April 28, 1959 E. M. FARR 2,884,261

TRAILER HITCH

Filed Oct. 11, 1957

FIG. 1.

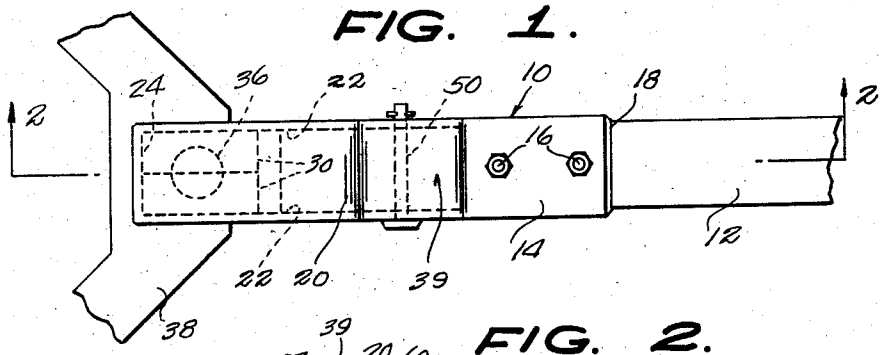


FIG. 2.

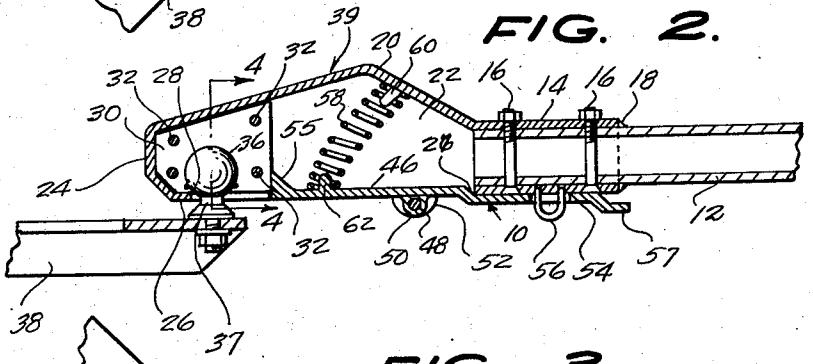


FIG. 3.

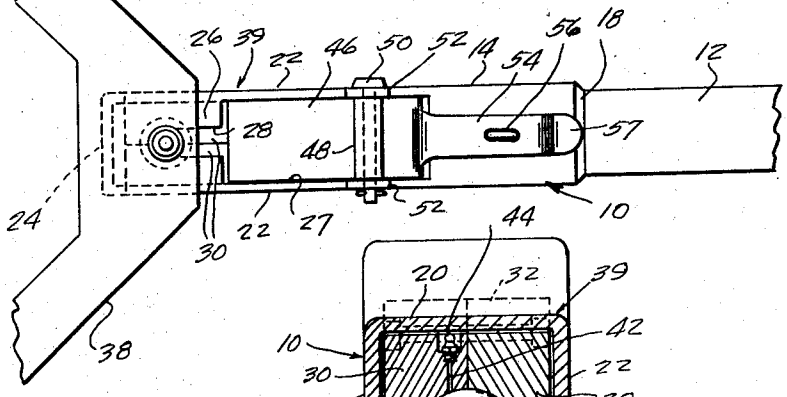
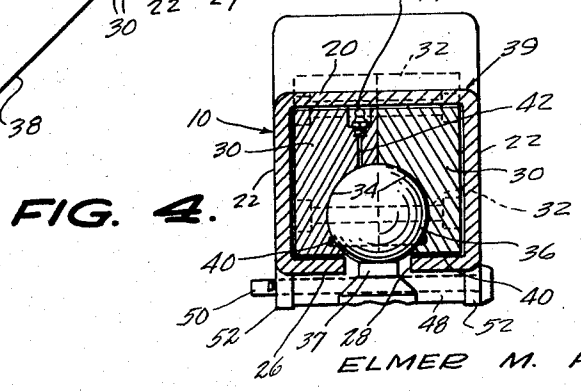


FIG. 4.



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TRAILER HITCH

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This invention relates to trailer hitches or couplings, and more particularly has reference to a hitch adapted for engaging the ball element that extends upwardly from the draw bar of a traction vehicle.

The main object of the present invention is to provide a generally improved hitch, that will be particularly designed to facilitate swift and easy latching and unlatching of the components of the hitch carried by the traction and trailer vehicles respectively, and will further be designed to facilitate automatic locking of the device when the components thereof are latchingly engaged with each other.

A further object is to provide a sure and strong locking action that will resist both accidental and intended separation of the component parts of the hitch, except of course by authorized individuals. In this way, it is proposed to provide a tamper-proof hitch, which cannot be broken apart by unauthorized individuals except, perhaps with great difficulty. It is further proposed, in carrying out this particular object of the invention, to provide a hitch that will be characterized by its safety, eliminating any tendencies toward accidental separation of the hitch when the vehicles are in motion.

A further object is to provide a hitch, which despite its compact size and relatively low cost, will be possessed of a substantial degree of strength, and an adaptability for resisting strains imposed in those directions along which sudden strains or pressures, such as those resulting during collisions, tend to move.

Another object is to incorporate, in the invention, means attachable directly to a conventional ball element of a draw bar, thus to permit use of the hitch without requiring modification or redesign of a conventional draw bar and its associated ball element.

Another object is to provide a hitch which will be designed to facilitate universal movement of the ball-element-engaging components of the hitch, relative to the ball element, in the same manner as conventional hitches already in use.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a top plan view of a hitch according to the present invention, illustrating fragmentarily a trailer tongue and draw bar;

Figure 2 is a longitudinal sectional view on line 2—2 of Figure 1;

Figure 3 is a bottom plan view; and

Figure 4 is an enlarged, transverse sectional view on line 4—4 of Figure 2.

Referring to the drawing in detail, designated generally at **10** is the hitch constituting the present invention, applied to a trailer tongue **12**.

At its trailing end, the hitch includes a sleeve **14** of rectangular cross section, receiving the leading end of tongue **12** and secured fixedly to the tongue by longitudinally spaced, vertically disposed bolts **16**, with the fixed connection of the sleeve to the tongue being further secured through the provision of a weld **18**.

Integral with the rear end of the sleeve **14** is an elongated housing including a top wall **20** which as shown in Figure 2 is of humped formation, that is, the top wall has forward and rear portions which are oppositely inclined and converge in an upward direction to provide a low hump or projection on the top wall.

The housing further includes side walls **22** integral with the top wall **20** and merging into the side walls of sleeve **14** is clearly shown in Figure 3. At its front end, the housing has a front end wall **24**, merging into a bottom wall **26** which extends for only a part of the length of the housing, the remaining part of the housing being formed open at its bottom as at **27**. Formed in bottom wall **26** is a longitudinal slot **28** opening in a rearward direction upon the opening **27** (see Figure 3). Bottom wall **26**, in this regard, is preferably formed of a thicker metal than the top and side walls, although this has not been illustrated in the drawing, so as to adapt the bottom wall for receiving heavier strains. This is desirable in view of the fact that the construction is designed to place part of the stress upon the bottom wall **26**.

Within the forward portion of the housing **20** there is provided a sectionally constituted block comprising block sections **30**, **30** (Figure 4) each occupying half the area of the forward portion of the housing, above bottom wall **26**. The inner surfaces of the sections **30** are in face-to-face contact, and the sections are secured fixedly to each other through the provision of transversely extending connecting bolts **32** (see Figure 2).

Formed in the contacting inner faces of the block sections are part-spherical recesses **34**, cooperating to provide a spherically shaped cavity opening at its bottom through the slots **28** and receiving a ball element **36** having a neck portion **37** extending through slots **28** as shown in Figure 2. The neck portion merges into a base, having the usual depending shank, engaged in the rear portion of the draw bar **38**.

The sections are connected to each other in position receiving the ball element, so that the sections thus are more or less permanently connected to the ball element. The heads of the bolts and nuts provided thereon, are countersunk in the outer surfaces of the sections, as shown in Figure 4, so that the sections snugly fill the interior of the forward portion of the housing, which housing has been generally designated at **39** in the several figures of the drawing.

In a commercial embodiment, means would be provided for assuring that there would be continuous lubrication between the surfaces of the ball element and of the block sections. To this end, there is a circumferentially extending grease seal **40** engaged in communicating grooves of the sections, which grooves open upon the recesses **34**. Said lubricant or grease seal cooperates with a grease fitting **42**, **44** through which lubricant may be directed to the cavity in which the ball element is universally movable.

Designated at **46** is a latching and locking plate, which completely closes the bottom opening **27** of the housing. Plate **46** has at its underside a transverse sleeve **48**, receiving a pivot bolt **50** that bears in depending ears **52** integrally formed upon the underside of the housing.

The latch plate thus is fulcrumed intermediate its ends for swinging movement about a horizontal axis extending transversely of the underside of the housing. Latch plate **46**, at its rear end, has a reduced tongue element **54** offset slightly in a downward direction relative to the forward portion of the latch plate. At its forward ex-

tremity, the latch plate has an upwardly projecting, transversely extending abutment 55 of triangular cross section, adapted to engage against the rear surface of the slide constituted by block sections 30, 30.

Intermediate its ends, the reduced width tongue element 54 has a longitudinal slot receiving a keeper 56 of U-shape depending from and fixedly secured to the underside of the sleeve 14. The hasp of a padlock or the like, not shown, can be extended through the keeper, thus preventing unauthorized individuals from swinging the plate 46 to unlocking position. The rear extremity of the tongue element 54 is further offset as at 57, providing a handle to facilitate swinging of the plate 46 about the axis defined by the pin 50.

Designated at 58 is a compression, coil spring, one end of which is circumposed about a lug 60 extending downwardly from top wall 20, with the other end receiving a lug 62 projecting upwardly from the front portion of plate 46. Spring 58 tends to bias plate 46 counterclockwise in Figure 2, to its locking position shown in this figure of the drawing, with tongue element 54 limiting the plate against swinging movement beyond said locking position, due to its engagement with the sleeve 14.

In use, and assuming that one desires to disengage the ball element from the trailer tongue, that is, the traction from the trailing vehicle, one merely swings latch plate 46 clockwise in Figure 2 to an extent sufficient to completely open the front part of the opening 27. Therefore, the housing can now be shifted to the left in Figure 1, relative to the block and ball element, so that the block sections are now disposed rearwardly of the bottom wall 26, thus permitting the block sections to move downwardly through the opening 27. The block sections would ordinarily be left permanently attached to the ball element 36.

When the trailing and traction vehicles are to be coupled once again, the block sections are moved upwardly through the opening 27, and will tend to bias the plate 46 clockwise in Figure 2, to permit the block sections to enter the housing. Thereafter, the block sections are moved forwardly, with the neck portion 37 entering slot 28 until the block sections are in their final, Figure 2 position under the expanding action of spring 58, so that the plate automatically locks the block sections in the Figure 2 position, by disposition of the abutment 55 across the rear of the block sections. The hasp of a padlock can now be extended through keeper 56 if desired and this prevents the plate 46 from swinging clockwise in Figure 2 to an unlocking position. A completely safe locking action thus results, and further, the hitch is fully protected against unauthorized tampering such as might otherwise tend to occur.

Further, the hitch has desirable characteristics, in respect to the manner in which stresses and strains are received and assimilated. Since the bottom of the ball socket is in the slot 28, part of the stress is placed upon the bottom 26 which is preferably of material heavier than the remaining walls of the housing. Still further, the engagement of the block sections against the front wall 24, and against the abutment of the plate 46, with the plate 46 in turn having an offset bearing against the front end of the sleeve 14, causes an efficient assimilation of strain exerted upon the device in a longitudinal direction, such as might occur if there was an impact between the automobile and a second vehicle. Tendencies of the traction and trailing vehicles to move toward and away from each other are also effectively taken up by this particular construction.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A trailer hitch comprising an elongated housing extending in a fore-and-aft direction and having an opening rearwardly from the front end of the housing; means for connecting the housing to a tongue of a first vehicle; a block movable into and out of the fore part of the housing through said opening and adapted to be connected about and be universally movable in respect to a ball element of a second vehicle; and a locking plate pivoted on the housing in said opening for movement between a locking position in which the plate extends as an abutment limiting the block against movement out of the fore part of the housing, and an unlocking position in which the plate is disposed clear of the block to free the same for movement out of the fore part of the housing, the block and housing having complementary non-circular configuration formed to interengage the same against relative rotation, when the block is in said fore part of the housing, about an axis extending longitudinally of the housing as well as about any axis lying transversely of the housing, the block traveling along a straight path longitudinally of the housing and having a sliding engagement with the housing in its travel into and out of said fore part of the housing, the locking plate, in the locking position thereof, lying wholly in a plane extending longitudinally of the housing in said path to limit the block against sliding movement when the block is in said fore part of the housing.

2. A trailer hitch comprising an elongated housing extending in a fore-and-aft direction and having an opening rearwardly from the front end of the housing; means for connecting the housing to a tongue of a first vehicle; a block movable into and out of the fore part of the housing through said opening and adapted to be connected about and be universally movable in respect to a ball element of a second vehicle; and a locking plate pivoted on the housing in said opening for movement between a locking position in which the plate extends as an abutment limiting the block against movement out of the fore part of the housing, and an unlocking position in which the plate is disposed clear of the block to free the same for movement out of the fore part of the housing, the block and housing having complementary non-circular configuration formed to interengage the same against relative rotation, when the block is in said fore part of the housing, about an axis extending longitudinally of the housing as well as about any axis lying transversely of the housing, the block traveling along a straight path longitudinally of the housing and having a sliding engagement with the housing in its travel into and out of said fore part of the housing, the locking plate, in the locking position thereof, lying wholly in a plane extending longitudinally of the housing in said path to limit the block against sliding movement when the block is in said fore part of the housing; and resilient, yielding means interposed between the plate and housing tensioned to bias the plate to said locking position.

3. A trailer hitch comprising an elongated housing extending in a fore-and-aft direction and having an opening rearwardly from the front end of the housing; means for connecting the housing to a tongue of a first vehicle; a block movable into and out of the fore part of the housing through said opening and adapted to be connected about and be universally movable in respect to a ball element of a second vehicle; and a locking plate pivoted on the housing in said opening for movement between a locking position in which the plate extends as an abutment limiting the block against movement out of the fore part of the housing, and an unlocking position in which the plate is disposed clear of the block to free the same for movement out of the fore part of the

housing, the block and housing having complementary non-circular configuration formed to interengage the same against relative rotation, when the block is in said fore part of the housing, about an axis extending longitudinally of the housing as well as about any axis lying transversely of the housing, the block traveling along a straight path longitudinally of the housing and having a sliding engagement with the housing in its travel into and out of said fore part of the housing, the locking plate, in the locking position thereof, lying wholly in a plane extending longitudinally of the housing in said path to limit the block against sliding movement when the block is in said fore part of the housing; and resilient, yielding means interposed between the plate and housing tensioned to bias the plate to said locking position, said plate when swung to said locking position thereof being in engagement with a portion of the housing for limiting the plate against movement beyond said locking position.

4. A trailer hitch comprising an elongated housing extending in a fore-and-aft direction and having an opening rearwardly from the front end of the housing; means for connecting the housing to a tongue of a first vehicle; a block movable into and out of the fore part of the housing through said opening and adapted to be connected about and be universally movable in respect to a ball element of a second vehicle; and a locking plate pivoted on the housing in said opening for movement between a locking position in which the plate extends as an abutment limiting the block against movement out of the fore part of the housing, and an unlocking position in which the plate is disposed clear of the block to free the same for movement out of the fore part of the housing, the block and housing having complementary non-circular configuration formed to interengage the same against relative rotation, when the block is in said fore part of the housing, about an axis extending longitudinally of the housing as well as about any axis lying transversely of the housing, the block traveling along a straight path longitudinally of the housing and having a sliding engagement with the housing in its travel into and out of said fore part of the housing, the locking plate, in the locking position thereof, lying wholly in a plane extending longitudinally of the housing in said path to limit the block against sliding movement when the block is in said fore part of the housing; and resilient, yielding means interposed between the plate and housing tensioned to bias the plate to said locking position, said plate when swung to said locking position thereof being in engagement with a portion of the housing for limiting the plate against movement beyond said locking position, the housing including a keeper and the plate having a slot receiving the keeper when the plate is in the locking position thereof, whereby to permit insertion of a padlock through the keeper for locking the plate in said locking position.

5. A trailer hitch comprising an elongated housing extending in a fore-and-aft direction and having an opening rearwardly from the front end of the housing; means for connecting the housing to a tongue of a first vehicle; a block movable into and out of the fore part of the housing through said opening and adapted to be connected about and be universally movable in respect to a ball element of a second vehicle; and a locking plate pivoted on the housing in said opening for movement between a locking position in which the plate extends as an abutment limiting the block against movement out of the fore part of the housing, and an unlocking position in which the plate is disposed clear of the block to free the same for movement out of the fore part of the housing, the block and housing having complementary non-circular configuration formed to interengage the

same against relative rotation, when the block is in said fore part of the housing, about an axis extending longitudinally of the housing as well as about any axis lying transversely of the housing, the block traveling along a straight path longitudinally of the housing and having a sliding engagement with the housing in its travel into and out of said fore part of the housing, the locking plate, in the locking position thereof, lying wholly in a plane extending longitudinally of the housing in said path to limit the block against sliding movement when the block is in said fore part of the housing, said block being composed of face-to-face, connected sections having confronting, partly spherical recesses cooperating to provide a spherical cavity receiving the ball element, the connections between the ball sections comprising removable bolts and nuts, disposed wholly within and completely covered by the housing when the block is engaged in the fore part of the housing to prevent separation of the sections when the same are disposed within the housing.

6. A trailer hitch comprising an elongated housing extending in a fore-and-aft direction and having an opening rearwardly from the front end of the housing; means for connecting the housing to a tongue of a first vehicle; a block movable into and out of the fore part of the housing through said opening and adapted to be connected about and be universally movable in respect to a ball element of a second vehicle; and a locking plate pivoted on the housing in said opening for movement between a locking position in which the plate extends as an abutment limiting the block against movement out of the fore part of the housing, and an unlocking position in which the plate is disposed clear of the block to free the same for movement out of the fore part of the housing, the block and housing having complementary non-circular configuration formed to interengage the same against relative rotation, when the block is in said fore part of the housing, about an axis extending longitudinally of the housing as well as about any axis lying transversely of the housing, the block traveling along a straight path longitudinally of the housing and having a sliding engagement with the housing in its travel into and out of said fore part of the housing, the locking plate, in the locking position thereof, lying wholly in a plane extending longitudinally of the housing in said path to limit the block against sliding movement when the block is in said fore part of the housing, said block being composed of face-to-face, connected sections having confronting, partly spherical recesses cooperating to provide a spherical cavity receiving the ball element, the connections between the ball sections comprising removable bolts and nuts, disposed wholly within and completely covered by the housing when the block is engaged in the fore part of the housing to prevent separation of the sections when the same are disposed within the housing, said fore part of the housing including a bottom wall which the sections overlie when the block is in the fore part of the housing, said bottom wall having a rearwardly opening longitudinal slot adapted to receive the ball element, said slot opening upon said opening of the housing to permit movement of the ball element into and out of the slots through said opening, the slot following said path and lying in the plane of the plate.

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