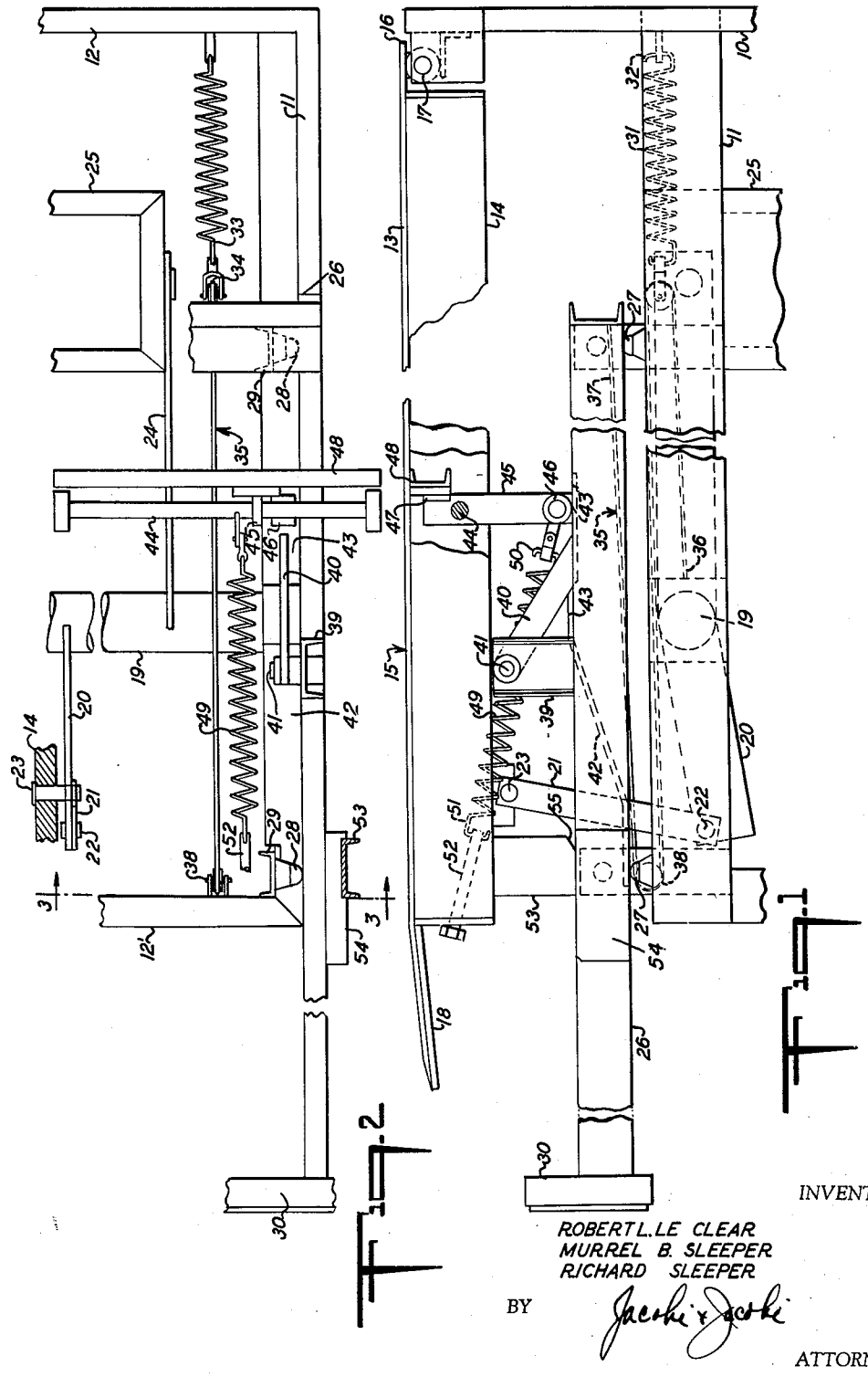
Feb. 20, 1962 R. L. LE CLEAR ETAL 3,021,545

AUTOMATIC DOCKBOARD

Filed Feb. 28, 1957 4 Sheets-Sheet 1



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AUTOMATIC DOCKBOARD

Filed Feb. 28, 1957 4 Sheets-Sheet 2

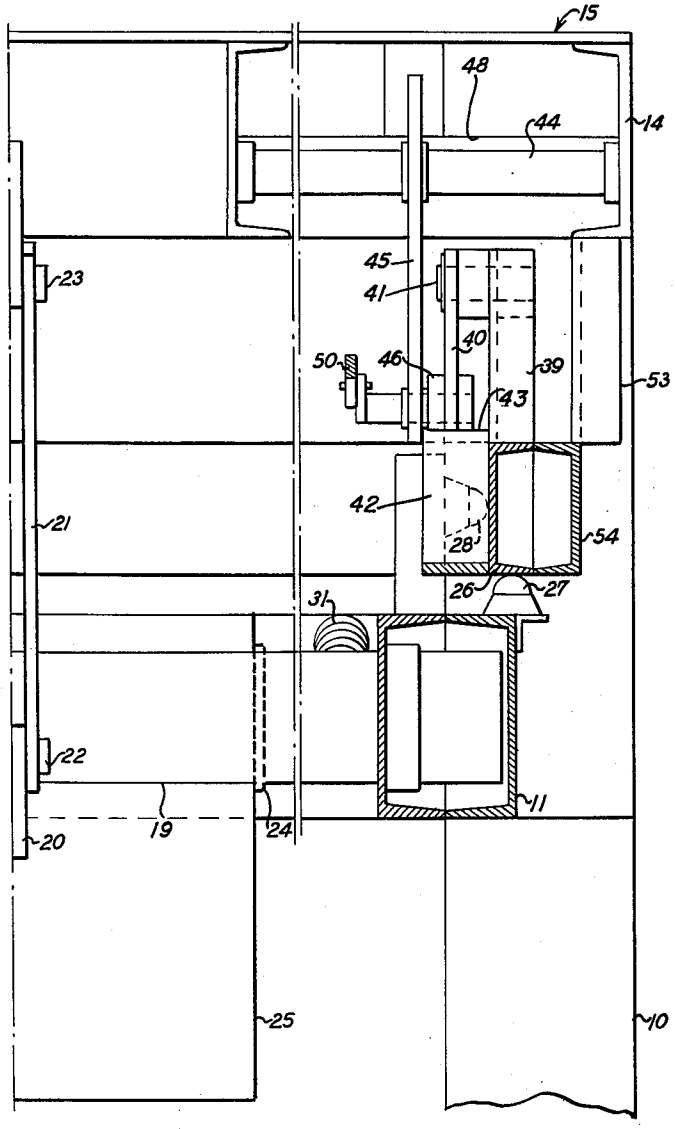


Fig. 3

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AUTOMATIC DOCKBOARD

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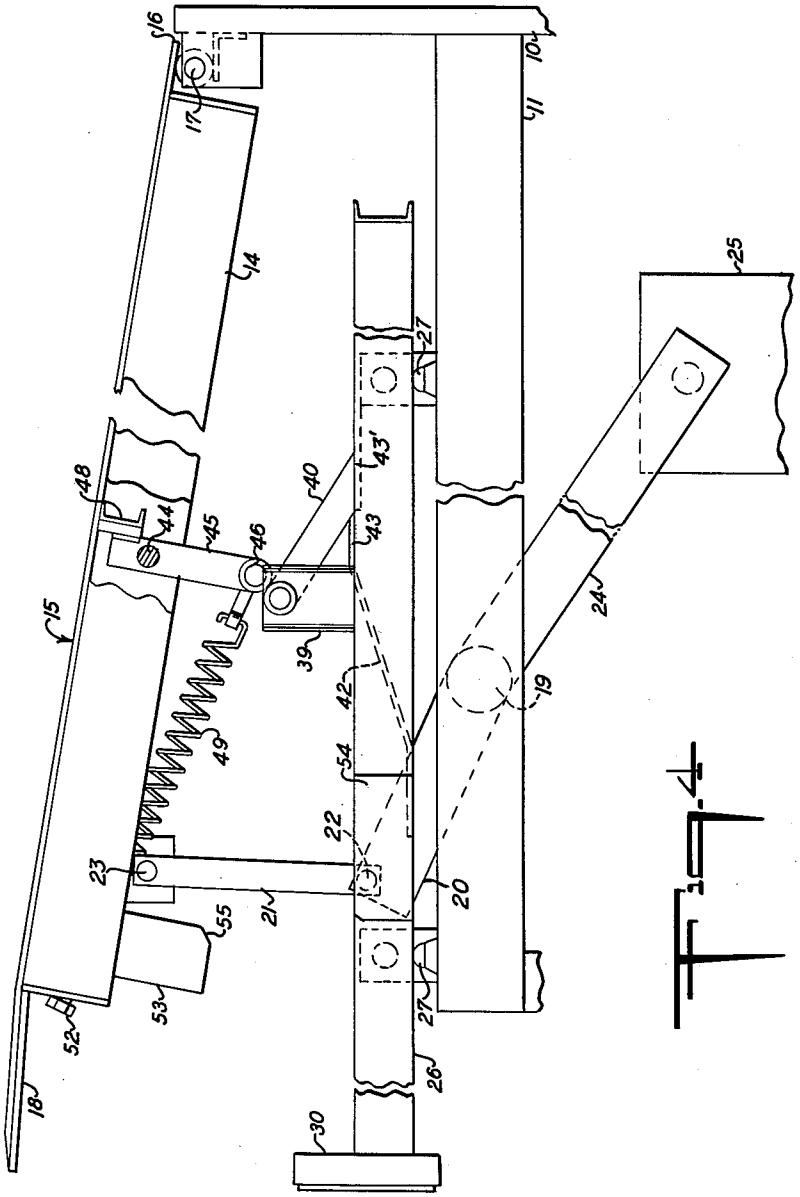


FIG. 4

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AUTOMATIC DOCKBOARD

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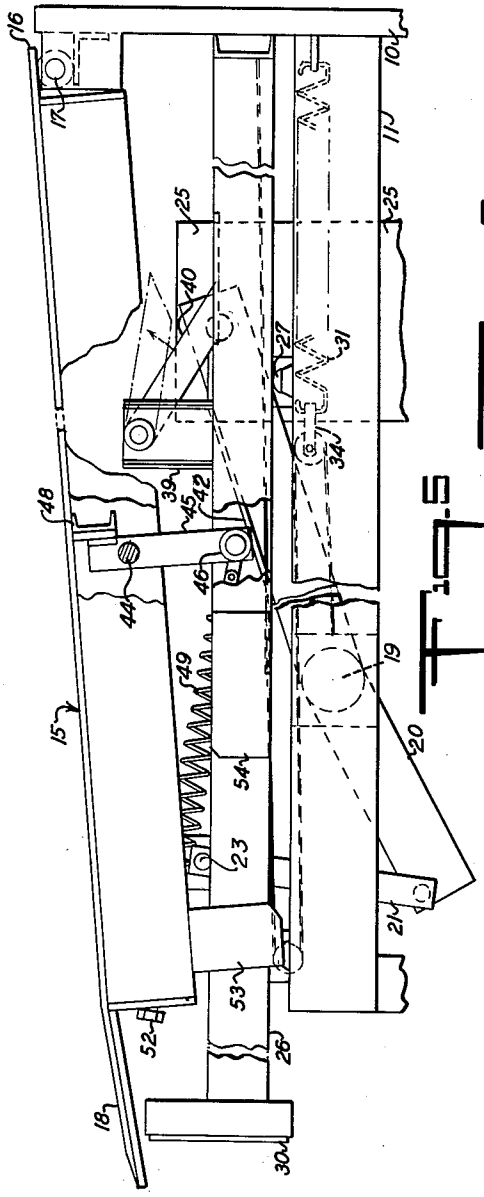


FIG. 5

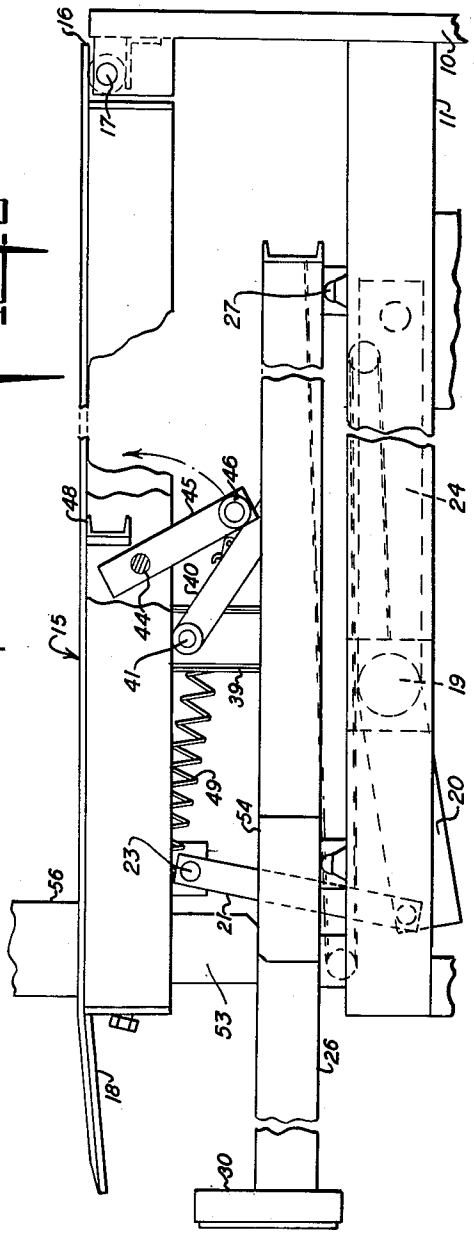


FIG. 6

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AUTOMATIC DOCKBOARD

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This invention relates to warehouse or shipping platform equipment and more particularly to a dockboard for installation in a shipping platform, which dockboard includes a platform which will automatically adjust to the height of a truck body and after removal of the truck assume a horizontal position in alignment with the remainder of the shipping platform.

Heretofore, numerous types of automatically adjustable dockboards have been proposed and utilized, but many of these were extremely complex in structure utilizing fluid pressure jacks or cylinders to elevate and adjust the dockboard platform and also in certain instances, incorporating a plurality of counter-weights, together with the necessary cables and pulleys which serve to actuate the platforms. These prior art dockboard structures were relatively costly to construct and install and furthermore, the operation thereof was not always positive and accurate with the result that the dockboard platform either failed to adjust properly or remained in a position to be engaged by the truck backing into position with consequent damage to the dockboard platform and surrounding structure. Furthermore, many of these prior art dockboards did not provide mechanism to prevent damage thereto in the event a truck or other vehicle engaged the actuating bar, while at the same time, the dockboard platform was prevented from rising due to a door or other closure disposed above the dockboard platform or if for some other reason the dockboard platform could not be raised at that particular time. Prior art dockboards were also subject to damage due to a sudden impact by a truck or other vehicle on the operating arm, since no provision was made for absorbing such impact without damage to the dockboard structure.

It is accordingly an object of the invention to provide an automatic dockboard which may be conveniently and economically constructed from readily available materials and conveniently installed in shipping platforms or other locations and which will operate to automatically position the dockboard on the body of a truck simply by backing the truck into loading or unloading position.

A further object of the invention is the provision of an automatic dockboard incorporating yieldable means for absorbing shock in the event the actuating bar is moved at a time when the dockboard platform is prevented from moving upwardly.

A still further object of the invention is the provision of an automatic dockboard in which the force exerted on the dockboard platform to move the same upwardly may be adjusted in accordance with conditions normally encountered and which provides a safety feature to prevent damage to the dockboard equipment.

Another object of the invention is the provision of an automatic dockboard incorporating only a single counterweight which partially counter-balances the weight of the dockboard platform and in which the movement of the dockboard platform by engagement of a truck or other vehicle with an actuating bar is accomplished by a pivotally mounted inclined trackway and a ramp to return the dockboard platform to horizontal position upon withdrawal of the truck or other vehicle.

A further object of the invention is the provision of an automatic dockboard, including means to support the platform of the same in horizontal position in alignment with the remainder of a shipping platform in which the dockboard is installed, but permitting movement of the dockboard platform below a horizontal position when a truck or other vehicle moves into place for loading or unloading operations.

A still further object of the invention is the provision of an automatic dockboard utilizing a minimum number of moving parts thereby maintaining the structure relatively simple and substantially free from maintenance problems.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a fragmentary side elevational view of a dockboard constructed in accordance with this invention and with the dockboard platform in horizontal position and the actuating bar fully projected prior to being engaged by a truck or other vehicle to actuate the dockboard platform;

FIG. 2 is a fragmentary top plan view of the operating mechanism of the dockboard of this invention;

FIG. 3 a fragmentary sectional view taken substantially on the line 3—3 of FIG. 2;

FIG. 4 a fragmentary side elevational view showing the dockboard platform in substantially maximum raised position and just prior to downward movement of the same into engagement with a truck body to be loaded or unloaded.

FIG. 5 a fragmentary side elevational view similar to FIG. 4, but showing the dockboard platform in position below the horizontal, which position, among others, may be occupied during loading and unloading operations; and

FIG. 6 a fragmentary side elevational view similar to FIG. 4, but showing operation of the yieldable actuating means when upward movement of the dockboard platform is prevented by an obstruction or a load thereon.

With continued reference to the drawing, there is shown an automatic dockboard constructed in accordance with this invention and which may well comprise a frame having corner posts **10**, side members **11** and cross members **12** and **12'**. The frame may be installed in a suitable opening provided in a shipping platform or other location and it is only necessary to provide a foundation sufficient to support the weight of the dockboard and any normal load imposed thereon.

The dockboard may include an upper supporting surface **13** of any suitable material, such as metal, wood or the like and a framework **14** of any suitable character, serves to carry the supporting surface **13** and provide a unitary platform **15**, which may be pivotally supported along the rear edge **16** thereof from a suitable hinge or pivot members **17** secured to the frame provided by the posts **10**, side members **11** and cross members **12**. The platform **15** may be provided along the forward edge thereof with an overhanging downwardly inclined portion **18** which is adapted to rest on the body of a truck or other vehicle to be loaded or unloaded.

A cross shaft **19** is rotatably mounted between the side members **11** of the frame and an arm **20** is secured to the cross shaft **19** and extends forwardly toward the front edge of the platform **15**. A link **21** is pivotally connected at **22** to the forward end of the arm **20** and the opposite end of the link **21** is pivotally connected at **23** to a portion of the frame structure **14** of the platform **15**. A pair of arms **24** are fixed to the cross shaft **19** and extend rearwardly thereof and suspended between the arms **24** and pivoted thereto is a weight **25** which serves to partially counter-balance the weight of the platform **15**. As a consequence, only a relatively small force will be required to raise the platform **15** about the pivotal mounting **17** and upon removal of such force the platform **15** will move downwardly by the force of gravity, but at a

relatively slow rate due to the partial counter-balance provided by the weight 25.

An actuating bar 26 is slidably mounted on rollers or other anti-friction means 27 carried by the side members 11 of the frame which permits movement of the actuating bar 26 longitudinally of the platform 15. Additional rollers 28 are mounted on uprights 29 secured to the main frame and the rollers 28 serve to engage the inner side of the actuating bar 26 to maintain the same in position during forward and backward movement thereof. It is, of course, understood that the actuating bar 26 and supporting structure is duplicated on the opposite side of the assembly. Vehicle engaging abutments 30 are secured to the forward ends of the actuating bars 26 and the abutments 30 are spaced sufficiently to allow the platform 15 to pass between them. If desired, a cross member, not shown, may connect the forward ends of bars 26.

As shown in FIGS. 1 and 2, the actuating bar 26 and vehicle engaging abutment 30 is in the extreme forward position and the bar 26 and abutment 30 are normally yieldably held in this position by a tension spring 31 having one end 32 secured to the cross member 12 of the frame and the opposite end 33 secured to a pulley 34 which in turn, engages a flexible cable 35, one end 36 of which is attached to the frame and the opposite end 37 passes over a pulley 38 mounted on the forward cross member 12' of the frame and is attached to the actuating bar 26. The tension spring and cable structure just described is, of course, duplicated on the opposite side of the apparatus. As will be seen, from an inspection of FIG. 1, movement of the actuating bar 26 rearwardly will serve to tension the spring 31 and upon removal of the force tending to move the actuating bar 26 rearwardly, the spring 31 will contract to move the actuating bar 26 forwardly to the position shown in FIG. 1.

An upright 39 is mounted on the actuating bar 26 and a rearwardly and downwardly extending member 40 is pivotally mounted at the forward end 41 on the upright 39 to provide an inclined trackway. As shown in FIG. 2, the trackway 40 is offset inwardly of the bar 26 for a reason to be presently described. Disposed below the trackway 40 and secured to the inner side of the bar 26 is an upwardly and rearwardly extending ramp 42 which terminates in a horizontal portion 43' at the rear end thereof, disposed beneath the rear end of the inclined trackway 40 and normally serving to support the same.

A shaft 44 is pivotally mounted on the frame 14 of the platform 15 and carried by the shaft 44 is a downwardly extending actuating arm 45 provided on the lower end thereof with an offset roller 46 for engaging the inclined trackway 40 and the ramp 42, in a manner to be later described. The upper end 47 of the actuating arm 45 engages a cross member 48 of the frame 14 on the platform 15 which provides a stop means for limiting pivotal movement of the actuating arm 45 in one direction beyond a vertical position, as shown in FIG. 1. The actuating arm 45 may move pivotally in the opposite direction, but in order to normally maintain the same in the vertical position shown in FIG. 1, there is provided an adjustable tension spring 49 connected at one end 50 to the actuating arm 45 adjacent the lower end thereof and the opposite end 51 of the tension spring 49 is connected to an adjusting means 52 secured to the frame 14 of the platform 15. Consequently adjustment of the adjusting means 52 will serve to vary the tension in the spring 49 and thereby vary the force required to move the actuating arm 45 in a counter-clockwise direction, as viewed in FIG. 1 and to normally maintain the arm 45 in the vertical position shown in FIG. 1.

In order to maintain and support the platform 15 in the horizontal position shown in FIG. 1, there may be provided downwardly extending legs 53 on the frame 14 of the platform 15 and such legs serve to engage blocks 54 secured to the outer surface of the actuating bars 26. As shown in FIG. 1, the rear lower edge 55 of the legs 53 may be beveled to facilitate engagement with the upper surface of the blocks 54 upon forward movement of the actuating bars 26.

In the normal operation of the dockboard of this invention, a truck or other vehicle moves rearwardly to engage the abutments 30 on the actuating bars 26 which results in moving such bars rearwardly against the action of the tension springs 31 and, as best shown in FIG. 4, this will cause the roller 46 on the lower end of the actuating arm 45 to engage and move upwardly on the inclined trackway 40 which results in elevating the platform 15 to the position shown in FIG. 4. Further movement of the actuating bars 26 rearwardly will result in the roller 46 passing over the upper end of the inclined trackway 40 and due to the weight thereof, platform 15 will move downwardly until the roller 46 on the actuating arm 45 engages the upper surface of the ramp 42, or until such time as the overhanging portion 18 on the platform 15 engages the surface of the truck body or other vehicle to be loaded or unloaded. At this time, the platform 15 may well occupy the position shown in FIG. 5.

After completion of the loading or unloading operation, the truck or other vehicle will withdraw thereby permitting the actuating bars 26 to move forwardly under the action of tension spring 31 and engagement of the roller 46 with the ramp 42 will result in moving the platform 15 upwardly to a horizontal position and during such movement the roller 46 will pass beneath the inclined trackway 40 to pivotally move the same upwardly, as shown in FIG. 5, until the roller 46 has moved rearwardly of the same, at which time, the inclined trackway 40 will move downwardly to the original position as shown in FIG. 1. The operation my then be repeated.

In the position shown in FIG. 1, the platform 15 is supported by the legs 53 engaging the blocks 54 on the actuating bars 26, but as will be seen from an inspection of FIG. 5, upon movement of the actuating bars 26 rearwardly, the blocks 54 are moved rearwardly of the legs 53 thereby permitting the platform to move downwardly below a horizontal position. Return of the actuating bars 26 to forward projected position, as shown in FIG. 1 will result in again raising the platform 15 to a slightly above horizontal position to permit moving the blocks 54 beneath the lower ends of the legs 53 to support the platform. Upon completion of the forward movement of bars 26, the rollers 46 will drop into the recesses 43' to permit movement of the legs 53 downwardly into engagement with the blocks 54. The beveled rear corners 55 on the legs 53 are provided in the event the legs 53 move downwardly before forward movement of the blocks 54 is completed.

As was mentioned above, safety means has been provided in order to prevent breakage or damage to the equipment in the event upward movement of the platform 15 is blocked by an obstruction, such as a door 56, as shown in FIG. 6, or a load on the platform and this safety feature is provided by the pivotal mounting of the actuating arm 45 and the adjustable tension spring 49 normally maintaining such actuating arm in vertical position. The operation of this safety feature is clearly shown in FIG. 6, in which instance, the obstruction, such as the door 56 engages the upper surface of the platform 15 to prevent upward movement thereof and upon movement of the actuating bars 26 rearwardly to engage the inclined trackway 40 with the roller 46, the force exerted thereby is normally sufficient to raise the platform 15, as described above, but when movement of the platform is prevented, the actuating arm 45 will pivot in a counter-clockwise direction as shown in FIG. 6, which will permit rearward movement of the bars 26 without exerting a force thereon sufficient to break or damage the operating mechanism. The force required to pivot the actuating arm 45 in a counter-clockwise direction is determined by adjustment of the tension spring 49. Upon movement of the actuating bars 26 forward-

ly, the actuating arm 45 will return to vertical position as shown in FIG. 1, in readiness for normal operation of the platform 15.

It will be seen that by the above described invention there has been provided a relatively simple, yet highly effective automatic dockboard structure which serves to automatically adjust the platform of such dockboard upon engagement of a truck or other vehicle with the actuating mechanism and also including means to support the platform in horizontal position to permit cross traffic or other use thereof when the same is not being used for loading or unloading operations. Furthermore, as described above, safety features have been provided which prevents breakage or damage to the operating mechanism in the event normal upward movement of the platform 15 is prevented by an obstruction or a load thereon. As will be apparent, little skilled labor is required in the manufacture of the dockboard of this invention and consequently, the same may be conveniently manufactured by relatively simple fabricating operations thereby maintaining the cost of manufacture at the minimum.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. An automatic dockboard comprising a frame, a platform pivotally mounted adjacent the rear edge on said frame, a cross shaft rotatably mounted on said frame, an arm fixed to said shaft intermediate the length thereof and extending toward the front edge of said platform, a link connecting said arm and said platform, a pair of arms fixed to said shaft and extending toward the rear edge of said platform, a weight suspended from said pair of arms to partially counter-balance the weight of said platform, an actuating bar slidably mounted on said frame for movement longitudinally of said platform, a vehicle engaging abutment on the front end of said bar, spring means for urging said bar forwardly to position said abutment forwardly of the front edge of said platform, an upright on said bar, a rearwardly and downwardly extending member pivotally mounted at the forward end on said upright to provide an inclined trackway offset inwardly of said bar, an upwardly and rearwardly extending ramp secured to the inner side of said bar and terminating in a horizontal portion disposed below said inclined trackway and normally supporting the rear end of said trackway, a downwardly extending actuating arm pivotally mounted on said platform, stop means on said platform for preventing pivotal movement of said actuating arm in a forward direction beyond a vertical position but permitting pivotal movement in the opposite direction, adjustable tension spring means for urging said actuating arm toward vertical position, an offset roller on the lower end of said actuating arm for engaging said trackway and ramp, and cooperating abutment means on said platform and bar for supporting said platform in a horizontal position when said bar is in said forward projected position and upon rearward movement of said bar permitting movement of said platform below a horizontal position.

2. An automatic dockboard comprising a frame, a platform pivotally mounted adjacent the rear edge on said frame, means to partially counter-balance the weight of said platform, an actuating bar slidably mounted on said frame for movement longitudinally of said platform, a vehicle engaging abutment on the front end of said bar, means for urging said bar forwardly to position said abutment forwardly of the front edge of said platform, an upright on said bar, a rearwardly and downwardly extending member pivotally mounted at the forward end on said upright to provide an inclined trackway, an upwardly and rearwardly extending ramp secured to said bar and terminating in a horizontal portion disposed below said inclined trackway and normally supporting the rear end of said trackway, a downwardly extending actuating arm pivotally mounted on said platform, stop means on said platform for preventing pivotal movement of said actuating arm in a forward direction beyond a vertical position but permitting pivotal movement in the opposite direction, adjustable tension spring means for urging said actuating arm toward vertical position, an offset roller on the lower end of said actuating arm for engaging said trackway and ramp, and cooperating abutment means on said platform and bar for supporting said platform in a horizontal position when said bar is in a forward projected position and upon rearward movement of said bar permitting movement of said platform below a horizontal position.

3. An automatic dockboard comprising a frame, a platform pivotally mounted adjacent the rear edge on said frame, means to partially counter-balance the weight of said platform, an actuating bar slidably mounted on said frame for movement longitudinally of said platform, a vehicle engaging abutment on the front end of said bar, means for urging said bar forwardly to position said abutment forwardly of the front edge of said platform, an upright on said bar, a rearwardly and downwardly extending member pivotally mounted at the forward end on said upright to provide an inclined trackway, an upwardly and rearwardly extending ramp secured to said bar and terminating in a horizontal portion disposed below said inclined trackway and normally supporting the rear end of said trackway, a downwardly extending actuating arm pivotally mounted on said platform, means for preventing pivotal movement of said actuating arm in a forward direction beyond a vertical position but permitting pivotal movement in the opposite direction, means for yieldably urging said actuating arm toward a vertical position, an offset roller on the lower end of said actuating arm for engaging said trackway and ramp, and cooperating abutment means on said platform and bar for supporting said platform in a horizontal position when said bar is in forward projected position and upon rearward movement of said bar permitting movement of said platform below a horizontal position.

4. An automatic dockboard comprising a frame, a platform pivotally mounted adjacent the rear edge on said frame, means to partially counter-balance the weight of said platform, an actuating bar slidably mounted on said frame for movement longitudinally of said platform, a vehicle engaging abutment on the front end of said bar, means for urging said bar forwardly to position said abutment forwardly of the front edge of said platform, an upright on said bar, a rearwardly and downwardly extending member pivotally mounted at the forward end on said upright to provide an inclined trackway, an upwardly and rearwardly extending ramp secured to said bar and terminating in a horizontal portion disposed below said inclined trackway and normally supporting the rear end of said trackway, a downwardly extending actuating arm pivotally mounted on said platform, means for preventing pivotal movement of said actuating arm in a forward direction beyond a vertical position but permitting pivotal movement in the opposite direction, means for yieldably urging said actuating arm toward vertical position, and an offset roller on the lower end of said actuating arm for engaging said trackway and ramp.

5. A dockboard construction comprising a ramp member having a forward end and a rearward end; means at said rearward end of said ramp member for pivotally supporting said ramp member for swinging movement of said ramp member through an arc; a bumper frame member; means mounting said bumper frame member beneath said ramp member for movement of said bumper frame member from a first position in which its forward end extends beyond said forward end of said ramp member for engagement by a vehicle having a load carrying bed to be loaded or unloaded, to a second position in

which said forward end of said ramp member projects beyond the forward end of said bumper frame member; supporting means reacting between said bumper frame member and said ramp member for supporting the latter in substantially horizontal position when said bumper frame member is in said first position; and operating means interposed and reacting between said bumper frame member and said ramp member in response to movement of said bumper frame member from said first position towards said second position for swinging said ramp member upwardly from said horizontal position to such position that said forward end of said ramp member is adapted to be located above the level of the load carrying bed of the vehicle so as to prevent damaging said forward end of said ramp member by the bed of said vehicle, said operating means including a rearwardly and downwardly extending member pivotally mounted at its forward end on said bumper frame member to provide an inclined trackway, a downwardly extending actuating arm pivotally mounted on said ramp member, stop means on said platform for preventing pivotal movement of said actuating arm in a forward direction beyond a vertical position but permitting pivotal movement in the opposite direction, adjustable tension spring means for urging said actuating arm toward vertical position, and an offset roller on the lower end of said actuating arm for engaging said trackway, said actuating arm adapted to pivotally collapse against the action of said adjustable tension spring means on application of an overload.

6. An automatic dockboard comprising a frame, a platform pivotally mounted adjacent the rear edge on said frame, means to partially counterbalance the weight of said platform, an actuating bar slidably mounted on said frame for movement longitudinally of said platform, a vehicle engaging abutment on the front end of said bar, means for urging said bar forwardly to position said abutment forwardly of the front edge of said platform, a rearwardly and downwardly extending member pivotally mounted at the forward end on said bar to provide an inclined trackway, an upwardly and rearwardly extending ramp secured to said bar and terminating in a horizontal portion disposed below said inclined trackway and normally supporting the rear end of said trackway, a downwardly extending actuating arm mounted on said platform, an offset roller on the lower end of said actuating arm for engaging said trackway and ramp, and resilient means connected to said actuating arm yieldably urging said actuating arm forwardly into an upright position.

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