

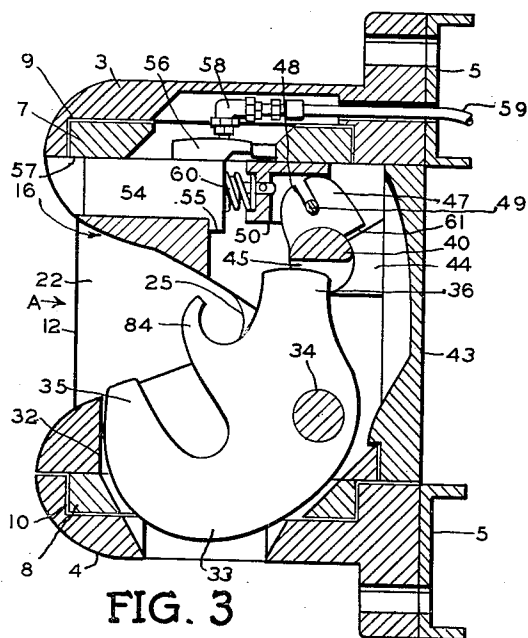
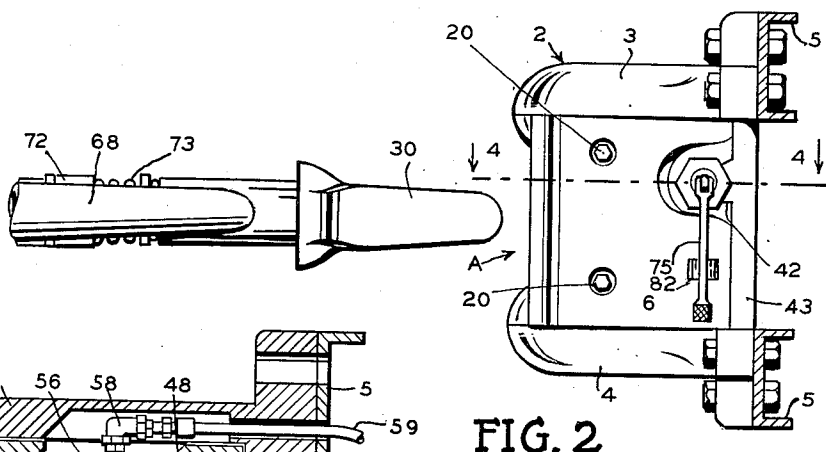
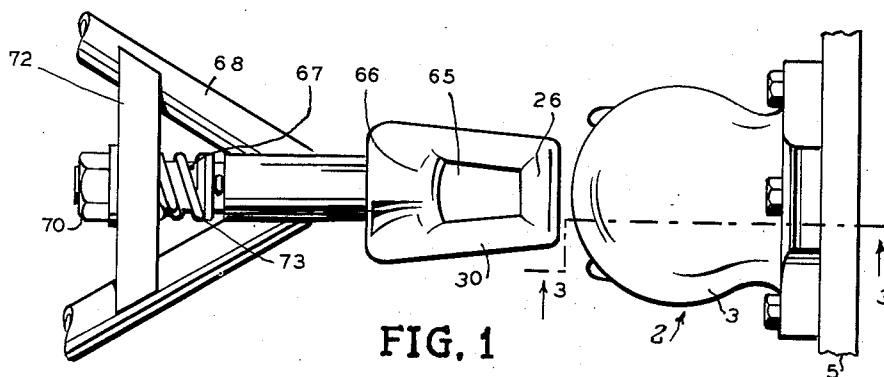
July 10, 1951

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VEHICULAR COUPLER

2,559,962

Filed March 22, 1950

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

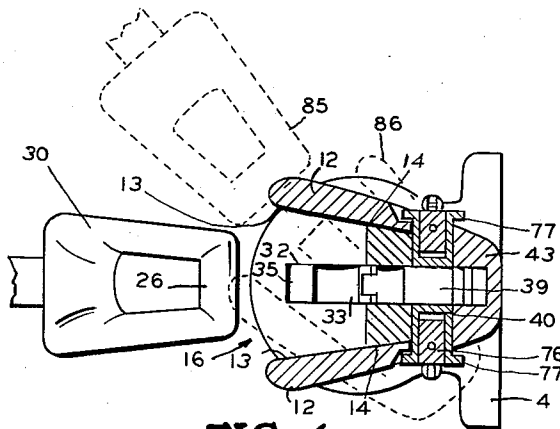


FIG. 4

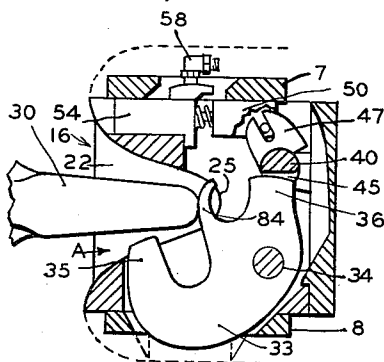


FIG. 5

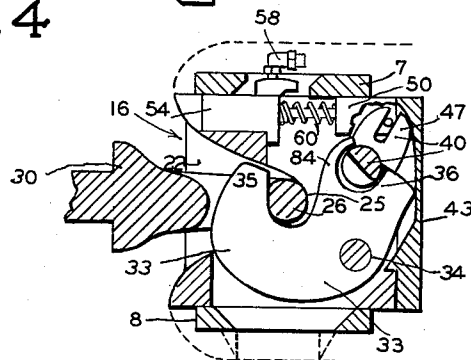


FIG. 6

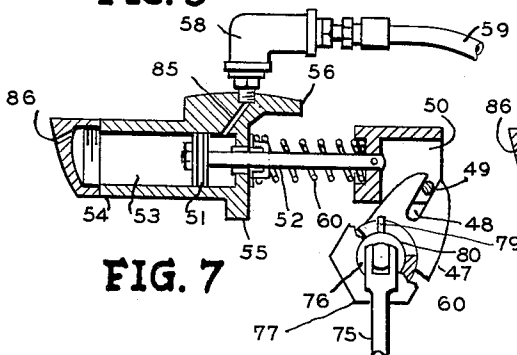


FIG. 7

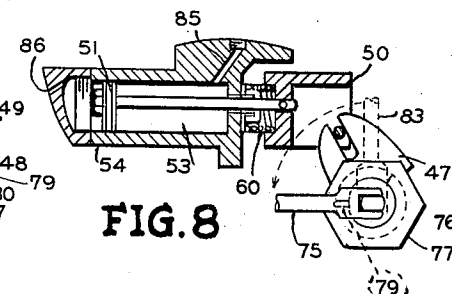


FIG. 8

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UNITED STATES PATENT OFFICE

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VEHICULAR COUPLER

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4 Claims. (Cl. 280—33.15)

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This invention pertains to vehicular couplers and has for its objects:

First, the provision of a coupler which is rigid, strong, and well adapted to stand all load strains and road shocks, but will provide ample movement between the tractive vehicle and the drawn vehicle to allow for all relative movements of the vehicles during travel;

Second, the provision of a coupler having means for automatically locking onto the tongue of a drawn vehicle without the necessity of mutually alining or definitely positioning said vehicles;

Third, the provision of a coupler having a minimum number of spring held parts, and with the load carrying members arranged so that the coupler will not be rendered inoperative or release the tongue by reason of the failure of any of the latching parts.

I attain the foregoing objects by means of the device, construction and combination of parts shown in the accompanying drawing, in which:

Figure 1 is a plan view of a coupler unit and tongue incorporating my improvements;

Figure 2 is a side elevational view thereof;

Figure 3, a vertical sectional view of the coupler unit drawn on a larger scale, and taken substantially on line 3—3 of Figure 1;

Figure 4 is a horizontal sectional view of the coupler unit taken substantially on line 4—4 of Figure 2;

Figure 5 is a vertical longitudinal sectional view showing hook parts and tongue in disengaging position;

Figure 6 is a similar sectional view showing movement of the hook and its latching mechanism after engaging the tongue.

Figure 7 is a vertical sectional view of the latching shaft operating mechanism, showing the position of the mechanism when the shaft is in latched position.

Figure 8 is a similar view but showing the position of the mechanism when the latching shaft is in unlatched position.

Similar numerals refer to similar parts in the several views.

In the drawings, 2 indicates the coupler body in general. This body includes an upper bracket 3 and a lower bracket 4, both attached to the tractive vehicle body parts 5, and the coupler case 6 which is pivotally supported between brackets 3 and 4. The coupler case 6 pivots on a vertical axis approximating its center. This is accomplished by providing cylindrical bosses 7 and 8 at its top and bottom which bear cylindrical sockets 9 and 10 formed in the inner faces of the brackets 3 and 4, respectively.

The case 6 includes vertical flank plates 12 which are held together at the top and bottom by bosses 7 and 8. The inner faces 13 of these plates converge toward the rear and are adapted

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to contact the outer vertical lateral faces 14 of the latch body 16. The latch body 16 fits vertically between the inner faces of bosses 7 and 8 and laterally between faces 13 of case 6. Latch body 16 is held within case 6 by cap screws 20 extending transversely inward thru outer plates 12. The outward facing portion of latch body 16 is shaped to provide a transverse notch 22, the upper and lower faces of which converge toward the rear where they join a rounded back face 25. This case and body structure provides a funnel-shaped opening generally indicated by letter "A," having converging side, top and bottom faces adapted to receive tongue head 30. It is to be noted that this opening can be pivoted in a horizontal plane in any rearward direction within an arc of substantially 180°. It is also apparent that the inwardly converging faces of tongue opening "A" will center tongue head 30 both vertically and horizontally as it is forced into this opening.

A slot 32 is formed in the lower part of latch body 16 to receive the tongue hook plate 33. This hook plate is journaled to tilt on transverse hook shaft 34, and is shaped to have engaging hook 35 at its front or outer end and a locking heel 36 on its inner portion. The axis of shaft 34 is intermediate and somewhat below, or offset, from hook 35 and heel 36. The upper face of heel 36 is curved on a radius having its center coinciding with the axis of shaft 34. The hook plate rotates or tilts clockwise on shaft 34 from the open position shown in Figure 5 to the tongue engaging position shown in Figure 6.

The hook plate is held in latched position by the latch shaft 40. This shaft extends transversely within notch 42 in the rear portion of the case 6 and latch body 16 and is held in place by lugs 44 on rear cap piece 43. This cap piece is bolted to body 16 and assists in maintaining it in position within case 6. A notch 45 is formed in the center of shaft 40 to admit and pass the heel 36 of hook plate 33 when rotated to the unlatched position shown in Figures 3 and 5. In this position the locking heel may move forward through notch 45 and thus permit the hook 35 to descend and recede into slot 32. This condition of the hook may be known as the "open position." Latch shaft 40 is positioned so that locking heel 36 will just move through notch 45 when this shaft is turned to unlatching position as shown in Figures 3 and 5, but so that the solid part of the shaft adjacent notch 45 will engage the inner face of locking heel 36 when it is turned approximately 45° clockwise from the unlatching position shown in Figure 5 to the latching position shown in Figure 6. The axis of latch shaft 40 is therefore radially positioned relative to the axis of hook shaft 34 just beyond the curved upper face of heel 36.

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Above notch 45 and formed on shaft 40 a notched operating lug 47 extends radially outward. When this shaft is rotated clockwise (Figure 6) the detent 61 of this lug bears against the curved outer surface of locking heel 36 and stops further rotation in this direction. Notch 48 engages a transverse pin 49 in cross-head 50 from which it receives motion which in turn rotates shaft 40 from latched to unlatched position.

Crosshead 50 is operated longitudinally in a slot 57 in the upper part of latch body 16 by piston 51 on piston rod 52 working in cylinder 53 which is bored in cylinder block 54. Cylinder block 54 which is removably fitted in slot 57 is secured in place against longitudinal movement by lugs 55 and 56. A pipe fitting 58 on lug 56 joins the inner end of the cylinder 53 by means of port 85 to a tube 59 which is connected to mechanism (not shown) adapted to supply vacuum suction, or air pressure at less than atmosphere, or air pressure greater than atmospheric pressure as desired. A spring 60 surrounds piston rod 52 and by engaging the inner end of cylinder block 54 and the adjacent face of crosshead 50 normally urges the crosshead away from cylinder block 54, urges lug 47 to rotate shaft 40 clockwise to the latching position shown in Figures 6 and 7 until this motion is stopped by detent 61 contacting heel 36 of hook plate 33. At the same time the forward face of this heel engages the locking shaft 40 above notch 45. If air pressure is admitted into cylinder 53 through port 85, then crosshead 50 is moved forward, and rotates shaft 40 to the unlatched position shown in Figures 3 and 5.

The tongue head 30 has a transverse latching bar 26 at its forward end. Behind this is a rectangular opening 65 adapted to receive hook 35, and behind this is a base 66 which is made integral with a tongue shaft 67. This shaft is held in a tongue frame 68 in which it pivots. A large nut 70 screws onto shaft 67 and bears against the cross-member 72. A spring 73 is used to keep nut 70 drawn tight against the cross-member 72 to provide friction so that the tongue will not pivot too readily within frame 68.

It has been explained that latching shaft 40 can be rotated from latched to unlatched position by means of lug 47 operated by crosshead 50 which is pneumatically controlled. In addition to this means of movement, however, I provide manual means for latching and unlatching movement of this shaft. This includes handles 75 attached by knuckle joints to stub shafts 76 journaled in each end of shaft 40. These stub shafts are held in place by pins 79 operating in slots 80, and are free to turn in shaft 40 throughout approximately 180°. (See Fig. 7.) This structure permits handles 75 to hang downward, as shown in Figs. 2 and 7, when not in use. While thus depending the handles do not interfere with the movement of shaft 40 by crosshead 50 because of the free movement provided by slots 80. When so depending handles 75 can be held from swinging by snap springs 82.

To uncouple the hitch by hand, and independent of the pneumatic operative means above described, the handle 75 at either end of shaft 40 may be raised as shown by dotted outline 83, Figure 8, and the handle then swung until pin 79 engages the end of slot 80. The urge of spring 60 may then be overcome and the shaft moved to the unlatching position shown in said Figure 8.

In this same figure piston 51 is shown moved

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to the left or outer end of cylinder 53. It will be readily understood that if air pressure is introduced on the rod side of this cylinder through port 85 which is connected to fitting 58 this same unlatching movement may be had by pneumatic means which may be controlled from the driver's compartment of the traction vehicle. The outer end of cylinder 53 is vented at 86 to permit free movement of piston 51.

When hook 33 is engaged, as shown in Figure 6, it is held in this position by contact of hook heel 36 with latch shaft 40 which is rotated to latched position. Tongue bar 26 is then securely retained. Latch shaft 40 is retained in latching position, first by the urge of spring 60, and second by the urge of piston 51 caused by suction of partial vacuum on tube 59.

Hook plate 33 may be unlatched either by supplanting the reduced air pressure by air pressure above atmospheric pressure sufficient to force piston 51 and crosshead 50 to the left, or by manipulation of either one of handles 75 as above explained.

In use vehicles are coupled by bringing the tongue part 30 within opening "A" as indicated in Figure 5. When bar 26 has reached spur 84, which is intermediately positioned between the hook and heel on hook plate 33, the plate is rocked back (rotated clockwise) to locked position (Figure 6), latched as above explained, and hook 35 raised up into opening 65.

If the tractor and trailer vehicles are not lined up exactly and the tongue approaches the coupler from an angle as indicated in dotted outline 85 the body part 16 may be rotated as indicated by dotted outline 86, Figure 4, to meet it at a more correctly aligned position. In all cases the converging side and top and bottom walls of opening "A" assist in guiding the wedge shaped tongue head so that its bar 26 meets spur 84 at a position to rock hook 33 to latched position. Contact of the wedge shaped tongue head with the walls of funnel shaped opening "A" as a rule causes the coupler body to move to aligned position. Any axial rotational displacement of tongue head is likewise corrected.

Operation of the coupler is extremely simple. When uncoupled the hook 33 is ordinarily left in uncoupled position shown in Figures 3 and 5, with the tongue latching mechanism in the position shown in Figure 8.

Coupling between the vehicles is done as above explained. Tongue head 30 and attendant parts are drawn by contact with hook 36. Backing movement is attained by contact of the front of bar 26 with the back face 25 of opening A. Lateral pivoting is provided by rotation of case 6 within brackets 3 and 4. Vertical hinging by rotation of tongue bar 25 within the space between tongue hook 36 and back wall 25. Finally unlatching may be done as above explained. In an emergency latch shaft 40 can be rotated by a wrench applied to the hexagon nuts 77 at either end.

I claim:

1. A vehicle coupler for use with a tongue having a wedge-shaped head with a horizontal cross-bar at the outer end thereof, including a coupler body mounted to pivot on a vertical axis, provided with a tongue receiving opening therein, having converging top, bottom and side walls; a tongue hook plate pivoted in the lower portion of said body on a transverse shaft, adapted to rock from coupling to uncoupling position, having a hook on the outer portion, a latching

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heel at its inner portion and an intermediately positioned coupling spur; a rotary latching shaft transversely journaled in said body, having a notch adapted to pass said hook heel when in unlatched position and adapted to retain said hook when rotated to latching position; means for rotating said latching shaft from latching position to unlatched position, including a cross-head operated by a piston in a cylinder and arranged to move said shaft to latched position when suction is applied to said cylinder, and to move said shaft to unlatching position when air above atmospheric pressure is introduced into said cylinder, and means for resiliently maintaining said shaft in latched position, including a spring normally urging said crosshead away from said cylinder, whereby said latching shaft is maintained in latched position.

2. A vehicle coupler for coupling a tongue having a flat wedge-shaped body with a horizontal transverse latching bar at its front outer end, comprising in combination, a case enclosing a coupler body; bracket means for attaching said case to a traction vehicle so that it will swing horizontally throughout an outward arc; a tongue opening in said case having inwardly converging top, bottom and side walls; a hook plate slot formed in the bottom portion of said case body opening into the lower face of said tongue opening; a hook plate rockably supported on a transverse shaft, rockably operating in said slot, said plate having a hook at its outer end, a heel stop at its inner end and an intermediately positioned closing spur, adapted to move from coupling position with said hook portion raised from said slot to the upper wall of said opening to secure the cross bar of said tongue and with said heel portion depressed in latched position, to an uncoupled position with said spur positioned to contact said tongue bar when introduced into said opening, and with said hook depressed into said slot and said latching heel raised to unlatched position; a latching shaft rotatably journaled transversely in said case body adapted to engage the heel of said hook when in latched position and release said hook heel when in unlatched position; means for rotating said latching shaft including a piston element operative in a cylinder adapted to move said shaft to unlatched position when air pressure greater than atmospheric pressure is introduced into said cylinder and to retain said shaft in latched position when air pressure less than atmospheric pressure is maintained in said cylinder; a spring between said cylinder and said piston and said shaft normally urging said shaft to latched position; and manual means for rotating said shaft including handles at each end thereof adapted to normally fold to depending position and remain inoperative.

3. A vehicle coupler, for use with a tongue

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having a flat wedge-shaped head with a horizontal transverse bar at its forward end, including a coupler case mounted between attaching brackets to provide rotation on a vertical axis and having a tongue receiving opening with inwardly converging top, bottom and side walls, and a hook plate notch within the bottom portion thereof opening into said bottom wall; a hook plate rockably operative within said slot having a hook adapted to engage said tongue head, a spur adapted to contact the outer portion of said tongue cross bar for coupling motion and a locking heel at its inner portion; a latching shaft adapted to rotate from latching position, with said hook heel engaged to hold said hook plate in coupling position, to unlatched position with said hook heel released so that said hook plate will rock to uncoupled position; pneumatic means for rotating said latching shaft from latching position to unlatching position; spring mechanism for normally retaining said latching shaft in latching position and manual means for rotating said latching shaft from latching to unlatching position independent of said pneumatic rotating means.

4. A vehicle coupler, for use with a tongue having a flat wedge-shaped head with a horizontal transverse bar at its forward end, including a coupler case mounted between attaching brackets to provide rotation on a vertical axis and having a tongue receiving opening with inwardly converging top, bottom and side walls, and a hook plate notch within the bottom portion thereof opening into said bottom wall; a hook plate rockably operative within said slot having a hook adapted to engage said tongue head, a spur adapted to contact the outer portion of said tongue cross bar for coupling motion and a locking heel at its inner portion; a latching shaft adapted to rotate from latching position, with said hook heel engaged to hold said hook plate in coupling position, to unlatched position with said hook heel released so that said hook plate will rock to uncoupled position; pneumatic means for rotating said latching shaft from latching position to unlatching position; spring mechanism for normally retaining said latching shaft in latching position.

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