

[54] RAILWAY CAR COUPLER

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[51] Int. Cl. B61g 3/10

[58] Field of Search 213/76 R, 100 R, 100 W, 104

[56] References Cited

UNITED STATES PATENTS

2,935,211	5/1960	Metzger.....	213/100 W
2,956,694	10/1960	Metzger.....	213/100 W
1,476,429	12/1923	Tomlinson.....	213/104
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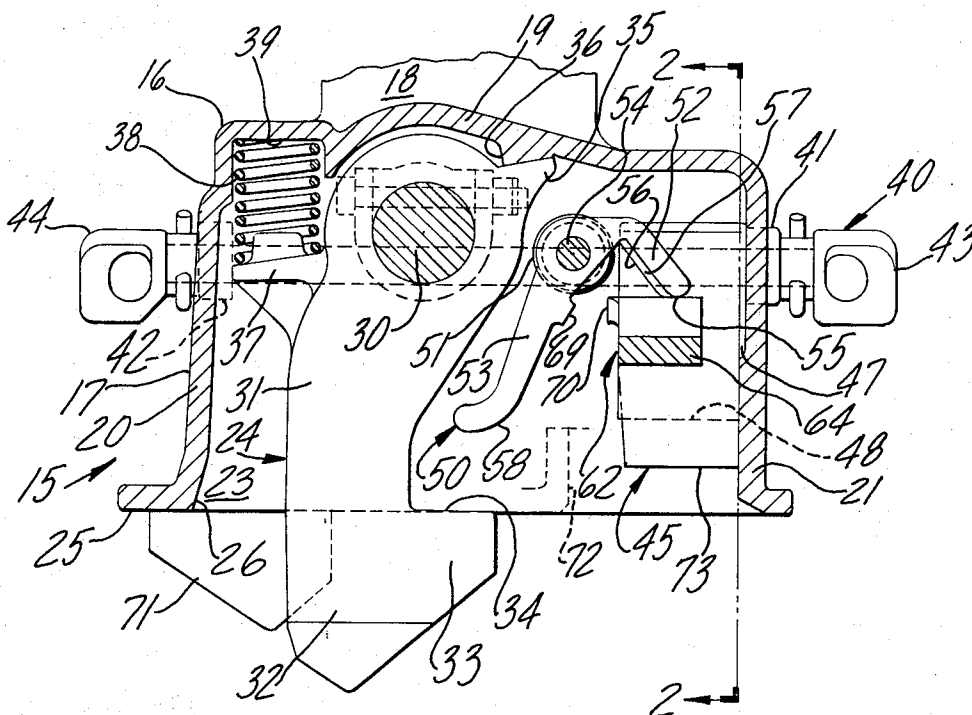
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[57] ABSTRACT

An automatic hook-type railway car coupler having a spring biased coupling hook mounted in its head for horizontal pivotal movement and adapted for interlocking engagement with the hook of an opposed similar coupler when the couplers are in a coupled position. The coupler is of the rotary bottom operated type having an uncoupling rod connected to each end of the coupler rotor member for actuation of the locking mechanism from either side of the coupler. More particularly, the coupler includes lock-set mechanism for maintaining the opposed hook of a mated coupled coupler in an uncoupled position in preparation for coupler separation.

15 Claims, 9 Drawing Figures



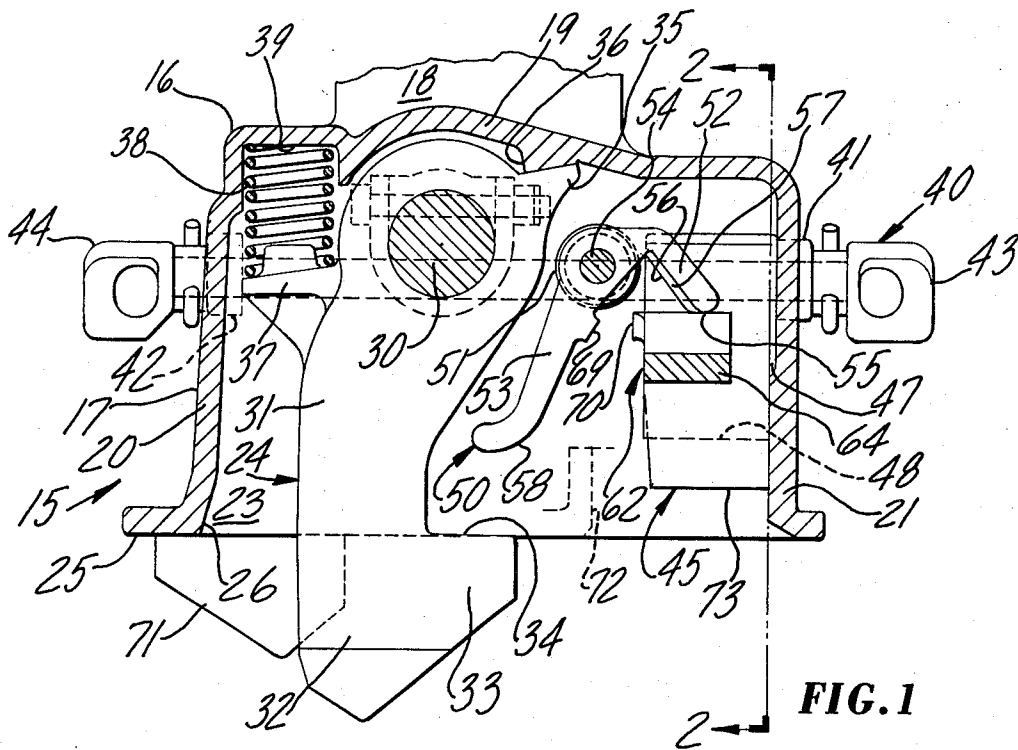


FIG. 1

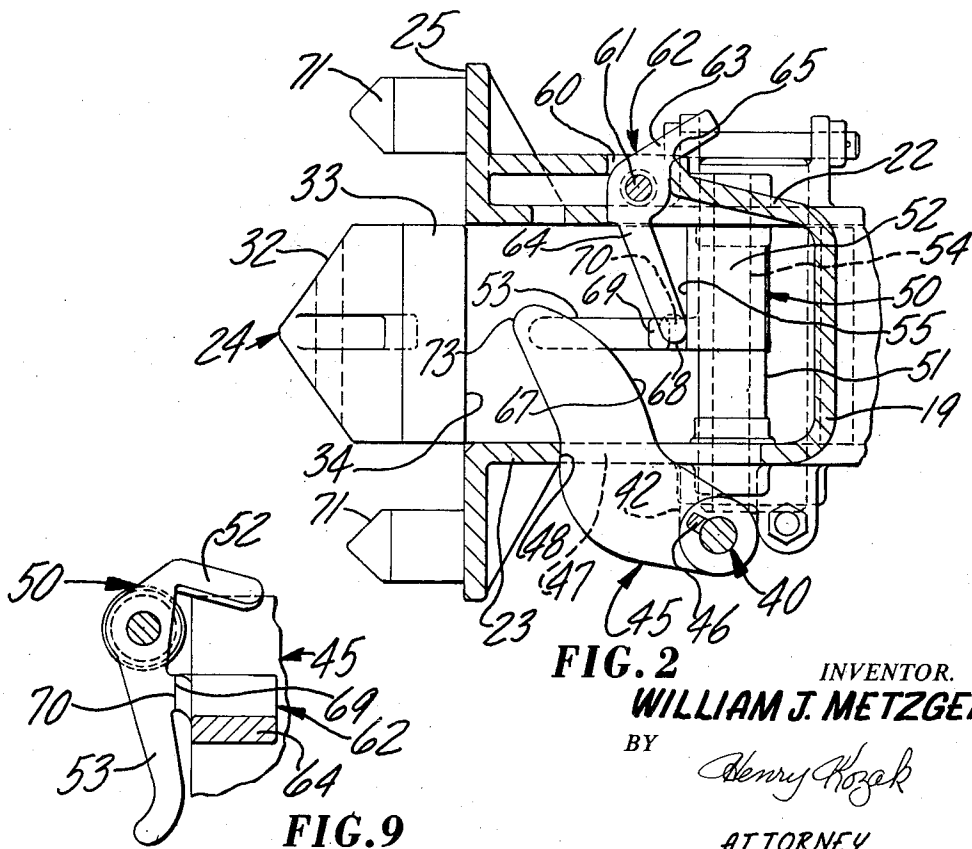


FIG. 2

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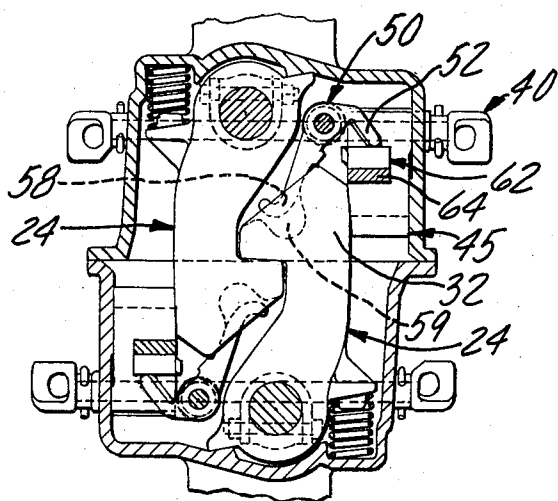


FIG. 3

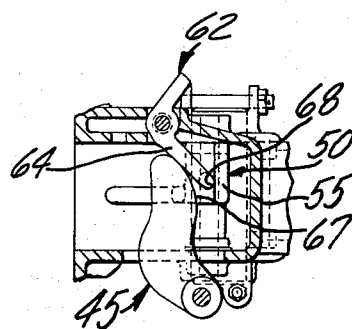


FIG. 5

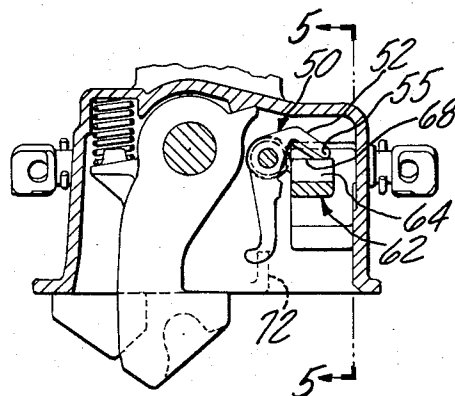


FIG. 4

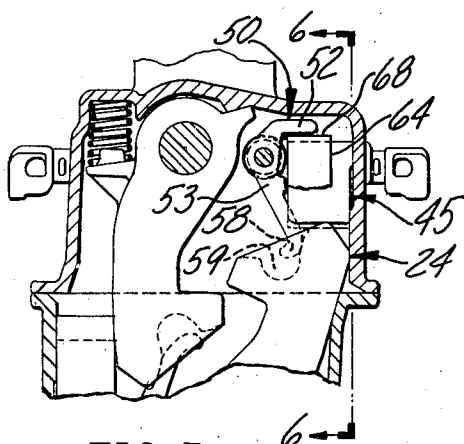


FIG. 7

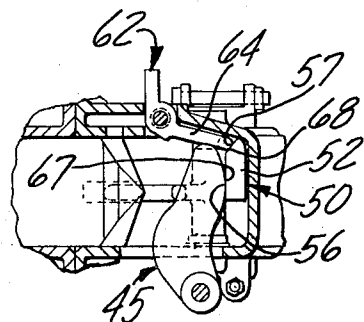


FIG. 6

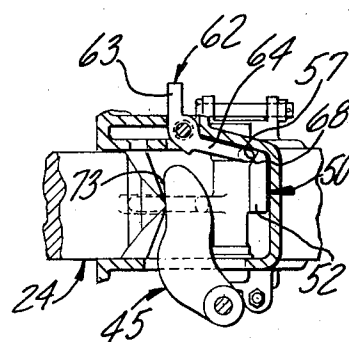


FIG. 8

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RAILWAY CAR COUPLER

BACKGROUND OF THE INVENTION

The present invention is an improvement over the lightweight hook-type car couplers disclosed in William J. Metzger's U.S. Pat. Nos. 2,935,211 and 2,956,694. Both prior art couplers include a rotary side operating means for operating the lock of the coupler, which means comprises a rotor shaft member that extends through the side walls of the coupler head above the top surface of the coupling hook. The lock is secured to the shaft for rotation therewith and is adapted to swing rearwardly to an unlocked position upon rotation of an uncoupling rod that is releasably secured to the rotor eye of the shaft. The uncoupling rod is disposed on the opposite side of the car facing the coupler as compared with the location of conventional A.A.R. approved uncoupling rods for knuckle-type railway car couplers when only one uncoupling rod is used and is rotatable in a direction opposite to the standard direction of rotation for uncoupling rods when actuating the locking mechanism. In addition, both hook-type couplers disclose a lock-set means that is dependent upon the position of the lock in its unstable unlocked position for maintaining the coupling hooks of two coupled couplers out of interengaging relationship in preparation to coupler separation. Accordingly, the lock must be positively maintained in a fully unlocked position in order to assure coupler separation. The present invention overcomes the above disadvantages and provides a rugged and practical railway car coupler of simple design, yet safe under all service conditions, including rotary dump operations.

One object of the invention is to provide a rotary bottom operated hook-type railway car coupler that may be operated in the usual manner by conventional uncoupling mechanism from either side of the coupler.

Another object is to provide a hook-type railway car coupler that is always ready to couple with an opposed similar coupler and whose hook, when two couplers are in coupled condition, may be placed in an uncoupled position in preparation for coupler separation and maintained in such uncoupled position by lock-set means.

DESCRIPTION OF THE DRAWINGS

In the drawings, with respect to which the invention is described below:

FIG. 1 is a sectional plan view of a hook-type railway car coupler embodying the invention, and showing the operating parts of the coupler in their normal position of rest;

FIG. 2 is a vertical sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a sectional plan view showing a pair of opposing couplers in a coupled position;

FIG. 4 is a sectional plan view of one of the couplers shown in FIG. 3 with the other coupler omitted for reasons of clarity and illustrating the position of the lock, lock-set member and thrower after the rotor shaft member has been partially rotated;

FIG. 5 is a vertical sectional view taken along line 5—5 of FIG. 4;

FIG. 6 is a view similar to FIG. 5 illustrating the lock urging the lock-set member into its lock-set position;

FIG. 7 is a fragmentary plan view similar to FIG. 3 and further illustrating the position of operating parts as the lock urges the lock-set member into its lock-set position;

FIG. 8 is a view similar to FIG. 6 illustrating the position of the operating parts of the coupler in preparation for coupler separation; and

FIG. 9 is a fragmentary plan view of the coupler shown in FIG. 1 illustrating the thrower rotated from its normal position of rest into engagement with the lock-set member.

DETAILED DESCRIPTION

Referring to FIGS. 1 and 2 of the drawings, there is shown a railway car coupler 15 which is of the automatic hook type. Coupler 15 has a body 16 comprising a hollow head 17 and an integral shank 18. A rearward portion of shank 18 is received within a yoke (not shown) and is pivotally secured thereto in the conventional manner to allow for horizontal and vertical angling of the coupler. Head 17 comprises a rear wall 19 joined by laterally spaced side walls 20 and 21 and vertically spaced top and bottom walls 22 and 23 to define a chamber therebetween for receiving a coupling hook 24. A generally flat, vertically disposed, buffing face plate 25 having an opening 26 therein bounds the forward extremity of the head.

Hook 24 is journaled to head 17 by means of a vertical pin 30 for horizontal pivotal movement between coupling and uncoupling positions. The hook, in its normal position of rest, extends forwardly through opening 26 and is disposed in its locking or coupling position on one side of the longitudinal central axis of the coupler. The hook comprises a body portion 31 and an enlarged hook-shaped head portion 32. Head portion 32 has a laterally extending portion 33, the rear side of which has a flat rearwardly facing pulling face 34. Face 34 is substantially centered transversely of the longitudinal central axis of the coupler and substantially coplanar with the front face of plate 25. A lug 35 extends laterally away from one side of the rear end of body portion 31 for abutting engagement with a complementary ledge 36 formed on rear wall 19 of the coupler head. A shoulder 37 extends laterally away from the opposite side of body portion 31 in forward spaced relation to lug 35. Shoulder 37 serves as a seat for one end of a spring 38 which is receivable within a pocket portion 39 in rear wall 19 of the coupler head. Spring 38 is disposed between shoulder 37 and pocket portion 39 under initial compression and urges the hook 24 about its pivotal axis in a counterclockwise direction. As illustrated in FIG. 1, ledge 36 functions as a stop means to approximately position the hook in its coupling position.

A rotor shaft member 40 is journaled to a pair of laterally spaced and horizontally aligned lugs 41, 42 which depend from the bottom wall 23 of the coupler. As shown in FIGS. 1 and 2, rotor member 40 has its axis of rotation contained in a transverse vertical plane disposed in close proximity to the pivotal axis of the coupling hook 24. Each end of the rotor member is provided with an eye portion 43, 44 that is adapted to be connected with an uncoupling rod (not shown) in the usual manner. A lock 45 is secured by means of a key 46 to rotor member 40 for rotation therewith. The

lock is disposed in close proximity to lug 41 and, in its normal position of rest, extends upwardly and forwardly from the rotor member. The lock projects through an opening 47 in the bottom wall of the coupler and is adapted to engage a forward portion 48 of the opening to limit the rotative movement of the lock in one direction and define its locking position. In this latter mentioned position, and as shown in FIG. 3, the lock is disposed between side wall 21 of the coupler and the forward side portion of head 32 of the coupling hook of the opposed coupled coupler. Preferably, the lock's center of gravity is located forwardly of the vertical plane containing the axis of rotation of the rotor member to effect reverse rotation of the lock as described below.

A thrower 50 having a body portion 51 and two spurs 52, 53 spaced at an angle from each other about its vertical axis is mounted for rotative movement within the head by a pin 54. With thrower 50 in its normal position of rest as shown in FIG. 1, spur 52 extends substantially tangentially away from the upper segment of body portion 51 and is bent laterally forwardly, terminating with a rounded end 55 rearwardly of the lock 45 and in spaced relation therewith. Spur 52 has a rearwardly inclined upper surface 57 for cooperation with the lock-set member as will hereinafter set forth. Spur 53 is substantially longer than spur 52 and may be defined as a curved finger that extends radially forwardly from the midsection of body portion 51. Spur 53 terminates in adjacent opposed relation with the forward portion of the coupling hook of an opposed coupler when two similar couplers are in a coupled position. As illustrated in FIG. 3, and as further described in U.S. Pat. No. 2,935,211, an end portion 58 of spur 53 is adapted to be received in a recess 59 in head 32 of the coupling hook of the opposed coupler when the couplers are in a coupled position.

Disposed within opening 60 in top wall 22 of the coupler and mounted thereto by a pin 61 for vertical rotative movement about its horizontal axis is a lock-set member 62. Lock-set member 62 comprises an upper leg 63 and a lower leg 64 angularly spaced from each other about its axis. Leg 63 extends upwardly and rearwardly relative to pin 61 and, when the lock-set member is in its reposed position, the leg is adapted to engage a rearward portion 65 of opening 60, as in FIG. 2. With leg 63 disposed in this position, lower leg 64 extends downwardly through opening 60 into the chamber of the coupler and terminates approximately midway the distance between the top and bottom walls of the coupler and in opposed relation with rearwardly facing curved surface 67 of lock 45 and end 55 of spur 52. With the lock-set member in its reposed position, end 55 on spur 52 of the thrower engages free end 68 of leg 64 to limit the rotative movement of the thrower in one direction and define its normal position of rest. To limit the rotative movement of the thrower in the opposite direction when the coupler is in an uncoupled position, and as shown in FIG. 9, an abutment 69 provided on spur 53 of the thrower is adapted to engage an opposing abutment 70 provided on leg 64 of the lock-set member.

Starting with the coupler parts in their normal position of rest and as viewed in FIG. 1, the parts cooperate in the following manner during a coupling operation.

As two similar couplers approach each other during a coupling operation and as the aligning guide pins or projections 71 on each coupler cooperate with opposed sockets or pocket portions 72 on the opposed mating coupler to properly align the couplers horizontally and vertically, such as set forth in applicant's copending application, U.S. Ser. No. 85,382, head portion 32 of each coupling hook enters opening 26 of the opposing coupler and engages the forwardly facing curved surface 73 of lock 45. Continued movement of the couplers toward each other causes each lock 45 to move rearwardly in an upwardly arcuate direction about its axis towards its associated lock-set member 62. Thereafter surface 67 on each lock slidably engages leg 64 of the associated lock-set member to urge the leg slightly rearwardly, thus causing the associated thrower 50 to be rotated about its vertical axis. During the final phase of the coupling operation, surfaces 34, 34 of the opposed coupling hooks slidably move into engagement with each other as the opposed hooks are resiliently urged by their associated springs toward their coupling position. During this phase of the coupling operation, end portion 58 of each spur 53 is received in recess 59 of the opposed coupling hook. As the opposed coupling hooks fully engage and as each thrower 50 assumes the position shown in FIG. 3, each lock reverses its direction of rotation as a result of gravity and rotates back to its original position as shown in FIGS. 1 and 2 and into engagement with the forward side portion of the hook of the mating coupler to maintain that hook in a coupled position.

Referring to FIG. 3, to disengage the coupling hooks of two coupled couplers of the present invention in preparation for coupler separation, rotor shaft member 40 on each coupler is rotated about its axis through actuation, in the usual manner, of the associated uncoupling rod (not shown). Rotation of the shaft causes the associated lock 45, which is keyed to the shaft to be moved upwardly and rearwardly in an arcuate direction out of cooperative engagement with head portion 32 of the opposed coupling hook 24. Continued rearward movement of the lock causes its rearwardly facing surface 67 to slidably engage leg 64 of the associated lock-set member 62; thus causing the latter to rotate about its axis, as shown in FIG. 5. As the lock actuates the lock-set member, end 68 of leg 64 slidably engages end 55 on thrower 50 to rotate that member about its vertical axis, as illustrated in FIG. 4. Rotation of the thrower causes end portion 58 on spur 53 to engage, in a camming manner, the inner wall of recess 59 on the opposed coupling hook to pivot the hook toward its uncoupling position, as shown in FIG. 7. With the lock fully thrown to its unlocking position as illustrated in FIG. 6, lock-set member 62 is disposed in its lock-set position, with end 68 on leg 64 engaging inclined surface 57 on spur 52 of the thrower. Simultaneously therewith, spur 53 pivots the opposed coupling hook 24 to its uncoupling position, as in FIG. 7. Since the opposed coupling hook is continuously resiliently biased towards its coupling position under the influence of its associated spring 38, a reacting force tends to urge thrower 50 in a reverse direction; thus causing spur 52 through its engagement with end 68 on leg 64 to frictionally hold the lock-set member in its lock-set position (FIG. 6) in preparation for coupler separation.

Upon release of the uncoupling rod, lock 45 reverses its direction of rotation under the influence of gravity and assumes the position shown in FIG. 8 with surface 73 of the lock in engagement with the tip of the opposed coupling hook. It will be understood that lock-set member 62 remains in lock-set position upon release of the uncoupling rod.

Should a yardman accidentally place one of the coupled couplers in a lock-set condition in preparation for coupler separation, he may easily recouple the mated couplers. To disengage the lock-set mechanism, leg 63 of the lock-set member is manually urged rearwardly towards the shank of the coupler to break the frictional contact between leg 64 and spur 52. Since the lock-set member's center of gravity is located rearwardly of its pivotal axis, the lock-set member automatically rotates towards its reposed position. Once frictional contact is broken, the opposed coupling hook, under the influence of its spring 38, is resiliently urged about its pivotal axis towards its coupling position. Thereafter lock 45, under the force of gravity, returns to its locking position between a side wall portion of the coupler and a forward portion of the opposed coupling hook.

From the above, it is evident that the hook-type coupler of the present invention is always ready to couple with an opposed similar coupler and, when in the coupled position with another coupler, the interengaging coupling hooks are positively locked against each other; thus precluding accidental coupler separation. Also, whenever it is desired to uncouple two coupled couplers, one of the couplers may be readily placed in lock-set position through actuation of the usual uncoupling rod, thereby disengaging the coupling hooks in preparation to coupler separation. Moreover, once a coupler is placed in lock-set position, it may be manually released from such position so that the couplers may remain coupled.

What is claimed is:

1. An automatic hook-type railway car coupler comprising a hollow head:

A. a coupling hook connected in said head for horizontal pivotal movement from a coupling position to an uncoupling position;

B. a lock member supported by said head for rotary movement from a locking position to an unlocking position, said lock member when in locking position being disposed in engagement with a forward side portion of the hook of a mating coupler to maintain said hook of the mating coupler in coupling position;

C. a thrower member rotatably mounted in said head for engaging the hook of said mating coupler to move the hook from its coupling to uncoupling position; and

D. a lock-set member movably supported by said head and adapted to be actuated by said lock member from reposed position to lock-set position, said lock-set member in moving to lock-set position actuating said thrower member to move the hook of said mating coupler to an uncoupling position, said lock-set member when in said lock-set position maintaining said thrower member in its position corresponding to said uncoupling position of the hook of said mating coupler.

2. A car coupler in accordance with claim 1 in which said head has a rear wall joined by laterally spaced side walls and vertically spaced top and bottom walls and providing a chamber therebetween for receiving said coupling hook, and wherein said lock-set member is mounted for vertical rotative movement about its axis by a pin mounted to said top wall.

3. A car coupler in accordance with claim 2 wherein resilient means is provided in said head for urging said coupling hook towards its coupling position, and said coupling hook having stop means for engaging an associated abutment on said rear wall of said head to limit pivotal movement of said coupling hook in its coupling position under the influence of said resilient means.

4. A car coupler in accordance with claim 2 in which a shaft member is rotatably supported in a horizontal plane below said bottom wall of said head, and said lock member is connected to said shaft member for rotation therewith.

5. A car coupler in accordance with claim 2 wherein said lock-set member comprises an upper leg and a lower leg, said upper and lower legs being so arranged that when the lock-set member is in said reposed position, one of said legs engages a portion of the top wall and the lower leg is disposed in adjacent opposed relation with said thrower member and said lock member.

6. A car coupler in accordance with claim 4 wherein said lock member extends in a direction upwardly and away from said shaft and through an opening in said bottom wall, and abutment means is provided on said bottom wall for engagement with said lock member for limiting rotative movement of said lock member while in said locking position.

7. A car coupler in accordance with claim 5 wherein said upper leg extends in a direction upwardly through an opening in said top wall to provide a manual release for said lock-set member when said latter member is in its lock-set position.

8. A car coupler in accordance with claim 5 wherein said thrower member comprises two spurs spaced at an angle about its axis, said thrower member in one position having one of said spurs disposed rearwardly of said lower leg of the lock-set member and adapted for engagement therewith for limiting movement of said thrower member in one direction when the lock-set member is in its reposed position, and the other spur being disposed in adjacent opposed relation with the forward portion of the coupling hook of the mating coupler when said thrower member is in said first mentioned position.

9. A car coupler in accordance with claim 8 wherein said one spur has a forwardly facing lower surface adapted to be slidably engaged by a portion of said lower leg upon actuation of said lock-set member by said lock member to swingably urge said thrower member from said first mentioned position towards a second position, and said one spur having an upper rearwardly inclined surface joining said lower surface and adapted to engage and hold said lock-set member in said lock-set position.

10. A car coupler in accordance with claim 8 wherein abutment means is provided on the free end of said lower leg of the lock-set member for engaging the other spur of said thrower member to limit movement of said thrower member in the other direction when the

lock-set member is in its reposed position and the coupler is in an uncoupled condition.

11. A car coupler in accordance with claim 1 wherein counterweight means is provided on said lock-set member to effect reverse rotation of said member upon the release of said member from said lock-set position.

12. An automatic hook-type railway car coupler comprising a hollow head:

- A. a coupling hook pivotally mounted in said head for horizontal pivotal movement from a coupling position to an uncoupling position;
 - B. a lock member connected to said head for rotary movement from a locking position to an unlocking position, said lock member in its locking position being disposed between a side wall portion of said head and a forward portion of the coupling hook of a mating coupler when the couplers are in a coupled relationship;
 - C. resilient means biasing said coupling hook towards its coupling position;
 - D. a thrower member mounted in said head for rotative movement from a first position to a second position; and
 - E. a lock-set member supported by said head for rotative movement from a reposed position to a lock-set position, said lock member upon being rotated out of said locking position operatively engaging and actuating said lock-set member to cause the latter to actuate said thrower member, said thrower member upon being engaged by said lock-set member being rotatable to its second position and caused to be held in said last-mentioned position by said lock-set member when the latter is in said lock-set position, said thrower member upon being actuated by said lock-set member operatively engaging said resiliently biased coupling hook of the mating coupler to pivot said last-mentioned coupling hook to an uncoupling position, and said coupling hook on said mating coupler in its uncoupling position reacting against said thrower member to cause said thrower member to maintain said lock-set member in its lock-set position.
13. A car coupler in accordance with claim 12 in which said head has a rear wall joined by laterally spaced side walls and vertically spaced top and bottom walls and providing a chamber therebetween for receiving said coupling hook, and said coupling hook

having stop means for engaging an associated abutment on said rear wall of said head to limit pivotal movement of said coupling hook in its coupling position under the influence of said resilient means.

14. A car coupler in accordance with claim 12 wherein counterweight means is provided on said lock member to effect reverse rotation of said member after the lock-set member has been positioned in its lock-set position.

15. An automatic hook-type railway car coupler comprising a hollow head:

- A. a coupling hook connected to said head for horizontal pivotal movement about a vertical axis from a coupling position to an uncoupling position;
- B. a shaft member rotatably mounted below the bottom wall of said head and having its axis of rotation contained in a transverse vertical plane disposed in close proximity to the pivotal axis of said coupling hook;
- C. a lock member operatively connected to said shaft member for rotation therewith, said lock member in its locking position extending in a forward direction upwardly and away from said shaft and through an opening in said bottom wall, said lock member in its locking position being disposed in engagement with a forward side portion of the hook of a mating coupler to maintain said last mentioned hook in a coupling position, said lock member being movable from its locking position to an unlocking position upon rotation of said shaft member,
- D. a thrower member rotatably mounted in said head for engagement with the hook of said mating coupler to move the hook from its coupling position to its uncoupling position, said thrower member being operatively associated with said lock member and upon actuation thereof by said last mentioned member said thrower member operatively engaging the hook of the opposed coupler to pivot said last mentioned hook to its uncoupling position; and
- E. a lock-set member pivotally mounted in said head and being movable by said lock member to lock-set position, said lock-set member when in lock-set position engaging said thrower member to hold said thrower member in its position corresponding to said uncoupling position of the hook of said mating coupler.

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