J. KELSO.

CAR COUPLING.

APPLICATION FILED MAR. 5, 1909.

956,976.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

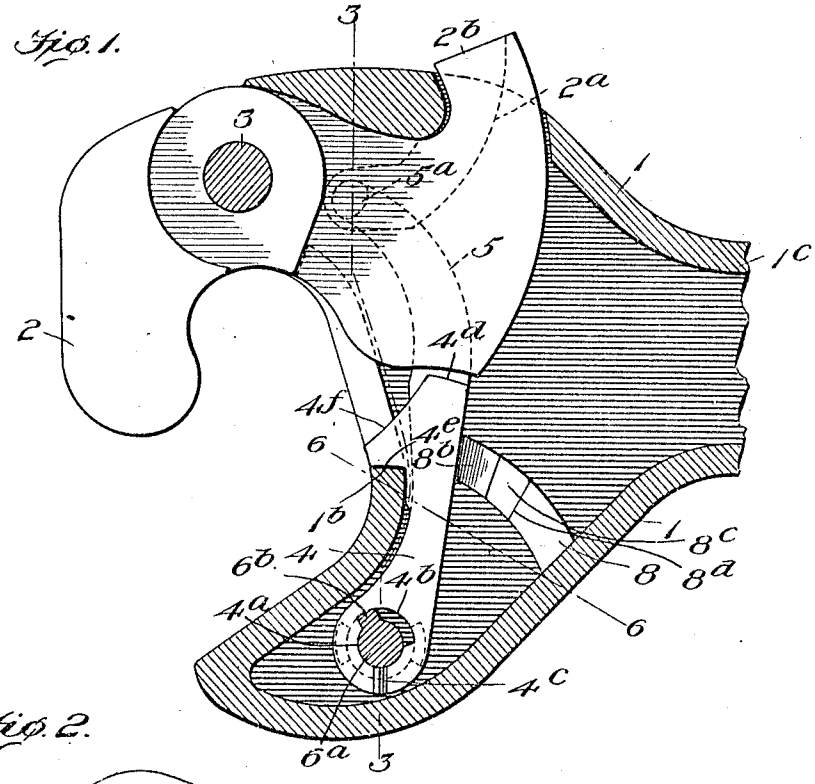
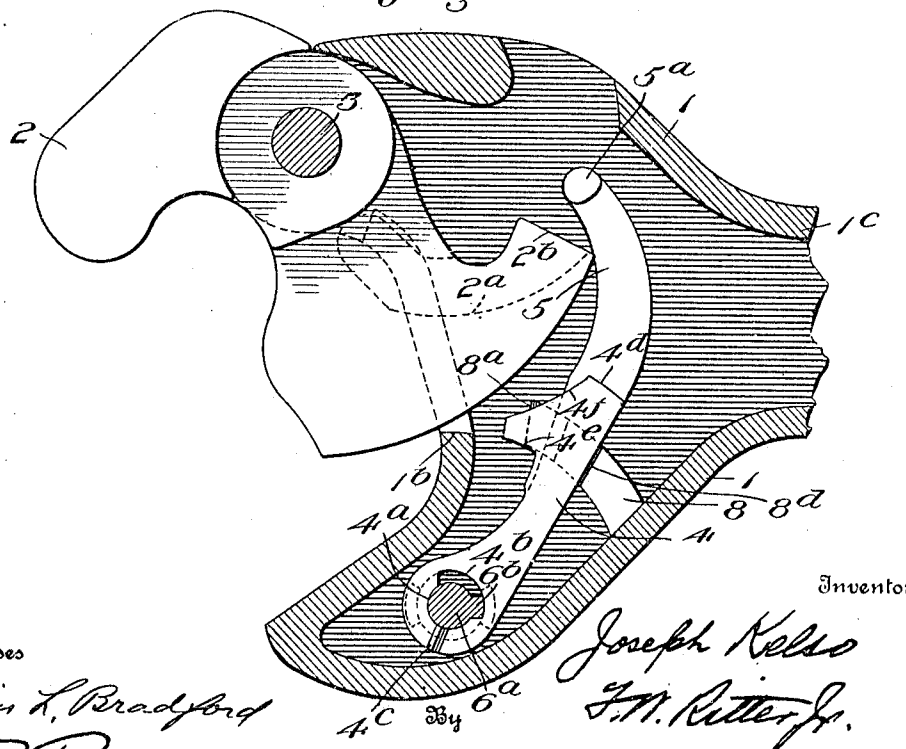


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

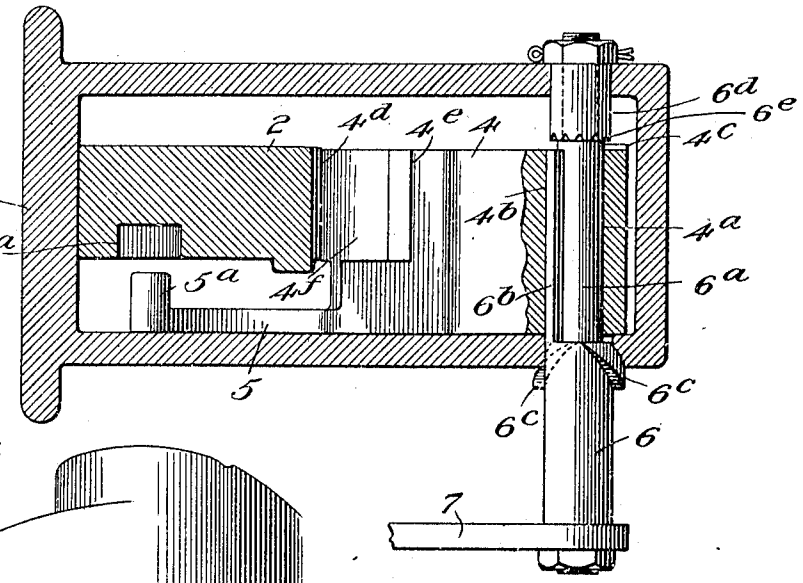


Fig. 4.

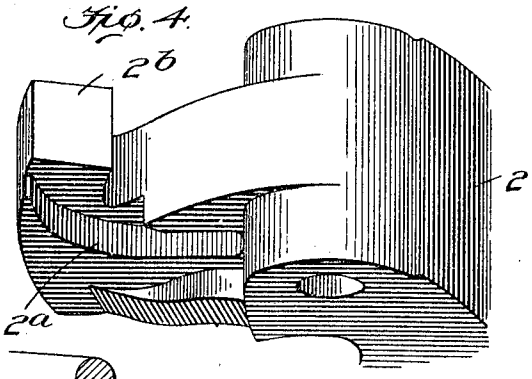


Fig. 5.

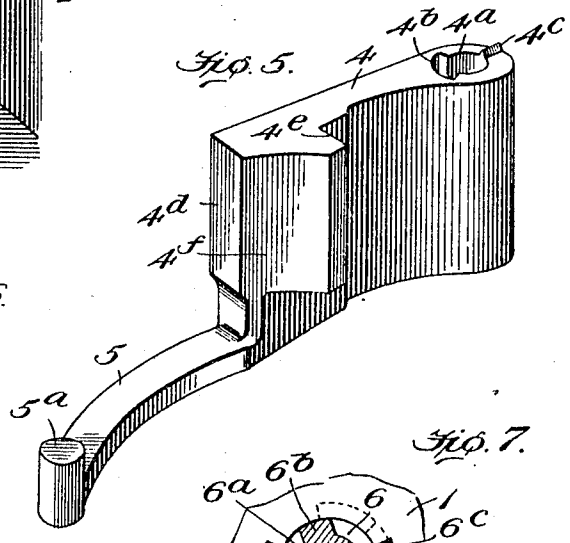


Fig. 6.

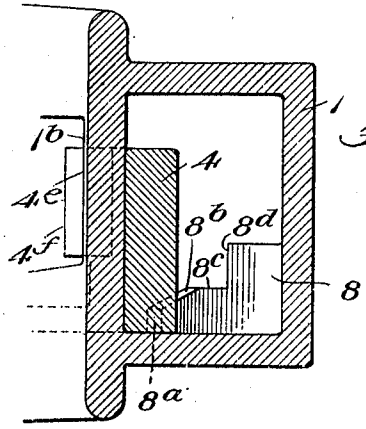
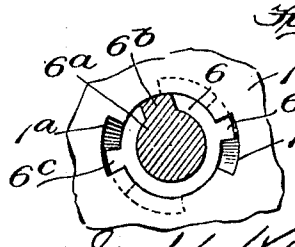


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH KELSO, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE McCONWAY & TORLEY COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CAR-COUPLING.

956,976. Specification of Letters Patent. Patented May 3, 1910.

Application filed March 5, 1909. Serial No. 481,352.

To all whom it may concern:

Be it known that I, JOSEPH KELSO, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Car-Couplers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to car couplers of the vertical plane type, and has for its objects to provide a strong and durable structure of few parts which shall efficiently operate to lock the knuckle in closed position, prevent accidental unlocking of the lock, and rotate the knuckle to an open position to permit automatic coupling with another coupler the knuckle of which is closed.

To this end, the principal feature of my invention, generally stated, consists in combining with the coupler head and a suitably formed knuckle pivoted thereon a knuckle lock which is slidably and rotatably mounted upon a vertical pivot pin located on the guard-arm side of the coupler head, said locking member being integrally connected with a knuckle-opener member that is arranged on the same side of the lock pivot pin as the knuckle-locking portion of said lock, and said locking member and said knuckle-opener swinging rearwardly, or away from the mouth of the coupler, during the unlocking and knuckle-opening operations of the device.

A further feature of my invention consists in providing a plurality of means for preventing an accidental unlocking of the coupler, said means operating both independently and in conjunction with each other to maintain the lock in a locked position.

There are other, minor, features of invention, residing in particular combinations of parts and in elemental construction, all as will hereinafter more fully appear.

In the drawings chosen for the purpose of illustrating my invention, the scope whereof is pointed out in the claims, Figure 1 is a horizontal section of a coupler embodying my invention, the knuckle and its locking mechanism being shown in plan in locked relation; Fig. 2 is a view similar to Fig. 1, but illustrating the positions the parts assume when the knuckle has been rotated to an open position by means of the knuckle-opener; Fig. 3 is a vertical section taken on the line 3—3, Fig. 1; Fig. 4 is a detail perspective view of the knuckle tail; Fig. 5 is a detail perspective view of the locking member and attached knuckle-opener; Fig. 6 is a vertical section taken in the plane of the line 6—6, Fig. 1; and Fig. 7 is a detail view partly in plan and partly in horizontal section, showing the relation of the lock pivot pin to the bottom wall of the coupler head when the lock is in locked position.

Like symbols refer to like parts wherever they occur.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, 1 is the coupler head, 2 the knuckle, 3 the knuckle pin by which the knuckle is rotatably mounted upon the head in the usual manner, 4 the coupler lock, 5 the knuckle-opener member which is integrally connected to the lock, and 6 the pivot pin upon which the lock 4 and knuckle-opener 5 are mounted and by which they are actuated through the instrumentality of the unlocking lever 7.

In order to cause the lock 4 to automatically move to a locked position under the influence of gravity when there is no pull upon the unlocking lever 7 and the knuckle 2 is in locked position, and for the further purpose of affording means which prevent an accidental unlocking of the coupler when in service, the coupler head is preferably provided on its lower wall with a member 8 which serves both to limit the rotation of the lock and to guide and control its vertical movements. The lock controlling member 8 is preferably formed with a vertical face 8^a which, as will be explained more fully hereafter, engages the lock 4 when the latter is in locked position and prevents an accidental unlocking of the coupler. Adjacent to and extending rearwardly and upwardly from the lock locking face 8^a, the member 8 is formed with an incline 8^b up which the lock 4 travels when moving to an unlocked position. This inclined face 8^b is of sufficient length to extend under the lock 4 when the

latter occupies an unlocked position while the knuckle 2 is closed, so that if, under such conditions, the pull upon the unlocking lever 7 is released, the lock 4 will move down the incline under the influence of gravity and automatically assume a locked position.

To the rear of the inclined face 8^b the member 8 is formed with a horizontal supporting shelf 8^c which, as shown in Fig. 2, maintains the lock and knuckle-opener mechanisms in the positions they assume at the completion of the knuckle opening operation. The opening or rearward rotation of the lock and knuckle-opener is limited by the vertical stop face 8^d formed at the inner end of the supporting shelf 8^c, as will be readily understood.

In order to allow the lock 4 to be rotated through the instrumentality of the unlocking lever 7 and lock pivot pin 6 and at the same time to be capable of such movement relatively to said pivot pin as will permit the member 8 to control the vertical movements of the lock when the latter executes an unlocking movement, the said lock 4 is preferably provided with a pin receiving aperture formed as two concentric cylindrical segments 4^a and 4^b of different diameters. The smaller cylindrical segment 4^a receives the corresponding cylindrical portion 6^a of the pivot pin 6, while the larger cylindrical segment 4^b receives the spline 6^b with which the said pivot pin is provided. As the cylindrical segment 4^b extends through an arc which is much greater than the thickness of the spline 6^b, it will be observed that the lock 4 and pivot pin 6 are permitted to have a relative rotation in addition to the relative vertical movement which the form of connection allows.

In order to cause the initial vertical movement of the lock 4 necessary to permit it to clear the upper end of the lock locking face 8^a prior to rotating rearwardly, the lock pivot pin 6 is provided with oppositely disposed inclined or spiral lugs 6^c, 6^c which co-act with correspondingly formed channels or guide grooves 1^a, 1^a formed in the coupler head. The spiral lugs 6^c are, as shown, preferably located immediately below the base of the reduced cylindrical portion 6^a of the lock pivot pin 6, and the grooves 1^a are formed in the lower wall of the coupler head 1 adjacent to the aperture through which the pivot pin 6 passes. As the pivot pin 6 is turned the coöperation of the lugs 6^c and the spiral grooves 1^a causes the said pin 6 to rise until the lugs have passed entirely out of the grooves, after which the lower ends of said lugs turn upon the bottom wall of the coupler head without causing any further upward motion of the pin. The upward motion of the pin 6 at the beginning of its turning movement causes a corresponding vertical movement of the lock 4, which is at such time engaged by the shoulder formed by the junction of the reduced portion 6^a of the pin with the portion of larger diameter to which the unlocking lever 7 is rigidly connected.

The upper end of the lock pivot pin 6 is provided with a lock locking member 6^d that is preferably in the form of a collar or enlargement which extends outwardly over the lock 4 adjacent to the lock pivot pin opening therein, said collar having its under face formed with teeth 6^e which are adapted to receive between them the tooth or lug 4^c that projects upwardly from the lock 4. The lower edge of the lock locking member 6^d of the pin 6 may be located above the upper face of the lug 4^c at any distance such that an upward vertical movement of the lock 4 independent of the pivot pin 6 will cause the said lug 4^c to interlock with the teeth 6^e before said lock has risen sufficiently to clear the lock locking face 8^a formed upon the member 8; but it is preferred to so proportion and combine the parts that the lower edges of the teeth 6^e are only slightly above the upper edge of the lug 4^c, thus insuring the engagement of the lugs 4^c and 6^e upon a slight rise of the lock 4 relatively to the lock pivot pin 6. This construction, it will be observed, forms a supplemental or auxiliary lock which prevents accidental unlocking of the coupler when in service, for if the lock 4 is accidentally jarred upwardly the lug 4^c thereof will engage between two of the teeth 6^e of the collar 6^d, thereby locking the pivot pin 6 against rotation with respect to the lock 4. As the lock 4 is at this time prevented from rotating by its engagement with the lock locking face 8^a of the member 8, the lock pivot pin 6 is, therefore, also prevented from revolving, with the result that the lock is prevented from moving out of the path of the knuckle.

It is preferred to form the collar or lock locking member 6^d with which the lock pivot pin 6 is provided as a cylindrical sleeve nut which is threaded upon the upper end of said pivot pin and may be additionally secured thereto by means of a cotter. By such a construction the lock pivot pin 6 is both journaled in and supported from the top wall of the coupler head 1.

The lock 4, which is pivotally mounted upon the guard arm side of the coupler head 1, as heretofore described, is formed with a face 4^d which engages the tail of the knuckle 2 when the latter is in coupled position, and with a bearing face 4^e that is designed to engage the vertical wall 1^b of the coupler head on the guard arm side of the coupler mouth to support the lock 4 against the thrust of the knuckle tail, the lock pivot pin 6, which has a slight looseness of fit in the lock 4, being thus relieved of strain. The face 4^f of the lock, which extends between

the locking face 4^d and the abutment face 4^e, is preferably curved to correspond to the circularly curved inner end of the knuckle 2, so that the lock may present a large wearing surface to the inner end of the knuckle as the latter rotates outwardly when the cars are separated after the lock 4 has been brought to an unlocked position.

Rigidly connected to the lock 4, and preferably formed integral therewith, is a knuckle-opener member 5 which extends under the tail of the knuckle 2 in the general direction of the knuckle pin 3. At its outer or free end the knuckle-opener is provided with an upwardly extending finger or stud 5^a which is adapted to engage the knuckle tail and force the knuckle open when the lock 4 performs an extended unlocking rotation after being withdrawn from the path of the knuckle tail.

For the purpose of coöperating with the knuckle engaging finger 5^a of the knuckle-opener 5, the under surface of the knuckle tail is formed with a downwardly projecting wall 2^a that extends from the hooked end 2^b of the knuckle toward the front or lugs end thereof. As shown, it is preferred that this wall 2^a shall be vertical, of generally curved form and shall extend toward and terminate adjacent to the knuckle pin opening in the knuckle. In order to increase the strength of the knuckle the wall 2^a may, as shown, be formed as one of the faces of an open ended slot.

It will be noted that the arrangement and construction of the parts of the car coupler as heretofore described permit a knuckle having a very wide and strong tail portion to be employed.

When the coupler is coupled to another coupler, an unlocking pull exerted upon the unlocking lever 7 causes the lock pivot pin 6 to rotate co-extensively with said lever. As the pin 6 rotates, the spiral lugs 6^c thereon coöperate with the correspondingly inclined grooves 1^a formed in the coupler head 1 to cause the said lock pivot pin 6 to move vertically upward until the lower ends of the lugs 6^c reach the upper ends of the grooves 1^a. This upward and turning movement of the pin 6 causes the shoulder formed at the base of the reduced portion 6^a thereof to engage and lift the lock 4 and attached knuckle-opener 5. As the spline 6^b on the lock pivot pin 6 is arranged to turn freely in the lock 4 until the lock has been elevated sufficiently to clear the upper end of the lock locking face 8^a on the member 8, it will be evident that the initial unlocking movement of the lock 4 is a vertical one unaccompanied by rotation, and that the knuckle-opener 5 has a similar initial movement. When, however, the lower face of the lock 4 has been elevated sufficiently to clear the lock locking face 8^a, the spline 6^b upon the lock pivot pin 6 engages one of the shoulders formed between the segmental cylindrical faces 4^a and 4^b of the lock pivot pin hole and causes said lock to rotate with the pivot pin 6 until the lock is withdrawn from the path of the knuckle 2 and the knuckle is free to rotate to an open position. This rearward or unlocking rotation of the lock 4 is accompanied by a further upward movement of the lock which is preferably accomplished not only by the continued vertical movement of the lock pivot pin 6, but also by the action of the incline 8^b formed on the member 8, said incline being preferably of proper pitch to contact the under surface of the lock as the latter is raised and rotated.

The unlocking rotation of the lock 4 is arrested by the engagement of the knuckle-opener finger 5^a with the downwardly projecting face 2^a of the knuckle tail, the knuckle 2 being itself prevented from rotating on account of its engagement with a mating coupler. When thus arrested in an unlocked position while the knuckle is closed, the lock 4 stands above the incline 8^b and the lower ends of the spiral lugs 6^c on the lock pivot pin 6 are preferably just at, or approximately at, the upper ends of the inclined grooves 1^a of the coupler head 1, so that if the unlocking pull upon the lever 7 is released, the lock 4 will gravitate down the incline 8^b and reassume a locked position, while the lock pivot pin 6, under the coöperation of the spiral lugs 6^c and spiral grooves 1^a, will also rotate and fall to its normal, or locked, position.

If the knuckle 2 is opened when the lock 4 is in the unlocked position just described, the release of the pull upon the uncoupling lever 7 will not be followed by a return of the lock to its locked position, but the lock will be maintained in unlocked position by the engagement of its curved face 4^c with the curved inner end of the knuckle tail. When, however, the knuckle 2 is returned to coupled position the knuckle tail will be withdrawn from in front of the lock 4 and the parts will automatically assume their locked positions, as heretofore described.

As shown in Fig. 3, it is preferred that the lock lifting shoulder formed on the lock pivot pin 6 at the base of the reduced cylindrical portion 6^a thereof shall be a slight distance below the lower face of the lock 4 when the parts are in locked position, since such a construction permits the lock pivot pin 6 to move upwardly a short distance before the lock 4 is lifted, thus certainly insuring the release of the lock 4 from the teeth 6^e of the lock-to-the-lock member 6^d carried by the said pivot pin 6.

If the knuckle 2 is free to rotate to an open position, an unlocking pull upon the unlocking lever 7 first causes the parts to perform the several movements heretofore de-

scribed, and then to perform an extended unlocking movement during which the finger 5^a of the knuckle-opener 5 swings rearwardly toward the shank 1^c of the coupler head in contact with the downwardly projecting wall 2^a formed on the under surface of the knuckle tail, thus forcing the knuckle 2 to rotate to open position. During this extended unlocking movement, the lock 4 travels over the shelf 8^e on the member 8 and the spiral lugs 6^e emerge from their grooves 1^a and rest and turn upon the lower wall of the coupler head 1. When the rearward rotation of the lock 4 is checked by the stop face 8^d with which the lock controlling member 8 is provided, the said lock will rest upon and be supported by the shelf 8^e in an unlocked position. Upon the return of the knuckle 2 to closed, or coupled position, the downwardly projecting face 2^a on the knuckle tail will engage the stud 5^a upon the end of the knuckle-opener and rotate said knuckle-opener 5 and lock 4 toward locked position until the latter reaches the incline 8^b, whereupon the parts will assume their locked positions under the influence of gravity, as heretofore explained.

In order that there shall be no unnecessary loss of power in the knuckle-opening operation due to frictional contact of the top surface of the knuckle-opening stud 5^a, with the tail of the knuckle 2, it is preferred to so proportion the parts that the locking lug 4^e upon the lock 4 will, by engagement with the under face of the top wall of the coupler head 1, prevent the top surface of said stud 5^a from contacting the under surface of the knuckle tail during the movement of the lock 4 across the horizontal supporting shelf 8^e in the knuckle opening operation.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, a lock for retaining said knuckle in coupled position, and a knuckle-opener member operating within said coupler head and movable rearwardly toward the shank of the coupler to force said knuckle to open position.

2. In a car coupler, the combination with a coupler head provided with a mouth for the entrance of the tail of a knuckle, of a knuckle provided with a tail, a lock for engaging the knuckle tail to lock the knuckle in coupled position, and a pivoted knuckle-opener member which is rotatable rearwardly away from the mouth of the coupler head to force said knuckle to open position.

3. In a car coupler, the combination with a coupler-head, of a knuckle pivotally mounted thereon, a pivoted lock for locking said knuckle in coupled position, and a pivoted knuckle-opener member, said lock and knuckle-opener member having a common pivotal center, and said lock being intermediate of the knuckle-engaging portion of the knuckle-opener and its pivotal center.

4. In a car coupler, the combination with a coupler head which is formed upon one side with means for pivotally mounting a knuckle thereon and upon the opposite side with a guard arm, of a knuckle pivotally mounted upon said coupler head, a rotatable lock pivotally mounted upon said guard arm, and a knuckle-opener member rigidly connected to said lock, said lock and said knuckle-opener being both movable rearwardly to unlock said knuckle and force it to open position.

5. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, said knuckle being provided upon its tail portion with a knuckle-opener engaging face which extends from a point adjacent to the knuckle-pin opening in the knuckle toward the inner end of said knuckle, a lock for said knuckle, said lock being pivotally mounted upon the coupler head upon tht guide-arm side thereof on a vertical pivot pin, and a knuckle-opener member rigidly connected to said lock and extending beyond the knuckle engaging face thereof toward the knuckle side of the coupler head, said knuckle-opener member being rotatable rearwardly to open said knuckle.

6. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, said knuckle being provided on its under surface with a knuckle-opener engaging wall which extends from the inner end of the knuckle toward the knuckle pin opening therein, a horizontally rotatable lock for said knuckle, and a knuckle-opener member rigidly connected to said lock and extending under the knuckle so as to engage the knuckle-opener wall thereon, said knuckle-opener member being rotatable rearwardly to open said knuckle.

7. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, an upwardly movable and horizontally rotatable lock for said knuckle, a vertically extending rotatable pivot pin by which said lock is pivotally mounted upon the coupler head, said pivot pin and said lock being capable of relative movement vertically and also of a relative rotation, means for preventing a complete unlocking rotation of said lock prior to an upward movement thereof, and mechanism carried by the lock pivot pin and coöperating with said means to lock the pivot pin against vertical movement when the lock moves upwardly with respect to said pivot pin.

8. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, a lock for said knuckle, said lock

being bodily and rotatably movable, a rotatable pivot pin upon which said lock is mounted, said pivot pin and said lock being capable of relative movement in the direction of length of said pivot pin and also being capable of a relative rotation, means for preventing a complete unlocking rotation of said lock prior to a rotary movement of said pivot pin, and mechanism coöperating with said means to lock the pivot pin against rotation upon a movement of the lock independent of the said pivot pin.

9. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, a pivoted lock for said knuckle, a rotatable lock pivot pin by which said lock is actuated and upon which it is mounted to rotate, means connected to the coupler head for preventing a complete unlocking movement of said lock prior to a rotation of said pivot pin, and mechanism carried by the lock pivot pin and coöperating with said means to lock said pivot pin and lock against movement to their unlocked positions upon an unlocking movement of the lock independent of a corresponding unlocking rotation of the pivot pin.

10. In a car coupler, the combination with a coupler head, of a knuckle pivotally mounted thereon, a vertically movable and horizontally rotatable lock for said knuckle, a rotatable and vertically movable pivot pin by which said lock is actuated, said lock and said pivot pin being splined together so as to permit them to have a limited relative rotation and a relative vertical movement, a lock controlling member having a vertical face which engages said lock to cause it to have an initial vertical movement in passing from a locked to an unlocked position, and a toothed member carried by said pivot pin above the upper surface of said lock and adapted to engage and interlock with said lock.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

JOSEPH KELSO.

Witnesses:

J. W. HARTLEY,

F. D. ECKER.