Feb. 1, 1944. W. J. METZGER 2,340,818

CAR COUPLER

Filed Aug. 9, 1941 3 Sheets-Sheet 1

Fig. 1.

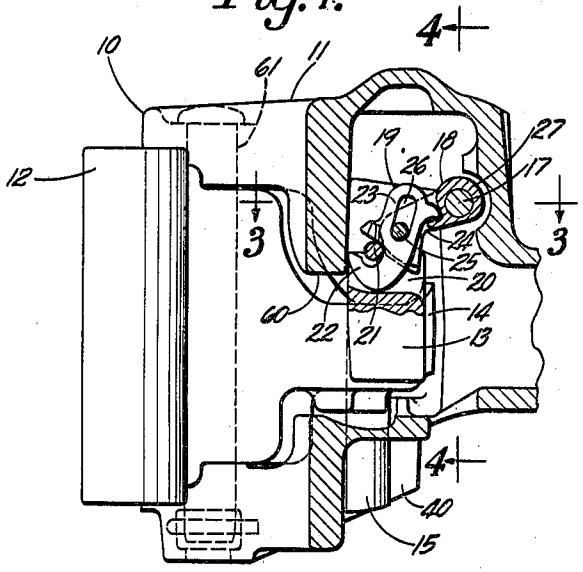
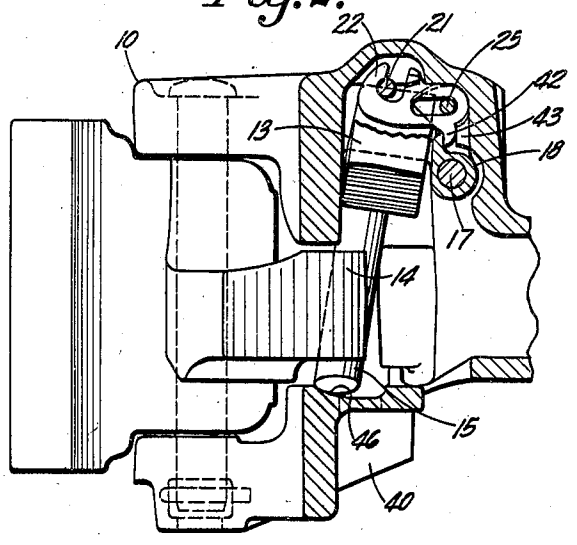


Fig. 2.



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Feb. 1, 1944. W. J. METZGER 2,340,818

CAR COUPLER

Filed Aug. 9, 1941 3 Sheets-Sheet 2

Fig. 3.

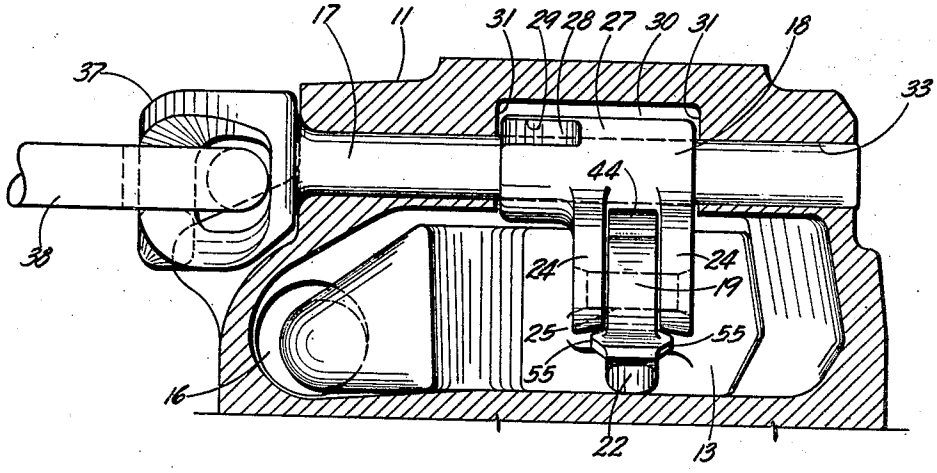


Fig. 4.

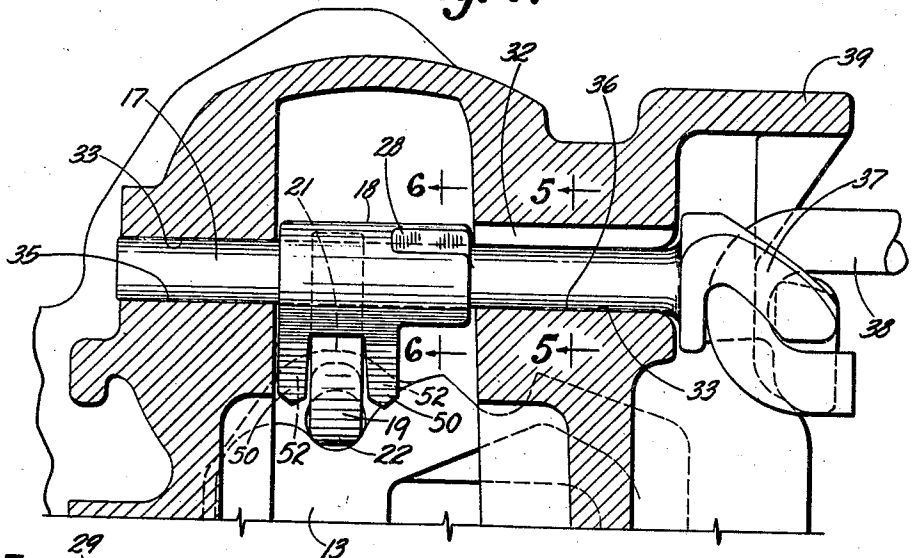


Fig. 5.

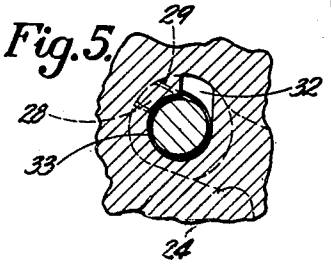
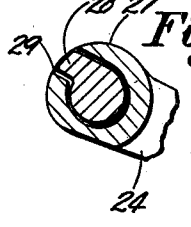


Fig. 6.



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Feb. 1, 1944. W. J. METZGER 2,340,818

CAR COUPLER

Filed Aug. 9, 1941 3 Sheets-Sheet 3

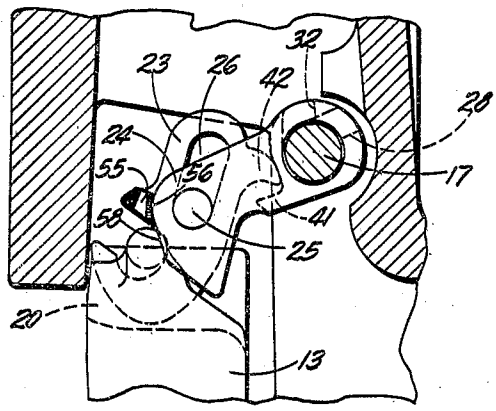


Fig. 7.

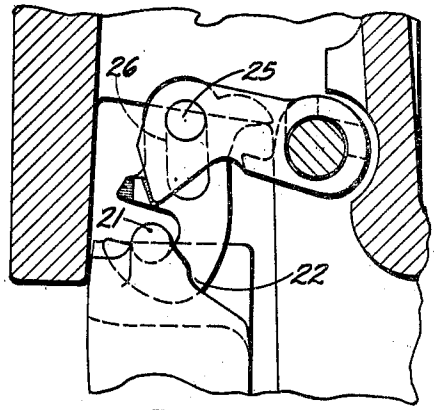


Fig. 8.

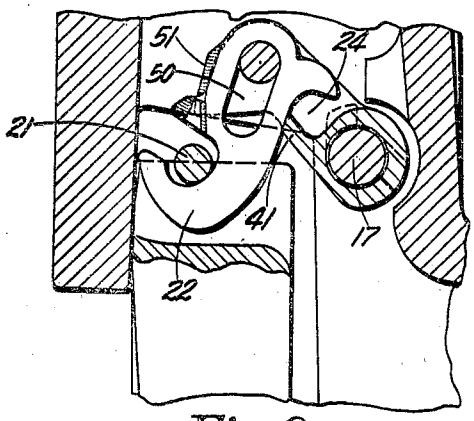


Fig. 9.

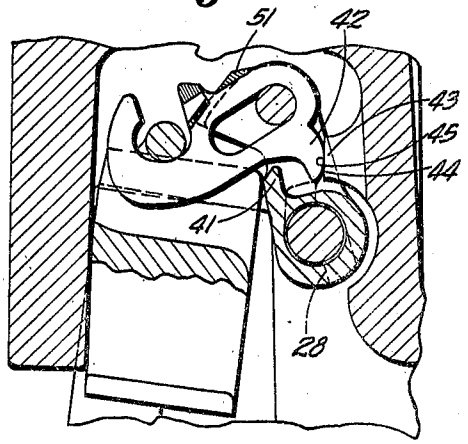


Fig. 10.

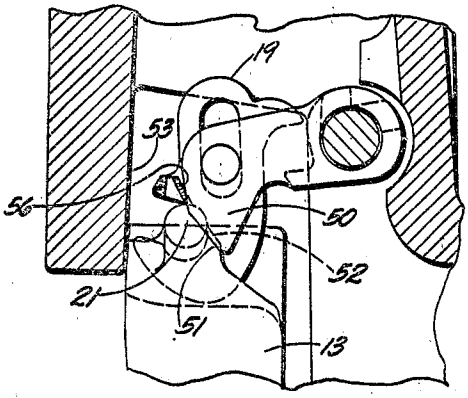


Fig. 11.

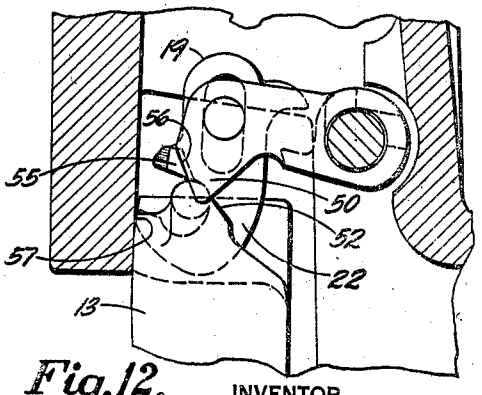


Fig. 12.

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Patented Feb. 1, 1944

2,340,818

UNITED STATES PATENT OFFICE

2,340,818

CAR COUPLER

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Application August 9, 1941, Serial No. 406,156

10 Claims. (Cl. 213—146)

This invention relates to car couplers and more particularly to the coupler lock operating mechanism.

Couplers applied to cars used in certain types of service such as moving of materials in industrial plants are often subjected to rather severe treatment and unintended usage whereby the lock operating mechanisms of the couplers have been damaged and rendered inoperative. This has occurred in couplers having either top or bottom type lock operating mechanisms. It is therefore an object of my invention to provide a coupler lock operating mechanism which is protected from damage and comprises a novel arrangement of parts within the coupler. A more specific object is to provide a new and improved coupler lock operating mechanism positioned within the upper portion of the coupler and rotary operated from the side thereof. Another object is to provide a rotary operated coupler lock actuating mechanism which is located intermediate the top and bottom of the coupler and which effectively precludes upward creeping or accidental jumping of the lock. Other objects and advantages of my invention will be apparent from the following description taken in conjunction with the drawings in which:

Fig. 1 is a vertical sectional view through a coupler embodying the invention, the parts being in locked position.

Fig. 2 is a view similar to Fig. 1 but showing the coupler in knuckle-thrown position.

Fig. 3 is an enlarged horizontal sectional view taken along line 3—3 of Fig. 1.

Fig. 4 is an enlarged vertical sectional view taken along line 4—4 of Fig. 1.

Fig. 5 is a fragmentary view taken along line 5—5 of Fig. 4.

Fig. 6 is a fragmentary view taken along line 6—6 of Fig. 4.

Figs. 7 to 10 are views showing the lock operating mechanism in various positions during the process of unlocking the coupler.

Fig. 11 is a view showing the anti-creep means in functioning position.

Fig. 12 shows secondary means in engagement to prevent upward movement of the lock.

In the drawings there is shown a coupler 10 having a head 11 and a pivotally connected knuckle 12. The lock member 13 seats on the knuckle tail 14 when in locked position and has a depending leg 15 which serves to swing open the knuckle during the uncoupling operation. In locked position leg 15 extends through an opening 16 in the bottom of the coupler.

The lock actuating mechanism is positioned within the chambered upper portion of the coupler head and comprises a horizontal rotor shaft 17, a rotor lever 18 mounted thereon, and a link 19 operatively connecting the lever and lock 13. The top of the lock is recessed as at 20 and is bridged by curved or eye portion 21 by means of which the lock is raised. Link 19 has a hook-shaped portion 22 which is received in recess 20 so as to underlie portion 21. The link also has a slotted portion 23 which extends between the spaced arms 24 of lever 18 and is operatively connected thereto by means of a pin or rivet 25 which passes through the elongated slot 26. Arms 24 extend from the lever hub portion 27 through which shaft 17 passes. The lever is keyed to the shaft by means of lug 28 integral with the shaft, said lug being received by a slot 29 in hub 27. It will be observed that hub 27 fits within a recess 30, the walls 31 of which maintain the lever positioned laterally of the coupler. In order to permit insertion of shaft 17 into its position within the coupler a vertical slot 32 is provided for lug 28 forming a continuation of the shaft receiving opening 33 in the head. The shaft must of course be inserted with lug 28 extending in a vertical direction, but after all of the parts are assembled and the coupler is in locked position, the lug assumes a position in which it is rotated with respect to slot 32 and is opposite the adjacent wall 31, precluding withdrawal of the shaft. Furthermore, during the entire operation of unlocking the coupler, lug 28 is always opposite wall 31 and never in a position in line with slot 32, thereby at all times assuring retention of the shaft within the coupler. It will also be observed that substantial bearing surfaces 35 and 36 are provided for the shaft so as to assure adequate support thereof during unlocking of the coupler. At one end of the shaft there is provided an eye portion 37 to which an uncoupling rod 38 is adapted to be hooked for imparting rotational movement to the shaft. To protect eye portion 37 from falling objects when the coupler is in service, the head is formed with an overhanging flange 39. At the bottom of the coupler there is provided a longitudinally extending rib 40 designed to protect the lock leg 15 from injury by objects which may strike the underside of the coupler.

The cooperation of the parts of the mechanism during unlocking of the coupler will now be described. The relation of the parts at the start of this operation with the members still in reposed position is shown in Figs. 1, 3, 4, and 7.

Upon rotation of shaft 17 to effect uncoupling the initial action is to take up the slack between the parts as is shown in Fig. 8, with pin 25 in engagement with the upper end of slot 26 in link 19 and with hook 22 contacting the underside of portion 21 of the lock. Upon further rotation of the shaft, the link and lock are raised. As this movement continues the parts reach the relationship shown in Fig. 9 in which the side of the link is in engagement with stop 41 which extends between arms 24 of the lever. Thereupon, the link and lever in effect act as a single member as the lock is raised further. It will be observed from Fig. 9 that the point of engagement between hook portion 22 of the link and eye portion 21 of the lock is slightly below the center of shaft 17 so that a substantially vertical upward force is exerted on the lock. This relationship continues until the rocker-shaped projection 42 on the link comes into engagement with stop 43 in the coupler head (Fig. 10). At this point in the uncoupling operation projection 42 has been brought into correct operative relation with respect to stop 43. As rotation of the lever progresses the force exerted by pin 25 against the link causes curved surface 44 of projection 42 to partly roll and partly slide with respect to surface 45 of stop 43, causing the hook end 22 of the link to swing upwardly. The link is thus caused to pivot about pin 25 and move out of engagement with stop 41. Hook 22 continues to rise until the parts reach the position shown in Fig. 2 with the lock fully raised and the knuckle swung open by the lock leg 15. When the knuckle is closed, the tail 14 thereof pushes the lock leg 15 off shelf 46 and into opening 16 so that the lock drops into locked position, and the other members fall into reposed relationship as at the start of the uncoupling operation.

Reverse operation of the mechanism is prevented by the engagement between hook portion 22 of the link and the lock in conjunction with the engagement of rocker projection 42 against stop 41 on the lever which will occur when it is attempted to rotate shaft 17 in the wrong direction.

In Fig. 11 is shown the anti-creep means for resisting upward creeping or accidental jumping of the lock. It comprises projections 50 on arms 24 of the lever having surfaces 51 which are adapted to engage abutments 52 on each side of eye portion 21 of the lock. This engagement takes place only when the lock tends to creep or jump upwards, and surfaces 51 are so positioned below the pivotal axis 17 of the lever that the lock becomes wedged between said surfaces and wall 53 and is effectively precluded from rising any further. Surfaces 51 are shaped so as to provide a substantial amount of surface engagement with abutments 52. Link 19 does not form a part of the anti-creep and in no way interferes with its effectiveness. However, as a precautionary measure in the event the lever accidentally swings upwardly so that surfaces 51 are not in position to engage abutments 52 to prevent upward movement of the lock, the link is provided on each side thereof with lugs 55 having surfaces 56 adapted to engage surfaces 51 and thereby prevent rotation of the link with respect to the lever, as shown in Fig. 12. The link and lever in such a case act as a single member pivoting about shaft 17, and as the end of hook portion 22 swings into engagement with wall 53 as at 57, upward movement of the lock is prevented. At this point the lock has risen only a small amount above its normal locked position so that the knuckle cannot open. It is to be understood, however, that the provision for preventing upward movement of the lock as shown in Fig. 12 is auxiliary to the anti-creep means shown in Fig. 11 which normally precludes rising of the lock.

Lugs 55 in addition to functioning in the aforesaid manner also act to prevent unhooking of the link from the lock when the parts are in locked position of the coupler. Referring to Fig. 7 it will be seen that if the link is moved to the right, as in attempting to disengage the hook portion 22, surfaces 56 of lugs 55 will engage portions 58 of the arms of the lever after a small amount of movement and thus prevent unhooking of the link.

The mechanism is assembled with the knuckle removed from the couper head. The link and lever are first joined by pin 25 and are inserted into the coupler head through the front opening 60. Next the shaft is inserted into the head and through hub 27 of the lever. The lock is then placed into the head and the link is hooked on to the eye portion 21, after which the shaft may be rotated so as to raise the lock sufficiently to permit the knuckle to be added. Upon insertion of the knuckle pin 61 the knuckle may be swung closed and the lock will drop to its normal locked positinon.

My invention provides a coupler in which the lock operating mechanism is afforded a high degree of protection from damage as may result from the various service conditions to which the coupler may be subjected. The invention also provides a compact and simple lock operating mechanism which is easy to assemble and operate.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What I claim is:

1. In a coupler having a pivotal knuckle, a lock for said knuckle, a rotatable shaft positioned at a higher level than said lock, a lever keyed to said shaft and having a pair of spaced arms, a link operatively joining said lock and said lever for raising said lock, said link extending between said arms and being joined thereto by a pin and slot connection providing for relative movement therebetween, and stop means on said link and on said lock each being adapted independently of the other to engage said lever to limit upward creeping of said lock.

2. An operating mechanism for a coupler having a pivotal knuckle and a lock comprising a rotatable shaft mounted in said coupler positioned at a higher level than said lock, a lever keyed to said shaft, a link pivotally and slidably connected to said lever, said link having a hook-shaped portion connected to said lock and adapted upon rotation of said shaft member to raise said lock to unlocked position thereof, and stop means on said link and on said lock each being adapted independently of the other to engage said lever to limit upward creeping of said lock.

3. In a coupler having a pivotal knuckle, a lock adapted to lock said knuckle in closed position, a pivotally mounted lever in said coupler, a link operatively joining said lock and said lever and

adapted to transmit lifting movement from said lever to said lock, stop means on said lever adapted to engage said link after a predetermined amount of pivotal movement of said lever so as to cause said link to pivot as an integral part thereof upon further movement of said lever.

4. In a coupler having a pivotal knuckle, a lock for said knuckle, a pivotally mounted lever, a link operatively joining said lever and said lock adapted to raise said lock out of locked position upon rotation of said lever, rocker means on said link, and stop means adapted to be engaged by said rocker means after a predetermined amount of rotation of said lever to cause said link to swing upwardly relative to said lever and lift said lock to unlocked position upon further rotation of said lever.

5. In a coupler a lock operating mechanism located within the coupler head and comprising a lock and a pivotally mounted lever, a link operatively connecting said lock and said lever, said link being adapted to raise said lock out of locked position upon rotation of said lever, means on said lever adapted to engage said link after a predetermined amount of lifting of said lock to cause said link to move as an integral part of said lever, rocker means on said link, and stop means adapted to be engaged by said rocker means after another predetermined amount of lifting of said lock to cause said link to swing upwardly relative to said lever and lift said lock to unlocked position upon further rotation of said lever.

6. In a car coupler a pivoted knuckle, a vertically movable lock for said knuckle, rotary operated means in said coupler positioned at a higher level than said lock, connecting means joining said lock and said rotary operated means, engagable means on said rotary operated means and on said connecting means adapted to rotate the latter with said rotary operated means during a portion of the lifting movement of said lock, and means on said connecting means adapted to engage said coupler to rotate said connecting means relative to said rotary operated means during another portion of the lifting movement of said lock.

7. In a coupler having a pivotal knuckle and a chambered head, a lock in said chamber for locking said knuckle in closed position, a pivotally mounted lever, a link operatively joining said lock and said lever, and means on said lever and lock whereby upon upward creeping of said lock the lock will directly engage said lever and said means will force the lock against a wall of said chamber and prevent further upward creeping of the lock.

8. In a coupler having a pivotal knuckle and a chambered head, a lock in said chamber for locking said knuckle in closed position, a pivotally mounted lever, a link operatively joining said lock and said lever adapted to raise said lock to unlocked position upon rotation of said lever, integral projecting means on said lever, and integral abutment means on said lock, said projecting means being adapted to engage said abutment means to force said lock against a wall of said chamber and prevent upward creeping of said lock.

9. In a coupler having a pivotal knuckle and a chambered head, a lock in said chamber for locking said knuckle in closed position, a pivotally mounted lever, a link operatively joining said lock and said lever adapted to raise said lock to unlocked position upon rotation of said lever, integral abutment means on said lock, and integral projecting means on said lever adapted to engage said abutment means at a point below the pivotal axis of said lever to force said lock against a wall of said chamber and prevent upward creeping of said lock.

10. In a coupler having a pivotal knuckle and a lock receiving chamber, a lock in said chamber, said coupler having shaft receiving openings in the sides thereof extending into said chamber, a shaft in said openings, a key on said shaft positioned within said chamber adjacent a wall thereof, one of said openings having a key slot adapted to receive said key during insertion of said shaft into the coupler, a lever mounted on said shaft having a key-receiving slot, said key extending into said slot for securing said lever to said shaft, and a link operatively connecting said lock and said lever and being adapted to raise said lock to unlocked position upon rotation of said shaft, said key during all operative positions of said shaft being angularly disposed with respect to said slot so as to preclude outward movement of said shaft from the coupler.

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