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[54] **SEMIAUTOMATIC KINGPIN LOCKING MECHANISM**
 7 Claims, 8 Drawing Figs.

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 280/435, 298/119

[51] Int. Cl..... **F16b 9/00**

[50] Field of Search..... 287/20.5,
 20.1, 20.3; 248/119 S; 105/368 S; 280/435, 436

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ABSTRACT: A semiautomatic kingpin-locking mechanism comprises a hollow head including a slotted support plate defining a home position for an associated kingpin, a pair of opposed spaced-apart locking jaw members pivotally mounted on the plate for movement between locking and unlocking configurations about the kingpin, a block movable among forward and intermediate and rearward positions respectively restraining the jaw members in their locking and unlocking configurations and permitting movement of the jaw members to their locking configurations, and a pair of triggers movable between holding and releasing conditions for respectively holding the block in its rearward position and permitting movement of the block among its various positions, the jaws in their unlocking configurations respectively engaging the triggers and moving them to their releasing conditions; a slide bar may be connected to the block for effecting movement thereof from without the head.

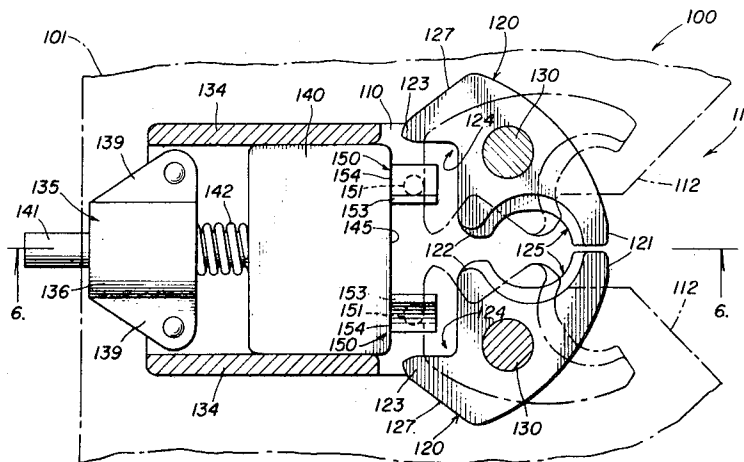


FIG. 1

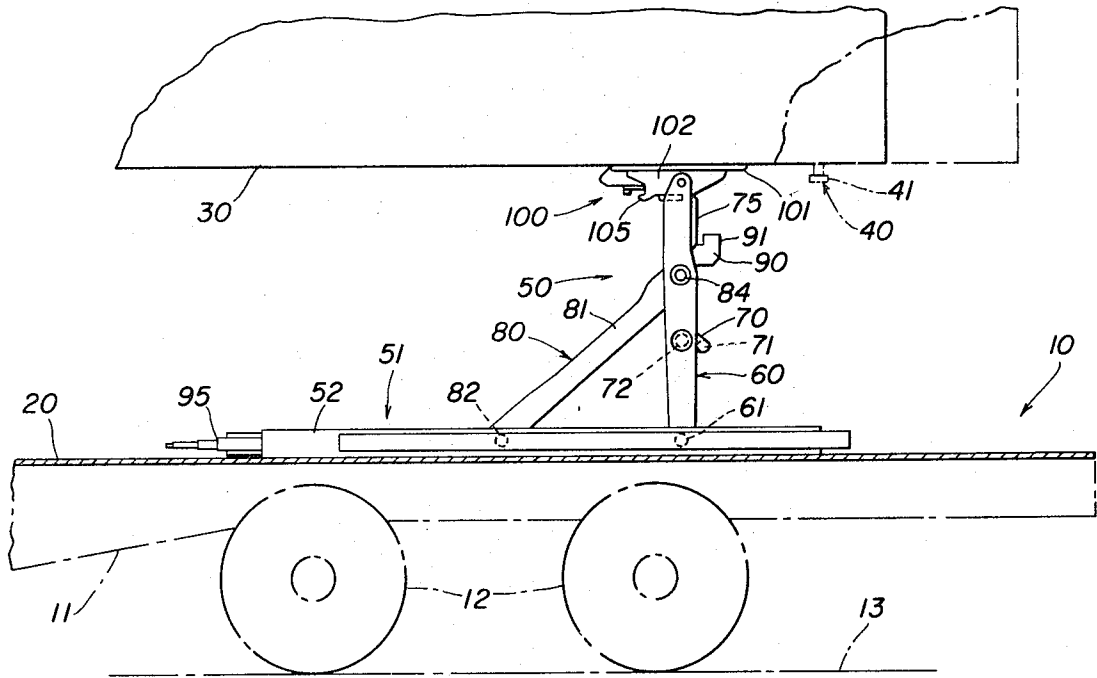
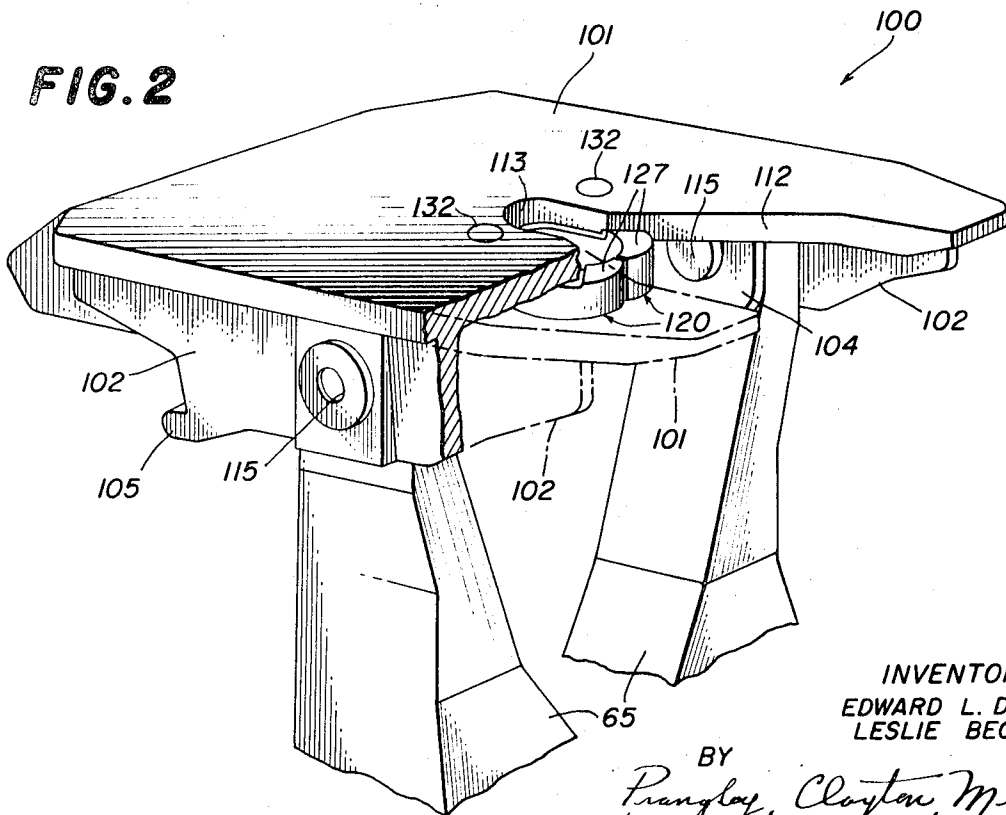


FIG. 2



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FIG. 3

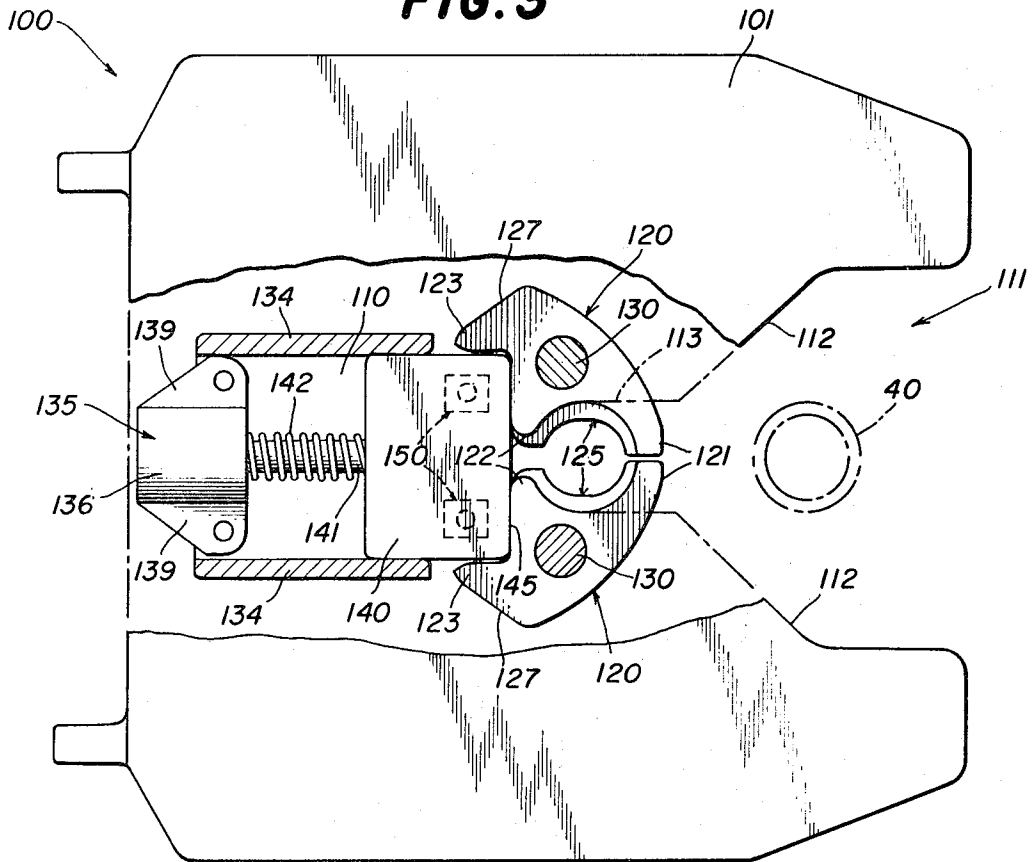


FIG. 4

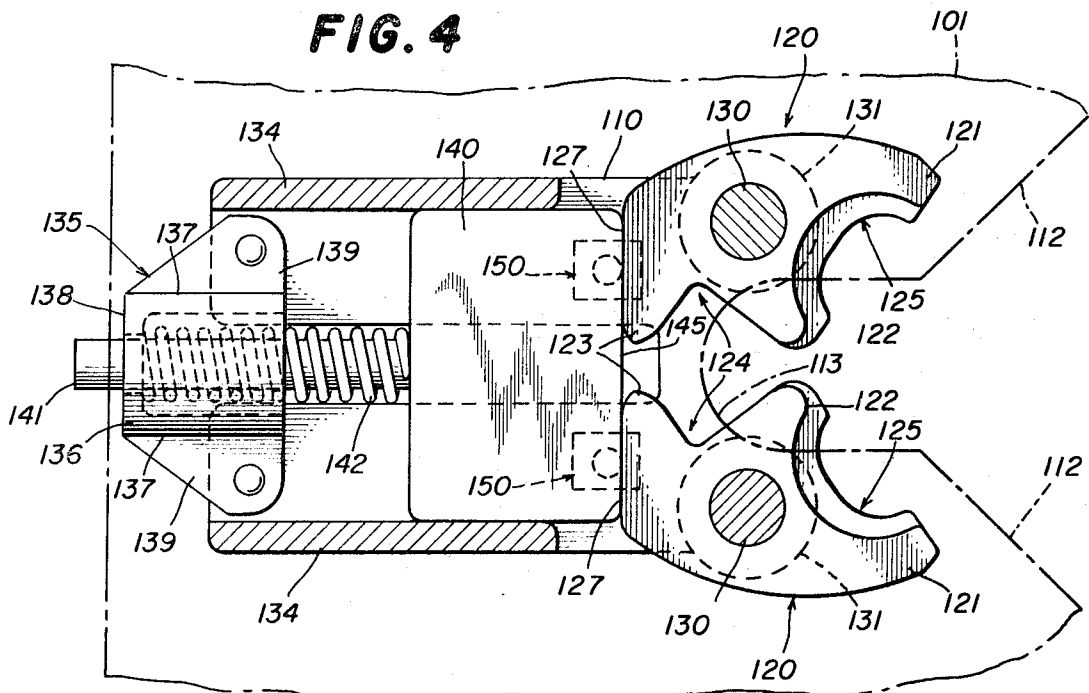


FIG. 5

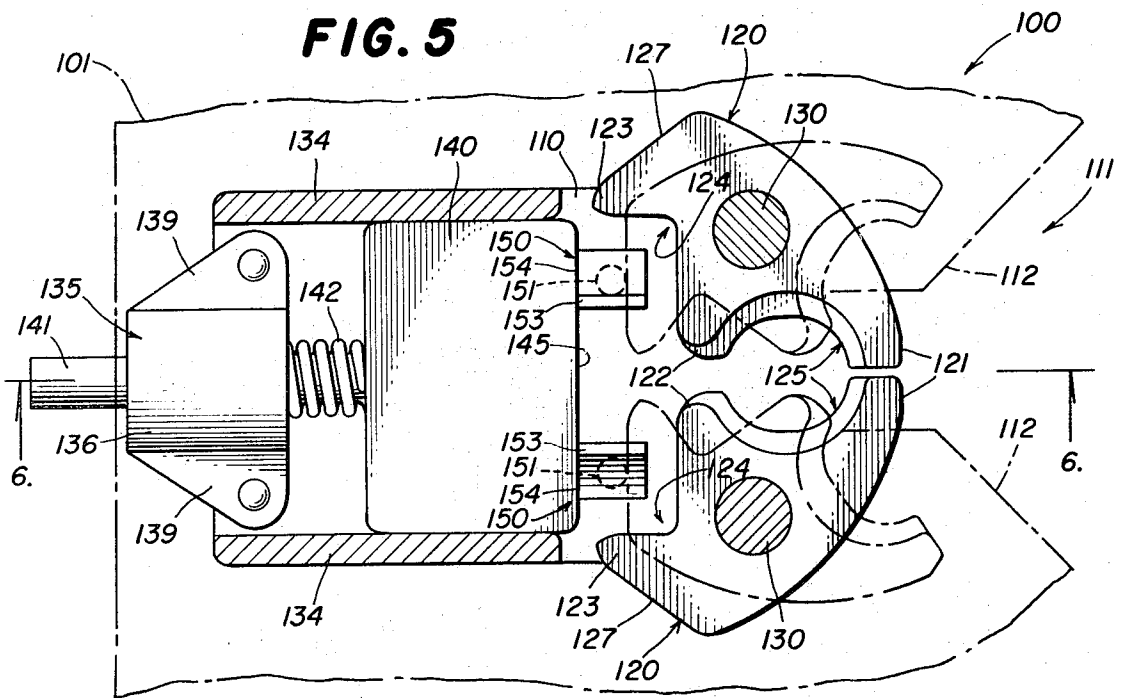


FIG. 6

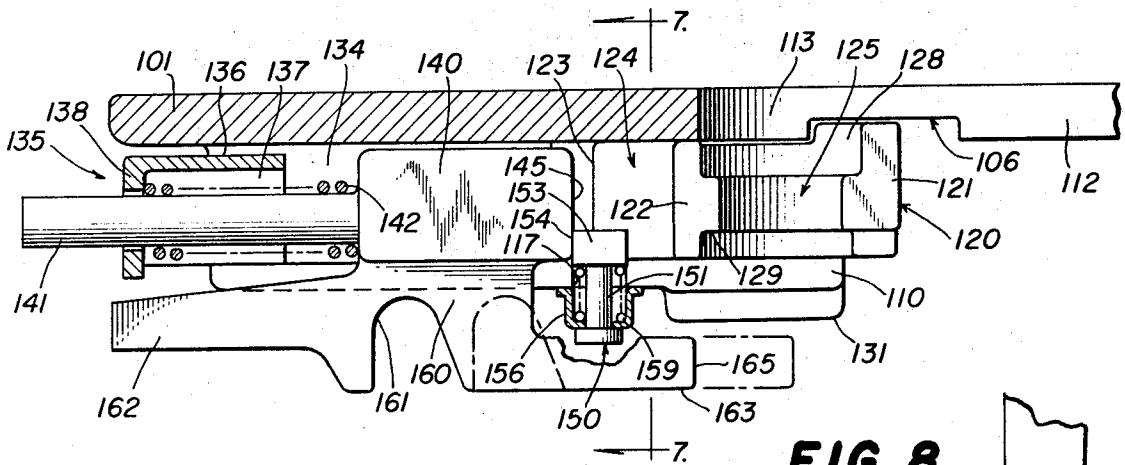


FIG. 7

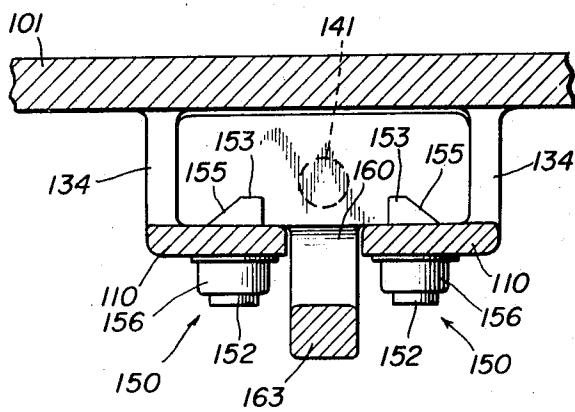
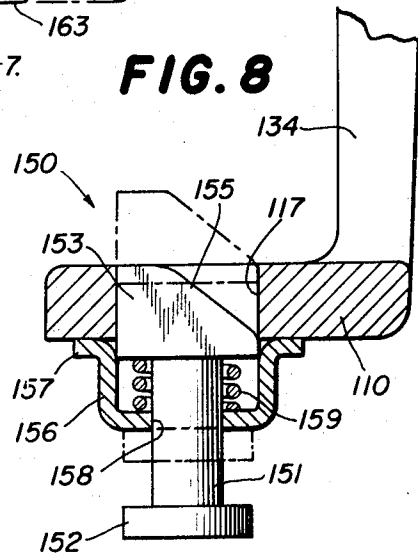


FIG. 8



SEMI-AUTOMATIC KINGPIN LOCKING MECHANISM

The present invention relates to fifth wheel mechanism for hitches carried by railway cars, and more particularly to such fifth wheel mechanisms that are adapted selectively to support and retain in place cooperating kingpins respectively carried by the front ends of road semitrailers or the like mounted upon the railway cars.

It is an important object of the present invention to provide a hitch for engaging the kingpin on a road semitrailer or the like, the hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate, the support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging sidewalls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within the hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of the guide slot and respectively mounted for pivotal movements about the intermediate portions thereof, the front ends of the locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within the hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of the locking members, the block in its forward position being disposed between the rear ends of the locking members and restraining the locking jaws in their locking configurations, the block in its rearward position being disposed from between the rear ends of the locking members and accommodating movement of the locking jaws into their unlocking configurations, block biasing means urging the block into its forward position, a trigger carried by the boxlike structure and mounted for movement with respect thereto between a holding condition and a releasing condition, the trigger in its holding condition being disposed in holding engagement with the block in its rearward position and restraining the block in its rearward position, the trigger in its releasing condition being disposed out of holding engagement with the block and accommodating movement of the block into its forward position, and trigger biasing means urging the trigger into the holding condition thereof, whereby movement of the block to the rearward position thereof accommodates movement of the trigger to the holding condition thereof for holding the block in its rearward position.

Another object of this invention is to provide a hitch of the type set forth wherein the block is also movable to an intermediate position between the forward and rearward positions thereof, the block in its intermediate position being disposed in engagement with the rear end of the locking members when the locking jaws are in their unlocking configurations and restraining the locking jaws in their unlocking configurations, and further including means for moving the trigger from its holding condition to its releasing condition when the locking members are moved to the unlocking configurations thereof, whereby movement of the block to the rearward position thereof accommodates movement of the trigger to the holding condition thereof and subsequent movement of the locking members to their unlocking configurations effects movement of the trigger to its releasing condition thereby releasing the block into its intermediate position engaging the locking members and restraining them in their unlocking configurations, and whereby subsequent movement of the locking members to their locking configurations accommodates movement of the block to its forward position for restraining the locking members in their locking configurations.

In connection with each of the foregoing objects, it is a still further object of this invention to provide a hitch of the type set forth, and further including an elongated slide bar connected to the block and arranged below the support plate and mounted for longitudinal movements between forward and rearward positions with respect thereto, the front end of the slide bar projecting longitudinally forwardly so that it is readily accessible from the exterior of the head, whereby move-

ment of the slide bar into its rearward position moves the block into its rearward position thereby to accommodate movement of the trigger to the holding condition thereof for holding the block in its rearward position.

Further features of the invention pertain to the particular arrangement of the parts of the hitch whereby the above-outlined and additional operating features are attained.

The invention, both as to its organization and method of operation together with further objects and advantages thereof will best be understood with reference to the following specification taken in connection with the accompanying drawings, in which:

FIG. 1 is a fragmentary side elevational view of one end of a railway car carrying a hitch according to the present invention in erected configuration thereon and showing one end of a road semitrailer supported on the hitch;

FIG. 2 is an enlarged fragmentary perspective view of a hitch according to the present invention with a portion of the top plate shown in phantom;

FIG. 3 is a further enlarged top plan view of the hitch of FIG. 2 with the top plate partially broken away to expose the kingpin locking mechanism and showing the locking block in its forward position and the locking members in their locking configuration;

FIG. 4 is a further enlarged top plan view of the kingpin locking mechanism of FIG. 3, but showing the locking members in their unlocking configurations and the block in its intermediate position;

FIG. 5 is a view similar to FIG. 4, but showing the block held in its rearward position by the triggers;

FIG. 6 is a view in vertical section of the kingpin locking mechanism according to this invention taken along the line 6-6 in FIG. 5;

FIG. 7 is a fragmentary view in vertical section taken along the line 7-7 in FIG. 6; and

FIG. 8 is a further enlarged fragmentary view in partial section of one of the triggers of FIG. 7 with the trigger shown in its releasing condition.

Referring now to FIG. 1 of the drawings, there is shown the right-hand end of a railway car 10 of the flat car type that is employed in piggyback service and that carries two road semitrailers 30 and that has mounted thereon two hitches 50, each carrying a fifth wheel mechanism 100 embodying the features of the present invention. Only one of the road semitrailers 30 and one of the hitches 50 have been illustrated in the interest of simplification. The two hitches 50 are arranged in longitudinal spaced-apart relation on top of the railway car 10 and support the front ends of the respective road semitrailers 30 arranged in like disposition on top of the railway car 10 in the piggyback operation. The railway car 10 may be of any suitable construction and arrangement and, as illustrated, the railway car 10 preferably comprising an elongated longitudinally extending underframe 11 of fishbelly configuration and supported at the opposite ends thereof by wheeled trucks 12 that cooperate with an associated rail track 13 in the usual manner. Also, the underframe 11 comprises a pair of body bolsters (not shown) that are respectively arranged adjacent to the opposite ends thereof, which body bolsters are respectively connected by associated kingpins (not shown) to the truck bolsters (not shown) of the wheeled trucks 12, so as to accommodate articulation of the underframe 11 and the trucks 12 all in a conventional manner.

The top of the underframe 11 carries a deck in the usual manner and has thereon a substantially flat deck plate 20 that extends over the entire deck of the railway car 10, the deck plate 20 having longitudinally extending side guide rails (not shown) extending the length thereof on the outer longitudinally extending edges thereof, the side guide rails extending upwardly substantially normal to the deck plate 20. Thus, the deck is of strong, sturdy construction and is capable of supporting the two road semitrailers 30 as well as a road tractor (not shown) which may be employed in loading and unloading the road semitrailer 30, as explained more fully hereinafter.

This traffic along the deck of the railway car 10 is longitudinally thereof, but it may be in either direction therealong, since the tractor normally backs the semitrailer 30 along the deck plate 20 in the loading operation and normally pulls the semitrailer 30 along the deck plate 20 in the unloading operation.

Each of the road semitrailers 30 is entirely conventional and comprises an underframe the rear end of which carries one or more axles, each carrying one or more pairs of rear wheels (not shown) adjacent to the outer ends thereof and the front end of which carries a centrally located depending kingpin 40, all in a well-known manner. Of course, the tractor (not shown) that may be employed to pull and to back the road semitrailer 30 is altogether conventional, the rear end thereof comprising one or more drive axles each carrying one or more rear wheels adjacent to the outer ends thereof as well as a fifth wheel mechanism disposed between the rear wheels mentioned. Also, the front end of the tractor comprises the usual motive power and control facilities as well as the hook to pull the hitches 50 from the storage positions thereof to the erected positions thereof all as will be explained more fully hereinafter.

Considering now the construction and arrangement of the hitch 50, it is first noted that the hitch 50 comprises an article of manufacture that may be employed on a wide variety of railway cars including the railway car 10 illustrated, so as to adapt the same to piggyback service. Preferably, the hitch 50 is of the type illustrated in the copending U.S. application Ser. No. 656,884 of Samuel H. Enochian, filed July 28, 1967 (now U.S. Pat. No. 3,497,169, granted Feb. 24, 1970), and assigned to the assignee of the present invention, the disclosure of which copending application is incorporated herein by reference. The hitch 50 comprises a unitary rigid base 51 of substantially rectangular hollow boxlike structure that includes a pair of longitudinally extending and laterally spaced-apart side members or supports 52, each in the form of a welded, generally channel-shaped structure, the supports 52 being connected at the opposite ends thereof by cross channel members (not shown).

The base 51 is formed hollow, and accommodates therein the remaining parts of the hitch 50 when the hitch 50 is in its storage position. Further, the base 51, and specifically the side members 52, rest directly upon the deck plate 20 of the railway car 10 and are fixedly secured thereto preferably as by welding.

Considering further the construction of the hitch 50, there is mounted upon the base 51 a standard 60 which carries on the lower end thereof pairs of spaced-apart ears (not shown) adapted to respectively receive therethrough pivot pins 61 which are mounted in the base 51. The described arrangement serves to mount the standard 60 for pivotal movements about the lower end thereof and between a rearwardly disposed storage position in which it is arranged within the hollow base 51 and a forwardly disposed erected position in which it is disposed principally out of the hollow base 51, the pivotal motion described being about an axis disposed transversely of the base 51 and coinciding with the longitudinal axes of the pivot pins 61. In its erected position, the standard 60 projects well above the front end of the base 51, and in fact comprises at the upper end thereof a pair of spaced-apart arms 65 (see FIG. 2) that carry at the outermost portions thereof a pair of aligned laterally extending openings the purpose of which will be described more fully hereinafter.

Mounted upon the intermediate portion of the standard 60 and specifically on the spaced-apart arms 65 thereof, is a pickup bar 70 that is arranged generally transversely of the arms 65. The pickup bar 70 further comprises end members 71 that have bearing portions therein receiving pivot pins 72 mounted in aligned openings in the standard arms 65. As illustrated, the pickup bar 70 is pivotal between an operative position illustrated in FIG. 1 wherein the pickup bar 70 extends forwardly with respect to the standard 60 to be engaged by a pickup hook on an associated road tractor, and a storage posi-

tion (not shown) wherein the pickup bar 70 is disposed completely within the confines of the standard 60 to provide a compact arrangement resulting in a low-profile hitch.

The upper portion of the standard 60 and specifically the spaced-apart arms 65 thereof pivotally support therebetween a rock lever 75 by means of pivot pins (not shown) that are channeled respectively in the standard arms 65. The rock lever 75 is preferably urged by springs (not shown) in a clockwise direction as viewed in FIG. 1, the rock lever 75 in its outermost position still being substantially confined within the general outline of the standard 60 thus to provide the compact arrangement for storage purposes.

Also, the hitch 50 comprises a strut 80 disposed rearwardly of the standard 60, the lower end of the strut 80 being disposed between the side members 52 within the hollow base 51. Extending upwardly from the lower end of the strut 80 is a pair of spaced-apart generally parallel and longitudinally extending arms 81. The lower end of the strut 80 has a transverse opening therein which receives therethrough a laterally extending pivot shaft 82 supported at the opposite ends thereof in slide bearings in the side members 52. The upper end of the strut 80 and specifically the upper ends of the arms 81 have aligned openings therethrough that respectively receive pivot pins 84 in transversely arranged aligned openings in the arms 65 of the standard 60 thereby pivotally to interconnect the upper end of the strut 80 at an intermediate point of the standard 60 disposed toward the upper end thereof.

The extreme upper end of the strut 80 slidably carries a plunger 90, the front end of which terminates in a strike button 91 positioned forwardly of the upper portion of the standard 60 in its erected position. The plunger 90 has a transverse and longitudinally extending slot therein receiving therethrough a pin (not shown) mounted on the strut 80 to guide the movement of the plunger 90 between an outer normal or rest position thereof illustrated in FIG. 1 and an actuated position thereof disposed to the left of the position illustrated in FIG. 1. The extreme rear end of the plunger 90 abuts against the rock lever 75 which serves to urge the plunger 90 to the outermost position thereof. The rear end of the plunger 90 is also in position to contact a linkage system (not shown) for unlatching the hitch 50 from its erected position and permitting the hitch 50 to be moved to its storage position within the base 51, all as is described in the aforementioned copending application Ser. No. 656,884. The standard 60 may be readily moved or pivoted from its storage position to its erected position by an associated tractor (not shown) mounted upon the deck plate 20 of the railway car 10. In order to facilitate such movement, the tractor is preferably provided with a hook that engages the pickup bar 70 carried by the standard 60. Thus, after connection of the tractor hook mentioned to the pickup bar 70, the tractor may be driven forwardly along the deck plate 20 for pulling the standard 60 from its storage position into its erected position.

Further, the hitch 50 comprises a buffer arrangement or retarder assembly 95 for absorbing kinetic energy from the standard 60, the strut 80 and the fifth wheel mechanism 100 incident to the movement of these elements to their storage positions as previously described, the retarder assembly 95 being described in detail in the aforementioned copending application Ser. No. 656,884.

Considering now the construction and arrangement of the fifth wheel mechanism 100, embodying the features of the present invention, and referring to FIGS. 2 to 8 of the drawings, this mechanism essentially comprises a head in the form of a top plate 101 defining a table adapted to engage the reinforced understructure of the front end of a road semitrailer 30. The top plate 101 is provided with a pair of laterally spaced-apart and downwardly directed side aprons 102 extending longitudinally of the railway car 10, the side aprons 102 being pivotally connected adjacent to the front ends thereof to the upper ends of the arms 65 of the standard 60 by means of transversely extending pivot pins 115. More particularly, a pair of longitudinally extending and laterally

spaced-apart plates 104 are respectively arranged inwardly of the side aprons 102 and in spaced relation therewith, the upper edges of the plates 104 being suitably secured as by welding to the lower surface of the top plate 101. The plates 104 lend additional rigidity to the structure and respectively receive the inner ends of the previously mentioned pivot pins 115. Accordingly, the head of the fifth wheel mechanism 100 is mounted upon the upper ends of the arm 65 of the standard 60 for pivotal movements about the aligned pivot pins 115. Integral with each of the side aprons 102 and extending rearwardly from the bottom rear edge thereof is a hook member 105, the purpose of which will be described more fully hereinafter. Preferably, the head is normally restrained in a position disposed substantially normal to the erected standard 60 as shown in FIGS. 1 and 2, by an arrangement including a pair of laterally spaced-apart and longitudinally extending leaf springs (not shown) acting between the pivot pins 115 and the undersurface of the top plate 101.

Further, the head of the mechanism 100 includes a bottom plate 110 spaced below the top plate 101 and cooperating therewith to provide a hollow boxlike structure having an open front end disposed to the right in the drawings. Also, a guide slot 111 is formed in the central front portion of the top plate 101 and has rearwardly converging sidewalls 112 terminating in a substantially semicircular recess 113 disposed adjacent to the longitudinal centerline of the top plate 101 and rearwardly of the front edge thereof, which recess 113 defines a home position for a cooperating depending kingpin 40 carried by the front end of an associated road semitrailer 30. A pair of laterally spaced-apart rectangular openings 117 are formed in the bottom plate 110 toward the front end thereof for a purpose to be described hereinafter.

A pair of laterally spaced-apart and vertically disposed pivot pins 130 are arranged on opposite sides of the semicircular recess 113 and extend through the top plate 101 and the bottom plate 110. Upon the pivot pins 130 a pair of locking members, generally designated by the numeral 120, are respectively pivotally mounted intermediate the ends thereof. Each of the locking members 120 comprises, as may be seen in FIGS. 5 and 6, a forwardly directed protuberance 121 and an inwardly directed centrally disposed protuberance 122, the protuberances 121 and 122 cooperating to define a forwardly directed substantially semicircular locking jaw, generally designated by the numeral 125. Also, each of the locking members 120 comprises a rearwardly directed protuberance 123, cooperating with the central protuberance 122 to define therebetween a generally right-angular notch or recess 124 for a purpose to be described more fully hereinafter. Each of the locking members 120 further includes a flat surface 127 at the rear end thereof along the rear protuberance 123 for a purpose which will also be described more fully hereinafter. The upper end 128 of the forwardly directed protuberance 121 of each of the locking members 120 extends vertically upwardly a slight distance above the central portion of the locking member 120, the upper end 128 being received in a complementary recess 106 in the underside of the top plate 101, as is best illustrated in FIG. 6. Also, each of the locking members 120 are pivotally mounted upon the pivot pins 130 between the upper plate 101 and the lower plate 110, whereby the locking jaws 125 are respectively movable between locking and unlocking configurations with respect to the cooperating kingpin 40, as respectively illustrated in FIGS. 3 and 4. When the jaws 125 are in their locking configurations the forward protuberances 121 are disposed close together whereby the jaws 125 cooperate to define a generally circular enclosure for the associated kingpin 40, while the rear protuberances 123 are disposed far apart from each other for a purpose to be described hereinafter. When the jaws 125 are in their unlocking configurations, the forward protuberances 121 are widely separated for permitting passage of the associated kingpin 40 therebetween, and the rear protuberances 123 are disposed close together with the rear surfaces 127 thereof disposed substantially in lateral alignment with each other as illustrated in FIG. 4.

Also, arranged between the top plate 101 and the bottom plate 110 and integral therewith are a pair of laterally spaced-apart and upstanding guide members 134 extending longitudinally from the rear end of the bottom plate 110 to a point intermediate the front and rear ends thereof rearwardly of the locking members 120. Disposed between the guide members 134 adjacent to the rear ends thereof is a boxlike retainer 135 including a flat top wall 136 and a pair of upstanding sidewalls 137 and an upstanding rear wall 138, the retainer 135 being connected to the bottom plate 110 by means of a pair of attachment flanges 139 respectively extending outwardly from the lower ends of the sidewalls 137. Arranged between the guide members 134 and between the top and bottom plates 101 and 110 is a locking block 140 disposed rearwardly of the locking members 120 and forwardly of the retainer 135 and mounted for longitudinal sliding movements forwardly and rearwardly upon the bottom plate 110 along the longitudinal axis of the head of the mechanism 100 among forward, rearward and intermediate positions, as will be described more fully hereinafter. The locking block 140 is generally in the shape of a hexahedron and is provided with an elongated indicator rod 141 extending rearwardly from the rear end of the locking block 140 substantially centrally thereof, the rear end of the indicator rod 141 being received through a complementary opening in the rear wall 138 of the retainer 135 as indicated in FIG. 4. Disposed in surrounding relationship with the indicator rod 141 is a compression spring 142 which bears against the rear wall of the block 140 and the rear wall 138 of the retainer 135 for urging the locking block forwardly toward the locking members 120.

A pair of laterally spaced-apart trigger mechanisms, generally designated by the numeral 150, are carried by the bottom plate 110 slightly forwardly of the guide members 134. Each of the trigger mechanisms 150 includes a short vertically extending pin 151 provided at the lower end thereof with a generally circular stop plate 152 and provided at the upper end thereof with a solid blocklike head 153, substantially rectangular in horizontal cross section. Each of the heads 153 has a flat rear bearing surface 154 and an inclined inner side surface 155 defining a cam surface for a purpose to be described more fully hereinafter. The triggers 150 are respectively adapted for vertical movements through the cooperating openings 117 in the bottom plate 110, a pair of retainer cups 156 being respectively provided immediately beneath the bottom plate 110 in alignment with the openings 117 therethrough for supporting the triggers 150 thereon. Each of the cups 156 has an annular attachment flange 157 extending around the periphery thereof for attachment to the bottom surface of the bottom plate 110 and an opening 158 in the bottom thereof for accommodating therethrough the pin 151 of the associated trigger 150. Disposed in surrounding relationship with each of the pins 151 is a compression spring 159 disposed within the cup 156 and bearing against the underside of the head 152 for biasing the trigger 150 upwardly into the holding condition thereof. In this holding condition, the head 153 extends above the upper surface of the bottom plate 110 and the stop plate 152 engages the bottom of the retainer cup 156 to limit the upward movement of the trigger 150. Each of the triggers 150 is also movable downwardly against the bias of the spring 159 to a releasing condition wherein the head 153 is disposed below the upper surface of the bottom plate 110, as indicated in FIG. 8.

Extending downwardly from the bottom surface of the locking block 140 through a cooperating slot in the bottom plate 110 is a fin member or tab 160 extending below the bottom of the lower plate 110 and having therein a generally semicircular slot 161. Integral with the tab 160 and extending rearwardly therefrom is an elongated tail portion 162. Integral with the tab 160 and extending forwardly thereof beneath the bottom plate 110 is an elongated slide bar 163, generally rectangular in cross section, and terminating at the forward end thereof in a strike button 165.

The operation of the fifth wheel mechanism 100 will now be described in detail. When it is desired to load a road

semitrailer onto the railway car 10 for support on the hitch 50, it is first necessary to pivot the hitch 50 to its erected position and to move the locking block 140 rearwardly to a rearward position out of the path of the locking member 120. In the event of crane loading or unloading of road semitrailers onto and off of the railway car 10, this movement of the block 140 may be accomplished manually by insertion of a bar into the slot 161 in the tab 160 and, by using the bar as a lever with the hook 105 of the top plate 101 as a fulcrum, urging the block 140 rearwardly against the bias of the compression spring 142. When the block 140 has been moved rearwardly to the position indicated in FIGS. 5 and 6 of the drawings, the front edge 145 thereof will be disposed rearwardly of the trigger openings 117 in the lower plate 110, whereupon the triggers 150 will be moved under the urgings of their compression springs 159 into the holding conditions thereof as indicated in FIG. 6. At this point, the bar may be removed and the block 140 may be released, the front surface 145 of the block 140 thereupon engaging the bearing surfaces 154 of the triggers 150 whereby the block 140 is held securely in its rearward position against the bias of the spring 142 by the triggers 150. The locking jaws 125 are then each moved to the unlocking configuration thereof, if they are not already in this configuration. When the locking jaws 125 are moved to their unlocking configurations, the rear protuberances 123 of the locking members 120 respectively engage the camming surfaces 155 of the triggers 150 for moving the triggers 150 into the releasing conditions thereof against the urging of the compression springs 159. Thus, when the locking members 120 have been moved into the configurations illustrated in FIG. 4, the locking block 140 will have been released from its rearward position and will have moved forwardly under the urging of the compression spring 142 to an intermediate position in engagement with the surfaces 127 at the rear ends of the locking members 120 for securely restraining the locking members 120 in the unlocking configurations thereof. The front end of the associated semitrailer 30 is then moved onto the fifth wheel mechanism 100 with the kingpin 40 being guided by the slot 111 into the home position formed by the recess 113 in the top plate 101. On moving into the recess 113, the kingpin will engage the central protuberances 122 of the locking members 120, thereby moving the locking jaws 125 into the locking configurations thereof. Upon movement of the locking jaws 125 to the locking configuration thereof, the rear protuberances 123 will have been moved out of engagement with the locking block 140 whereby the block 140 will be moved forwardly under the urging of the spring 142 to a forward position disposed between the rear ends of the locking members 120 with the front corners of the block 140 respectively disposed in the notches 124 of the locking members 120 for securely restraining the locking jaws 125 in their locking configurations, as illustrated in FIG. 3. It will be noted, that when the block 140 is in its intermediate position illustrated in FIG. 4, the front end thereof overlies the trigger openings 117, whereby both the block 140 and the locking members 120 cooperate to hold the triggers 150 in their releasing conditions. Thus, when the locking jaws 125 are moved to their locking configurations, the triggers 150 will still be held in their releasing conditions by the block 140 so as not to impede the forward movement of the block 140 to its forward position.

When it is desired to unload the semitrailer 30 from the railway car 10, it is again necessary to first move the block 140 to its rearward position as described above. The block 140 will be held in this rearward position by the triggers 150, thus permitting movement of the locking jaws 125 to the unlocking configurations thereof. Upon movement of the semitrailer 30 forwardly off of the fifth wheel mechanism 100 the kingpin 40 will engage the forward protuberance 121 of the locking member 120 to effect operation thereof, thereby moving the jaws 125 to the unlocking configurations thereof as illustrated in FIG. 4. As described above, this movement of the locking members 120 to their unlocking configurations effects move-

ment of the triggers 150 to their releasing conditions, thereby releasing the block 140 into its intermediate position as illustrated in FIG. 4. Thus, the fifth wheel mechanism 100 is again ready to receive the kingpin of another road semitrailer without any further manual operation. Thus, there is provided a semiautomatic operation of the fifth wheel mechanism whereby for each loading and unloading of a road semitrailer there is necessitated only one manual operation, i.e., the movement of the block 140 to its rearward position.

In tractor loading and unloading of road semitrailers onto the hitch 50, the operation of the fifth wheel mechanism may be fully automatic. It is first noted that the upper end of the rock lever 75 is positioned slightly forwardly of the front end of the slide bar 163 and is adapted for engagement with the strike button 165 thereon when the rock lever 75 is moved to the rearward position thereof. Thus, for example, in unloading a semitrailer from the railway car 10, a tractor is driven rearwardly along the deck plate 20 of the railway car 10 until the strike button 91 on the plunger 90 is engaged by rear bumper structure carried by the tractor, whereby the plunger 90 is moved rearwardly, effecting a corresponding rearward movement of the rock lever 75 until the upper end thereof engages the strike button 165 on the slide bar 163. Further, rearward movement of the plunger 90 on the rock lever 75 causes a rearward movement of the slide bar 163 whereby corresponding rearward movement of the block 140 to its rearward position is effected. The actuation of the plunger 90 also trips the linkage mechanism to cause the standard 60 to be pivoted from its erected position back into its storage position in the manner previously explained, whereupon engagement of the front protuberances 121 with the kingpin 40 pulls the jaws 125 into the unlocking configurations thereof with consequent release of the block 140 to its intermediate position as described above. The tractor continues its rearward movement after striking the strike button 91, whereby the fifth wheel mechanism carried by the rear end of the tractor is moved into supporting relation with the front end of the road semitrailer 30, as the fifth wheel mechanism 100 is moved out of supporting relation therewith. The fifth wheel mechanism carried by the rear end of the tractor automatically locks the kingpin 40 carried by the supported front end of the semitrailer 30 whereby the tractor may then be driven forwardly along the deck plate 20 to pull or draw the road semitrailer therewith and from the deck plate 20 of the railway car 10.

At this point, the hitch 50 is in readiness for completely automatic loading of the next road semitrailer 30 onto the railway car 10. In this case, with the standard 60 in its storage position, the tractor is driven rearwardly along the deck plate 20 of the railway car 10 so as to cause the supported road semitrailer 30 to be backed over the hitch 50 and therebehind. The tractor hook is then connected to the pickup bar 70. The tractor is then driven forwardly along the deck plate 20 so as to both draw the road semitrailer 30 forwardly therewith and to initiate the pivotal movement of the standard 60 from its storage position upwardly toward the front end of the road semitrailer 30 and behind the kingpin 40 thereof and toward the erected position of the standard 60. At the proper position of the road semitrailer 30, in its forward movement along the deck plate 20 and with respect to hitch 50, the fifth wheel mechanism carried by the rear end of the tractor and supporting the front end of the road semitrailer 30 is actuated to unlock the kingpin 40 of the road semitrailer 30, whereupon further forward movement of the tractor pivots the standard 60 completely into its erected position and moves the fifth wheel mechanism carried by the rear end of the tractor from its supporting position with respect to the front end of the road semitrailer 30 and moves the fifth wheel mechanism 100 carried by the top of the standard 60 into supporting position with respect to the front end of the road semitrailer 30. As the fifth wheel mechanism 100 is moved into its supporting position with respect to the front end of the semitrailer 30, the locking jaws 125 are automatically actuated into the locking configura-

rations thereof by the kingpin 40 in the manner previously described for securely locking the kingpin 40 in the fifth-wheel mechanism 100.

It will, of course, be necessary even in the tractor mode of loading and unloading to first be sure that the locking jaws 125 are in their unlocking configurations before pulling the hitch 40 to its erected position. If the locking jaws 125 are not in their unlocking configurations, they must first be manually moved to that configuration after manual movement of the block 140 to its rearward position as described above with respect to the crane mode of loading and unloading. For this purpose, the indicator rod 141 on the block 140 provides a clear indication of the position of the block 140. If the indicator rod 141 is fully extended rearwardly of the fifth wheel mechanism 100 as indicated in FIGS. 5 and 6, this indicates that the block 140 is in its rearward position; if the indicator rod 141 extends only a short distance rearwardly of the top plate 101 as indicated in FIG. 4, this indicates that that block 140 is in its intermediate position and that the locking members 120 are being held in their unlocking configurations; and if the indicator rod does not extend beyond the rear end of the top plate 101, as indicated in FIG. 3, this indicates that the block 140 is in its forward position and is holding the locking members in their locking configurations. Thus, when the indicator rod indicates that the block 140 is in its forward position, the block 140 must first be set in its rearward position and then the locking jaws 125 set in their unlocking configurations with consequent release of the block 140 to its intermediate position before proceeding with the operation of the fifth wheel mechanism 100. Similarly, when the indicator rod 141 indicated that the block 140 is in its rearward position, the locking jaws 125 must be moved to their unlocking configurations with consequent release of the block 140 to its intermediate position. However, once the block 140 has been set in its rearward position and the locking members 120 have been set in their unlocking configurations with consequent release of the block 140 to its intermediate position as described above, fully automatic tractor loading and unloading of road semitrailers onto and off of the railway car 10 can be performed indefinitely without any further manual operations, if the positions of the block 140 and the configuration of the locking members 120 are not manually tampered with thereafter.

From the foregoing, it will be seen that there has been provided a low-profile hitch including a semiautomatic fifth wheel mechanism for engaging and supporting the kingpin of an associated road semitrailer.

More particularly, there has been provided a kingpin locking mechanism which includes a pair of locking members which may be locked in either an unlocking or a locking configuration by means of a locking block, the locking block being also movable to a position out of engagement with the locking members and being automatically held in this position by spring-loaded triggers.

In addition, there has been provided a kingpin locking mechanism which provides automatic releasing of the triggers when the locking members are moved to the unlocking configurations thereof. Finally, there has been provided a semiautomatic kingpin locking mechanism of simple and economical construction which is readily adaptable for either crane or tractor modes of loading and unloading of road semitrailers or the like onto the associated railway car.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A hitch for engaging the kingpin on a road semitrailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate and a bottom plate suspended vertically

below said support plate substantially parallel thereto, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging sidewalls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot and respectively mounted for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, block biasing means urging said block into its forward position, a trigger mounted on said bottom plate and vertically movable with respect thereto between a holding condition and a releasing condition, a portion of said trigger being disposed above said bottom plate when said trigger is in the holding condition thereof, said trigger being disposed entirely below the upper surface of said bottom plate when said trigger is in the releasing condition thereof, said trigger in its holding condition being disposed in holding engagement with said block in its rearward position and restraining said block in its rearward position, said trigger in its releasing condition being disposed out of holding engagement with said block and accommodating movement of said block into its forward position, and trigger biasing means urging said trigger into the holding condition thereof, whereby movement of said block to the rearward position thereof accommodates movement of said trigger to the holding condition thereof for holding said block in its rearward position.

2. A hitch for engaging the kingpin on a road semitrailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging sidewalls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot and respectively mounted for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, block biasing means urging said block into its forward position, a trigger carried by said boxlike structure and mounted for vertical movement with respect thereto between a holding condition and a releasing condition, said trigger in its holding condition being disposed forwardly of and in holding engagement with said block in its rearward position and restraining said block in its rearward position, said trigger in its releasing condition being disposed out of the path of and out of holding engagement with said block and accommodating movement of said block into its forward position, and trigger biasing means urging said

trigger into the holding condition thereof, whereby movement of said block to the rearward position thereof accommodates movement of said trigger to the holding condition thereof for holding said block in its rearward position.

3. A hitch for engaging the kingpin on a road semitrailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging sidewalls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot and respectively mounted for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, block biasing means urging said block into its rearward position, a pair of laterally spaced-apart triggers carried by said boxlike structure and mounted for movement with respect thereto between holding conditions and releasing conditions, said triggers in the holding conditions thereof being disposed in holding engagement with said block in its rearward position and restraining said block in its rearward position, said triggers in the releasing conditions thereof being disposed out of holding engagement with said block and accommodating movement of said block into its forward position, and trigger biasing means urging said triggers into the holding conditions thereof, whereby movement of said block to the rearward position thereof accommodates movement of said triggers to the holding conditions thereof for holding said block in its rearward position.

4. A hitch for engaging the kingpin on a road semitrailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging side walls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, each of said locking members having a cam portion thereon, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward and intermediate positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, said block in its intermediate position being disposed in engagement with the rear ends of said locking members when said locking jaws are in their unlocking configurations and restraining said locking jaws in their unlocking configurations, block biasing

means urging said block into its forward position, two laterally spaced-apart triggers carried by said boxlike structure and mounted for movement with respect thereto between holding conditions and releasing conditions, said triggers in the holding conditions thereof being disposed in the path of and in holding engagement with said block in its rearward position and restraining said block into its rearward position, said triggers in the releasing conditions thereof being disposed out of the path of and out of holding engagement with said block and accommodating movement of said block into its intermediate and forward positions, trigger biasing means urging said triggers into the holding conditions thereof, each of said triggers having a camming surface thereon, said cam portions respectively engaging said camming surfaces for moving said triggers from the holding positions to the releasing positions thereof when said locking members are moved to the unlocking configurations thereof, whereby movement of said block to the rearward position thereof accommodates movement of said triggers to the holding conditions thereof and subsequent movement of said locking members to their unlocking configurations effects movement of said triggers to the releasing conditions thereof thereby releasing said block into its intermediate position engaging said locking members and restraining them in their unlocking configurations, and whereby subsequent movement of said locking members to their locking configurations accommodates movement of said block to its forward position for restraining said locking members in their locking configurations.

5. A hitch for engaging the kingpin on a road semitrailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging sidewalls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward and intermediate positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, said block in its intermediate position being disposed in engagement with the rear ends of said locking members when said locking jaws are in their unlocking configurations and restraining said locking jaws in their unlocking configurations, block biasing means urging said block into its forward position, a trigger carried by said boxlike structure and mounted for movement with respect thereto between a holding condition and a releasing condition, said trigger in its holding condition being disposed in holding engagement with said block in its rearward position and restraining said block into its rearward position, said trigger in its releasing condition being disposed out of holding engagement with said block and accommodating movement of said block into its intermediate and forward positions, trigger biasing means urging said trigger into the holding condition thereof, and means for moving said trigger from its holding condition to its releasing condition when said locking members are moved to the unlocking configurations thereof, said block in the intermediate position thereof engaging said trigger for holding said trigger in the releasing condition thereof, said

block in its intermediate position thereby holding said trigger in its releasing condition when said locking members are subsequently moved to the locking configurations thereof for assuring unimpeded movement of said block to its forward position, whereby movement of said block to the rearward position thereof accommodates movement of said trigger to the holding condition thereof and subsequent movement of said locking members to their unlocking configurations effect movement of said trigger to its releasing condition thereby releasing said block into its intermediate position engaging said locking members and restraining them in their unlocking configurations, and whereby subsequent movement of said locking members to their locking configurations accommodates movement of said block to its forward position for restraining said locking members in their locking configurations.

6. A hitch for engaging the kingpin on a road semi-trailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate and a bottom plate suspended vertically below said support plate substantially parallel thereto, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging side walls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward and intermediate positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, said block in its intermediate position being disposed in engagement with the rear ends of said locking members when said locking jaws are in their unlocking configurations and restraining said locking jaws in their unlocking configurations, block biasing means urging said block into its forward position, a trigger carried by said boxlike structure and mounted for movement with respect thereto between a holding condition and a releasing condition, said trigger including an upright pin having an enlarged head thereon and extending vertically through a complementary opening in said bottom plate, said head being disposed above said bottom plate in the path of and in holding engagement with said block in its rearward position and restraining said block into its rearward position when said trigger is in the holding condition thereof, said head being disposed below the upper surface of said bottom plate and out of holding engagement with said block and accommodating movement of said block into its intermediate and forward positions when said trigger is in the releasing condition thereof, trigger biasing means urging said trigger into the holding condition thereof, and means for moving said trigger from its holding condition to its releasing condition when said locking members are moved to the unlocking configurations thereof, whereby movement of said block to the rearward position thereof accommodates movement of

said trigger to the holding condition thereof and subsequent movement of said locking members to their unlocking configurations effects movement of said trigger to its release condition thereby releasing said block into its intermediate position engaging said locking members and restraining them in their unlocking configurations, and whereby subsequent movement of said locking members to their locking configurations accommodates movement of said block to its forward position for restraining said locking members in their locking configurations.

7. A hitch for engaging the kingpin on a road semi-trailer or the like, said hitch comprising a head including hollow substantially boxlike structure provided with an open front end and a support plate, said support plate having a longitudinally extending guide slot therein provided with an open front and rearwardly converging side walls and adapted to receive a cooperating kingpin and to define a home position therefor, a pair of locking members arranged within said hollow boxlike structure and disposed in laterally spaced-apart relation and located on opposite sides of said guide slot, a pair of laterally spaced-apart upstanding pivot pins extending between said plates and respectively mounting said locking members for pivotal movements about the intermediate portions thereof, the front ends of said locking members respectively providing a pair of locking jaws movable between locking and unlocking configurations with respect to a cooperating kingpin in its home position, a block arranged within said hollow head and mounted for longitudinal movements between forward and rearward and intermediate positions with respect to the rear ends of said locking members, said block in its forward position being disposed between the rear ends of said locking members and restraining said locking jaws in their locking configurations, said block in its rearward position being disposed from between the rear ends of said locking members and accommodating movement of said locking jaws into their unlocking configurations, said block in its intermediate position being disposed in engagement with the rear ends of said locking members when said locking jaws are in their unlocking configurations and restraining said locking jaws in their unlocking configurations, block biasing means urging said block into its forward position, a trigger inclining an upright pin having an enlarged head thereon and carried by said boxlike structure and mounted for vertical movement with respect thereto between a holding condition and a releasing condition, said head being disposed forwardly of and in holding engagement with said block into its rearward position when said trigger is in the holding condition thereof, said head being disposed out of the path of and out of holding engagement with said block and accommodating movement of said block into its intermediate and forwarding positions when said trigger is in the releasing condition thereof, trigger biasing means urging said trigger into the holding condition thereof, and means for moving said trigger from its holding condition to its releasing condition when said locking members are moved to the unlocking configurations thereof, whereby movement of said block to the rearward position thereof accommodates movement of said trigger to the holding condition thereof and subsequent movement of said locking members to their unlocking configurations effects movement of said trigger to its release condition thereby releasing said block into its intermediate position engaging said locking members and restraining them in their unlocking configurations, and whereby subsequent movement of said locking members to their locking configurations accommodates movement of said block to its forward position for restraining said locking members in their locking configurations.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,632,145 Dated January 4, 1972

Inventor(s) Edward L. Davis and Leslie Becsey

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 6, Column 13, line 56, delete "and", (first occurrence).

Claim 7, Column 14, line 41, "inclining" should be
-- including --;

Claim 7, Column 14, line 46, "into" should be -- in --.

Claim 7, Column 14, line 46, after "position" insert -- and
restraining said block into
its rearward position --.

Signed and sealed this 23rd day of May 1972.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents