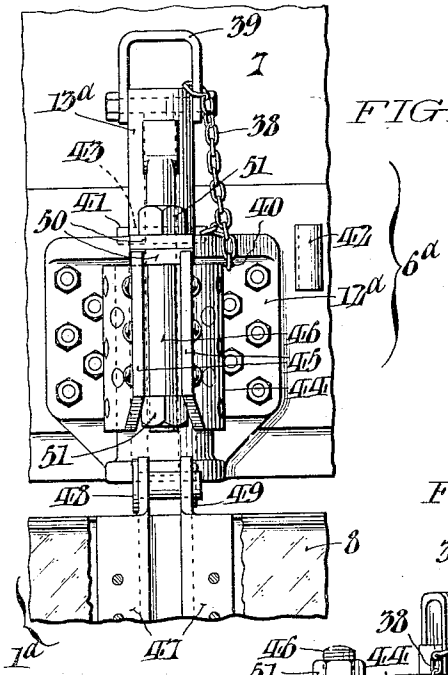


FIG. VI.

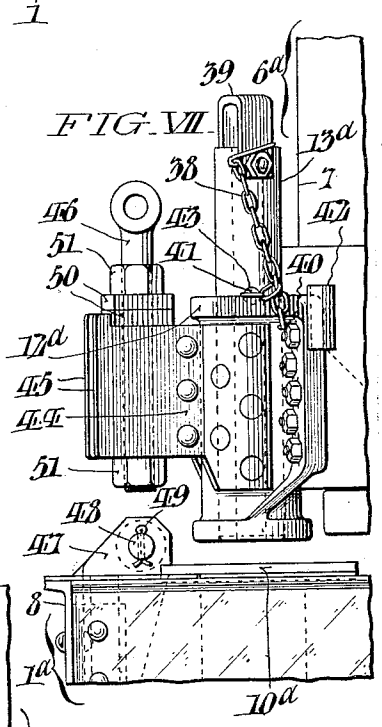


FIG. VII.

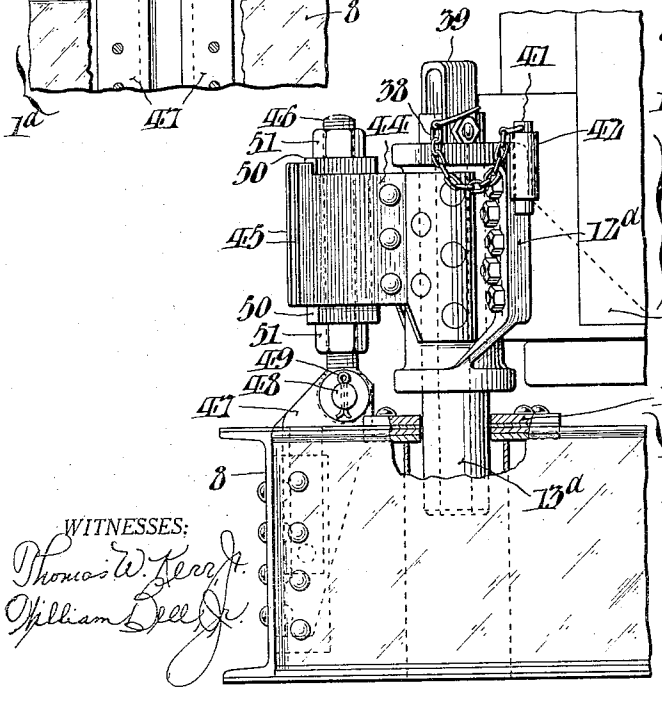


FIG. V.

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LOCKING ATTACHMENT FOR CRANES

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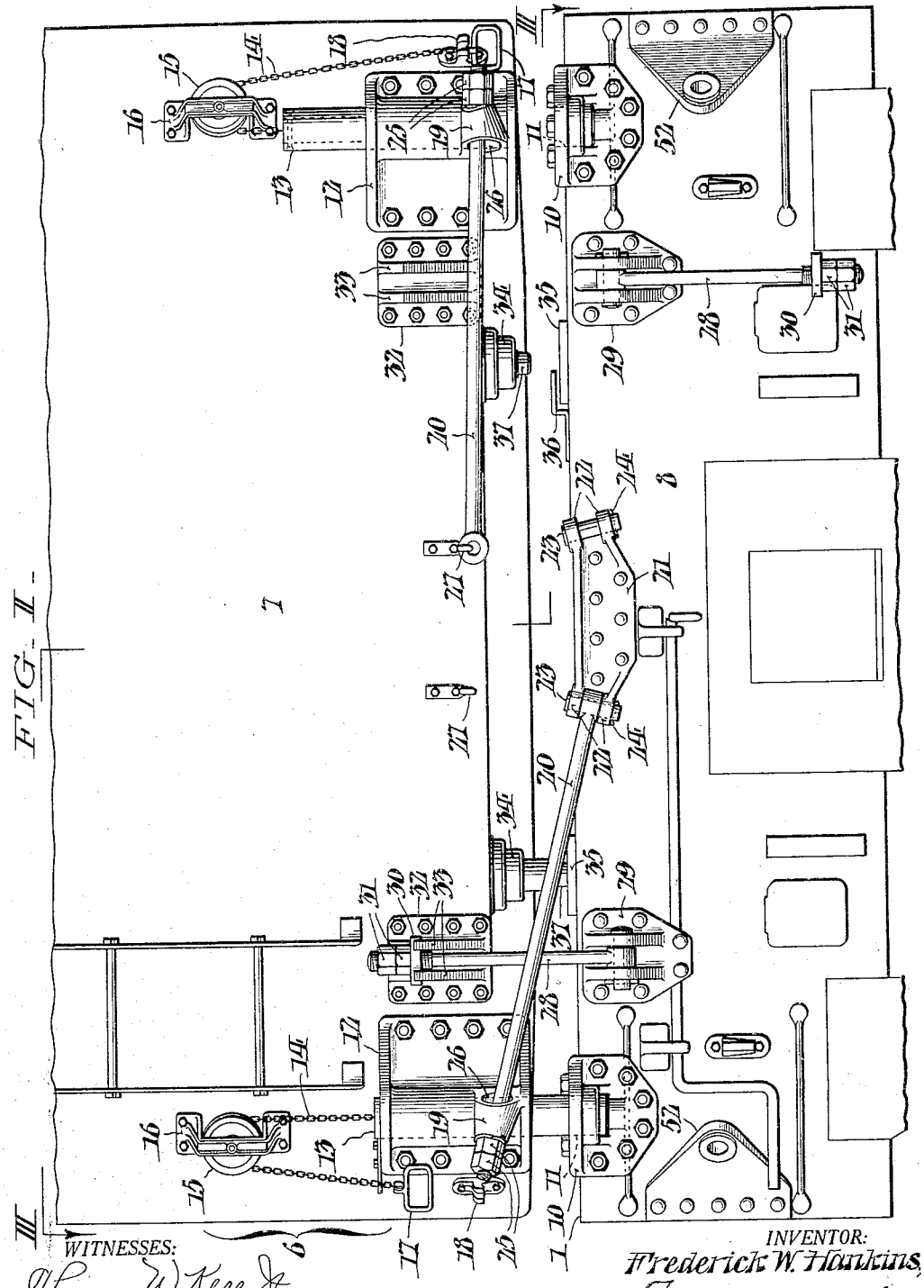


FIG. II.

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LOCKING ATTACHMENT FOR CRANES

Filed June 1, 1932 3 Sheets-Sheet 3

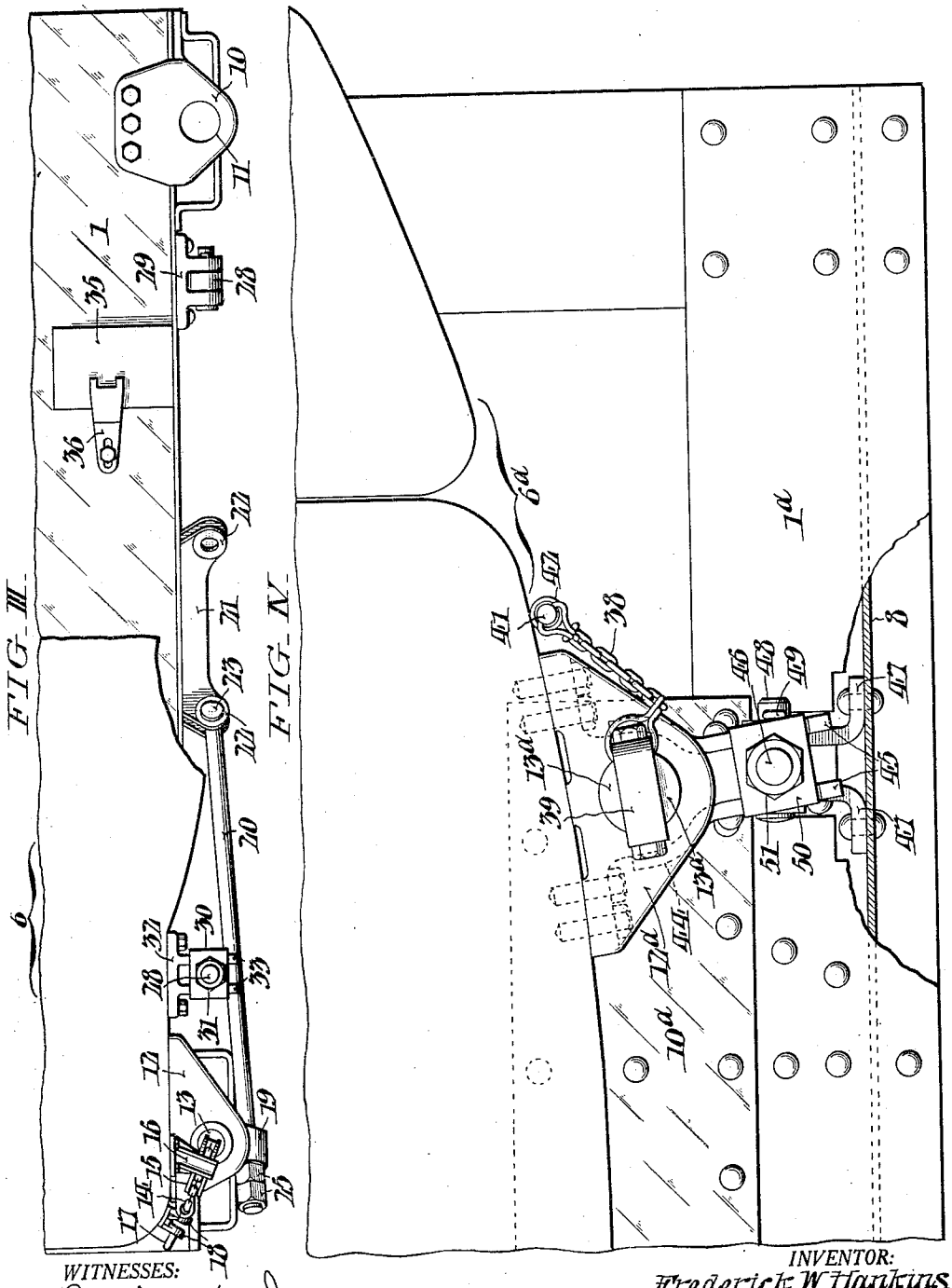


FIG. III.

FIG. IV.

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Patented Jan. 17, 1933

1,894,683

UNITED STATES PATENT OFFICE

FREDERICK W. HANKINS, OF PHILADELPHIA, PENNSYLVANIA

LOCKING ATTACHMENT FOR CRANES

Application filed June 1, 1932. Serial No. 614,733.

This invention relates to locking attachments for cranes, and has particular utility in its application to railroad crane vehicles, such as wrecking cranes, locomotive cranes, crane pile drivers, ditchers or the like. With crane vehicles such as employed by railroads for ready service, it is of the utmost importance that the boom and fall-block be adequately secured against rotation while in transit to prevent such parts from accidentally swinging out of line, thereby endangering passing traffic on adjacent tracks. It is also important that the devices for thus securing the rotating structure of the crane to the vehicle platform be designed to permit the rotating structure to be readily centered on its platform and locked thereto, as well as to permit its quick release, preparatory to operation of the crane.

Accordingly, the principal object of my invention is to provide in such a crane vehicle, a combination of centering and locking devices, the parts whereof are adapted to be manipulated with speed and facility to secure or release the rotating crane structure and are of sufficient strength to safeguard against dislodgment, or accidental release.

Other objects and advantages characteristic of my invention will become more fully apparent from the description hereinafter set forth of one embodiment or example of the practice of the invention, having reference to the accompanying drawings, whereof:

Fig. I represents a side elevation of a wrecking crane with locking attachments of my invention applied thereto at the rear end.

Fig. II represents an enlarged end view showing portions only of the car body and of the rotating crane structure.

Fig. III represents a plan view of the rear end of the car body with a portion of the rotating crane structure removed to show the car platform, as indicated by the lines III—III of Fig. II.

Fig. IV represents a plan view of a modified or alternative form of locking apparatus applied to a different type of railroad crane vehicle.

Fig. V represents a side elevation of the same with the parts in locked position.

Fig. VI represents a rear end view of the combined centering pin sleeve and tie rod bracket of the same, with the centering and locking pin maintained in raised position; and,

Fig. VII represents a side elevation similar to Fig. V, but with the centering and locking pin raised and the tie rod disassembled and housed in a position not obstructing rotation of the crane structure.

With reference initially to Fig. I, there is represented diagrammatically in the drawings a wrecking crane comprising generally a stationary platform structure 1 of a flat car and a rotatable crane structure thereon, consisting of a central pedestal 2, a pivoted boom 3 carrying the usual fall block 4 and lifting hook 5, and a cab structure 6 supporting the pivoted end of the boom and adapted to rotate about the axis of the pedestal 2. Such a form of wrecking crane is commonly used on railroads for ready service in emergencies, and it will be understood that the crane is selected for illustration herein merely as an example of a vehicle to which the hereinafter described locking attachments of my invention may be applied to advantage. In the wrecking crane shown in Fig. I, it will be noted that the rear end 7 of the operator's cab 6, when it is centered longitudinally on the platform 1, is in substantial vertical alignment with the rear end sill 8 of the car platform. In Fig. I, the apparatus for centering and locking the rotatable crane structure on the platform is comprehensively designated at 9. While this apparatus is shown as applied only to the rear of the cab, it will be appreciated that it is desirable with some types of vehicles to employ additional like apparatus at the front end of the cab or at other regions.

In Figs. II and III one form of locking apparatus is shown in detail as applied on the end sill 8 of the vehicle platform. Near each corner at the front and rear ends of the car there is a socket member 10 in the form of a casting which overhangs the edge of the car and is securely riveted to the end sill, each socket member having a large cylindrical opening 11. On the rear end 7 of the super-

imposed cab structure, sleeves or guides 12 are provided carrying centering and locking pins 13 which are adapted to be raised and lowered, and which when lowered enter into engagement with the socket members 10. For raising and lowering each centering and locking pin 13, a chain 14 is attached to the top thereof, this chain being carried on a sheave 15 mounted in a bracket 16. The chain 14 passes around the sheave 15 and terminates in a handle 17. When a centering and locking pin 13 has been raised within its sleeve or guide 12, it may be held in raised position by fastening the handle 17 to a hook 18 provided for that purpose, in the manner shown at the right hand of Fig. II.

Each centering pin sleeve or guide 12 has thereon a perforated lug 19 which affords one anchorage for a substantially horizontal tie rod 20. On each end sill 8 of the vehicle platform near the center thereof, there is a casting 21 having perforated lugs 22 affording anchorages for the opposite ends of the horizontal tie rods 20. When the crane is not in use, each horizontal tie rod 20 is secured to the anchorage 22 of the car platform by a removable bolt 23 having a cotter pin 24 passed through the end thereof. Nuts 25 are conveniently used for tightening the horizontal tie rods 20. The apertures 26 of the perforated lugs 19 are formed to permit limited angular movement of the tie rods 20 so that they may be swung upward to engagement with hook-shaped holders 27 on the rear end 7 of the operator's cab when the crane is in operation. Thus in effect the horizontal tie rods 20 are hinged at the perforated lugs 19.

Provision is made for preventing relative vertical movement between the rotatable crane structure and the car platform by the employment of vertical tie rods 28. Each vertical tie rod 28 is pivotally attached at its lower end to a hinge 29 secured to the end sill of the car platform near a socket member 10. At its free end each vertical tie rod 28 has a dog 30 adjustable by nuts 31, and adapted to engage the top edges of a grooved bracket 32. The brackets 32 serve as anchorages on the rear end 7 of the operator's cab and are preferably mounted adjacent to the centering pin sleeves or guides 12. Projecting wings 33 on the brackets 32 form a vertical groove for accommodating the vertical tie rods in the manner shown at the left hand of Fig. II, when the crane structure is locked to the car platform 1. When not in use, the vertical tie rods 28 are swung downward to a position, as shown at the right hand of Fig. II. Between the car platform 1 and the bottom of the operator's cab 6, there are provided jacks, such as diagrammatically indicated at 34, for supporting the rear end load.

The jacks 34 are shown mounted on the bottom of the operator's cab 6 and are extensible downward to engage pads 35 on the car platform. Associated with the pads 35 are nut locking devices 36 adapted to be moved outward to engagement with the nut portion 37 at the lower extremity of the jacks so as to hold the jack against rotation. In an obvious manner the jacks 34 are operative to support and prevent downward tilting of the rear end of the cab 6, whereas the vertical tie rods 28 prevent upward tilting of the rear end of the cab. Near the sockets 10 at the ends of the car, perforated brackets 52 are preferably provided to afford anchorages for stay wires, such as shown at 53 in Fig. I, for securing the booms.

In Figs. IV, V, VI and VII, there is shown a modified or alternative form of locking apparatus applied to another type of railroad crane vehicle, the rotating cab structure whereof is designated at 6*a*, and the platform structure whereof is designated at 1*a*. In this example, each socket member 10*a* is located inward from the corner of the car, and a sleeve or guide 12*a* is located in a corresponding position on the rear end of cab structure 6*a*. The sleeve or guide 12*a* carries a centering and locking pin 13*a*, which is adapted to be lowered into the socket member 10*a* when the cab structure is to be locked to the underlying platform 1*a*. For raising and lowering the centering and locking pin 13*a*, a chain 38 is employed, one end of the chain being attached to a stirrup 39 at the top of the centering pin, and the other end of the chain being secured to the guide or sleeve 12*a* at 40. On an intermediate portion of the chain there is carried a pin 41 which when out of use may be housed in a pipe 42, and which when employed for holding the centering and locking pin in raised position is inserted in an opening 43, as shown in Fig. VII. The sleeve or guide 12*a* is combined with a bracket 44 having rearwardly extending wings 45 which form a vertical groove for the reception of a tie rod 46. The vertical tie rod 46 is adapted for pivotal connection to perforated lugs 47 on the car platform, the connection being made by a removable bolt 48 having a cotter pin 49 inserted in the end thereof, as shown in Fig. V. On the vertical tie rod 46, there are dogs 50 for engagement with the top and bottom edges of the wing portions 45 of the bracket 44. Nuts 51 are associated with the dogs 50 to permit their vertical adjustment.

With this form of locking apparatus, when the crane is in operation, it may be desired to house the vertical tie rod 46 in the manner shown in Fig. VII. To accomplish this the nuts 51 are slackened off to permit the removal of the tie rod 46 from the bracket 44. The bolt 48 is then removed to unhinge the tie rod, and the tie rod is then reversed so that its lower end becomes its upper end, is

reinserted in the bracket 44, and there secured by turning the nuts 51.

Referring to the example of my invention illustrated in Figs. II and III, the operation of the locking apparatus is as follows: When the crane is in service, the parts assume the relation shown at the right hand of Fig. II, in which case the horizontal tie rods 20 are hooked on the holders 27, the vertical tie rods 28 are swung downward, the centering and locking pins 13 are held in raised position, and the jacks 34 are adjusted to be well clear of the car platform. When it is desired to assemble the parts for transportation of the crane, the first step consists in centering the rotating cab structure 6 longitudinally of the car platform. This is accomplished by rotating the cab to an approximately centered position, and then releasing the centering pins 13 by detaching the handles 17 from the hooks 18 and allowing the pins to fall by gravity. If the centering and locking pins 13 do not fall squarely into the socket member 10, the cab structure may be rotated slowly in one direction or the other until this engagement is effected.

It is usually more desirable and more safe to trail the boom of the crane structure. Inasmuch as there are sockets 10 at each end of the car platform, equidistant from the axis of rotation of the crane structure, the fore-and-aft position of the cab in one direction or the other can be varied at will, so that whether the car is to proceed in one direction or the other, the crane structure can always be secured with the boom trailed at the rear. After the directional position of the cab structure 6 has been thus fixed and it is centered longitudinally of the platform, the jacks 34 are operated to support the rear end load and to elevate the rear end of the cab 6 to the desired position for application of the tie rods 20, 28. When the jacks 34 have been extended, the vertical tie rods 28 are swung upward to housed position in the grooved brackets 32, whereupon the nuts 31 are turned to engage the top edges of the wings 33 and to lock the tie rods 28 in position. Finally, the horizontal tie rods 20 are released from the holders 27, applied to the perforated lugs 22 of the casting 21, and there locked by means of bolts 23 and cotter pins 24. When the parts are thus assembled, it will be noted that the centering and locking pins 13 are relieved wholly or partially of shearing stress by the horizontal tie rods 20; and the possibility of the centering and locking pins becoming dislodged by a rocking motion of the cab is prevented by the vertical tie rods 28.

The horizontal tie rods 20 not only protect the locking pins 13 and the vertical tie rods 28 against horizontal bending or shearing stresses, but also block and prevent displacement of the vertical tie rods 28 from engaged position; inasmuch as the points of connection and engagement of the horizontal tie rods 20 to the structures are at opposite sides of the vertical tie rods 28. The jacks 34 hold up the crane structure against the vertical ties 28, and thus prevent hammering against the vertical ties, and also coact with the two sets of tie rods to completely fix the crane structure relative to the car, and to prevent cross-working of the crane structure relative to either set of tie devices,—even independently of the locking pins 13.

When the wrecking crane has been transported to a scene of operation where it is to be placed in service as quickly as possible, it will be noted that the various parts of the locking apparatus may be disassembled rapidly, all of the fittings being within convenient reach of a workman and readily releasable.

When locking apparatus such as shown in Figs. IV, V, VI and VII is employed, the operations of releasing the cab structure 6*a* or locking it to the platform structure 1*a* are substantially similar. To release the cab structure the centering and locking pin 13*a* is raised by hand and locked in raised position by insertion of the pin 41 in the opening 43. To unfasten the tie rod 46, the nuts 50 are slackened off, and the tie rod is swung downward about the bolt 48, or, alternatively, the tie rod may be completely removed and housed in inverted position, as shown in Fig. VII. With this type of locking apparatus, the pair of nuts 51 at the top and bottom of each bracket 44 definitely fix the vertical position of the cab structure 6*a* with relation to the car platform 1*a* so that no jacks are necessary for supporting the rear end load during transportation.

While I have described the practice of my invention with reference to specific forms of locking attachments, it will be apparent that various changes may be made in the form of the apparatus herein disclosed without departing from the spirit of the invention as defined in the annexed claims; and it will be further apparent that at times certain features of the invention may be used to advantage without a corresponding use of other features.

Having thus described my invention, I claim:

1. In a railroad crane vehicle, the combination with a railway car and a crane structure rotatable thereon, of locking pin means for securing said crane structure in alignment with the car for travel; releasable vertical tie means for thereafter securing and holding down the crane structure to the car, and thus preventing disengagement of said locking pin means; and means for holding up said crane structure against said tie means, and thus preventing hammering between them, and also completely fixing the crane structure relative to the car.

2. In a railroad crane vehicle, the combination with a railway car structure and a crane structure rotatable thereon, of vertical tie devices at opposite sides of the car center connected to one of said structures and swingable relative thereto into and out of engagement with the other structure; and horizontal tie devices, for tensionally holding the crane structure against horizontal swinging either way relative to the car, each connected to one of said structures at one side of one of said vertical tie devices and swingable into and out of engagement with the other structure at the other side of such vertical tie device; so that one set of tie devices serves to block displacement of the other tie devices from engaged position as hereinbefore set forth.

3. In a railroad crane vehicle, the combination with a railway car and a crane structure rotatable thereon, of vertical tie means for holding down the crane structure to the car; means for holding up said crane structure against said tie means, and thus preventing hammering between them; and horizontal tie means for tensionally holding the crane structure against horizontal swinging either way relative to the car; said vertical and horizontal tie means thus coacting with one another and with said holding-up means to completely fix the crane structure relative to the car, and to prevent cross-working of the crane structure relative to either of said tie means.

4. In a railroad crane vehicle, the combination with a railway car and a crane structure rotatable thereon, of locking pin means for first definitely aligning said crane structure with the car for travel; releasable vertical tie means for thereafter securing and holding down the crane structure to the car, and thus preventing disengagement of said locking pin means; and horizontal tie means for tensionally holding the crane structure against horizontal swinging either way relative to the car, and thus protecting said locking pin means and said vertical tie means against horizontal shearing or bending stresses.

5. In a railroad crane vehicle, the combination with a railway car and a crane structure rotatable thereon, of locking pin means for arresting and holding the crane when swung into alignment with the car for travel; and means for then fixing them against relative displacement or working under the impulses and shocks of railway travel, comprising releasable vertical tie means for holding down the crane structure, thus preventing disengagement of said locking pin means; means for holding up said crane structure against said tie means, thus preventing hammering between them; and releasable horizontal tie means for also tensionally holding the crane structure against horizontal swinging either way; thus fixing the crane structure relative to the car, even independently of said locking pin means, beside protecting said locking pin and vertical tie means against horizontal shearing or bending stresses.

6. In a crane of the character described, including a stationary supporting structure, and a rotatable structure thereon, apparatus for locking said rotatable structure against rotation, including a guide on said rotatable structure, a socket in said supporting structure, a centering and locking pin slidable in said guide and adapted to enter said socket to fix the directional position of said rotatable structure, a tie rod hinged to said supporting structure, and a grooved bracket on said guide serving as an anchorage for the free end of said tie rod.

In witness whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 26th day of May, 1932.

FREDERICK W. HANKINS.