ABSTRACT OF THE DISCLOSURE

A knuckle-type car coupler wherein the lock includes a latch stored within the general control of the lock to pivot anticyclonically by gravity into a position for engaging the top wall of the coupler head during upsetting of the coupler. Movement of the lock is thus limited to prevent unlocking of the coupler.

Description

This invention is primarily concerned with avoiding accidental unlocking of couplers after the couplers have been rotated, e.g., through 135 degrees to 180 degrees as a part of car-dumping operation, and returned to upright position. In the transportation of such bulk commodities as coal and ore, railway cars are dumped singly or in pairs while coupled in a train. To enable such dumping, a swivel coupler is provided at one car end and a stationary or non-swiveling coupler is provided at the opposite car end. The non-swiveling car coupler has the conventional or standard uncoupling rod and associated uncoupling mechanism. Consequently, when the cars are rotated through 135 degrees or more in the car dumper, the uncoupling rod handle drops or falls out of its normally down position and actuates the coupler-operating mechanism. The coupler operating parts are thus shifted to unlocking position. After the cars are returned to upright position, the lock fails to drop into lock position because it is retained in lock set position. The associated cars are thus prepared for unintentional separation as the car train is shifted for another car-dumping operation. The conventional anti-creep mechanism of the coupler does not prevent this condition from arising because of the opportunity for the operating rod to reach to the full unlocking position during upsetting of the cars.

Hence it is an essential object of this invention to provide anti-creep mechanism in a knuckle type coupler which provides protection against unlocking of the coupler under conditions which permit unintentional travel of the operating rod to its coupler unlocking position.

Another object is to provide additional anti-creep facility to knuckle type couplers for the special function mentioned above with a minimum of modification of standard coupler design.

These objects are achieved in a general way in any automatic railway car coupler which comprises a lock which is free to move toward the top wall of the coupler head from a condition in which it maintains coupled relation with another coupler to an unlocked condition. Such lock has a recess extending inwardly from its top surface in which is housed a latch pivotally connected with the lock to be swung by its own weight out of the recess toward the top wall of the coupler head to prevent such movement of the lock as would result in unlocking of the coupler when the coupler is tilted more than 90 degrees from its usual upright position.

In the drawing with respect to which the invention is described:

FIG. 1 is a side elevation of a lock for a knuckle coupler of the type incorporating the present invention;
FIG. 2 is a rear elevation of the lock shown in FIG. 1;
FIG. 3 is a plan view of the lock shown in FIGS. 1 and 2;
FIG. 4 is a fragmentary elevation of a knuckle coupler in locked condition with parts in section;
FIG. 5 is a fragmentary elevation partly in section of a knuckle type coupler showing parts thereof in the lock set condition of the coupler;
FIG. 6 is a fragmentary elevation in partial section of the coupler of FIGS. 4 and 5 in an inverted position especially illustrating mechanism for preventing movement of the lock to an unlocking position; and
FIG. 7 is a view similar to FIG. 6 illustrating a modified latch for preventing movement of the lock to unlocking position.

FIGS. 1, 2 and 3 illustrate a lock which, in its external contour conforms closely with the conventional locks of the Association of American Railways (AAR) type F alternates standard interlocking coupler used extensively on rotary dump type railway cars. The lock 5 differs from the conventional lock of the F type coupler essentially in that it comprises a latch 6 and has a recess 7 formed in the upper portion or body 8. The lock further includes a leg 9 in integral depending relation with the body. The recess 7 is located in an off-center longitudinally longer portion of the body 8, i.e., that portion of the head which extends rearwardly beyond the leg 9 to define an overhanging surface 11 adapted to rest on a knuckle-thrower 9 as shown in FIG. 4. Other coupler portions shown in FIGS. 4, 5 and 6 are typical of the alternate standard F type coupler. This coupler, except for the lock and latch structure of the present invention, is shown in greater detail in Metzger Patent No. 2,709,007.

As shown in FIG. 1, the latch 6 is received within the recess 7 wholly within lateral elevational contour of the lock 5. It is secured in the forward portion of the recess 7 by a pin 14 which extends in a transverse horizontal direction of the coupler entirely through the body of the lock. Because it is essential that the latch swing freely by gravity without hindrance as soon as possible after rotation of the coupler beyond 90 degrees from its normal position, frictional engagement of portions of the latch which are radially remote from its pin axis with the sides of the recess 7 is minimized. Hence, the side surfaces 16, 17 are spaced as shown at a clearance with the lateral surfaces 18, 19 of the recess. The latch is supported in a manner to approximately maintain these clearances to include bearing bosses 21 and 22 having outward facing surfaces which are preferably machined or ground into conformity with precisely spaced parallel planes or other symmetrical contour to provide bearing surfaces which will facilitate free swinging of the latch. To further improve the wobble-free relation of the latch with the sides of the recess, the hole provided in the latch stem 28 for the pin 14 may be formed with close tolerance for the pin. To further assure the free working of the latch, the pin 14 and the latch may be secured together, as by a set screw or a key to interlock the hub of the latch with the pin if the pin is allowed to rotate relative to body 8. In FIGS. 1, 2, 3, 4 and 5, the latch is shown in its position of rest within the lock recess wherein it does not interfere with normal coupling and uncoupling operation of the coupler. In this position, it rests on a shoulder 25 defined by the lock internally of the recess 7. This shoulder functions as a stop defining the reclining or normal position of the latch. The latch may be tilted outwardly of the recess and the lateral contour of the lock as shown in FIG. 6. This maximumly tilted position is attained through movement of the latch to bring
its normally upward surface 27 into engagement with a stop therefor, i.e., the forward surface 26 of the recess 7.

The latch has a head 29 which is enlarged and radially outward with respect to the stem portion 28. The head is joined with the stem so that, when the latch is in its maximum outwardly tilted position against stop 26, the center of gravity of the latch is rearwardly of a vertical plane M—M. Hence, in the upright position of the coupler, the latch always returns to the position illustrated by FIG. 4 as soon as the lock moves slightly toward the bottom of the coupler to disengage the latch from the wall 36.

If the coupler is visualized with the parts arranged as seen in FIG. 6 but, instead, in its usual upright position, it is obvious that the mass of the latch is disposed primarily rearwardly of the vertical plane M—M and that the latch will swing rearwardly and downwardly to a position such as illustrated by FIGS. 1 and 4 whenever the coupler assumes an orientation wherein the lock leg 9 is inclined downwardly, i.e., less than 90 degrees relative to a vertical plane.

A common function of the coupler shown in the drawing and in Metzger Patent No. 2,709,007 is that it may assume a lock set condition in which the lock is positioned as in FIG. 5 so that the tail 31 of a knuckle 32 may pass through the forward notch 27 of the lock in swinging toward the foreground as viewed in FIG. 5. This enables the trainman to set a coupler of two coupled cars so that the cars will uncouple at any delayed occasion when one is pulled away from the other. Lock set condition is normally attained by swinging the operating rod to its full unlocking position and allowing the rod end lock to return by gravity toward locking position. However, the lock returns only part way to a lock-set position.

The lock 6 remains in lock set condition, as shown in FIG. 5, wherein a downward facing shoulder surface 33 formed by a notch along a lower rear area of the leg 9 rests on an upper surface or lock seat 34 of the knuckle thrower 12.

When inverting railway cars to discharge lading, such as ore, the lock of a conventional coupler including a chain of parts terminating in the operating rod connected therewith, move to coupler unlocking position. Such parts, in a majority of instances, would return to the coupler locking position when the car was returned to its upright position were it not for the lock-set mechanism. However, in using rotary dumping cars equipped with couplers of conventional internal parts wherein there is an opportunity for the operating rod to swing to its full coupler unlocking position, the lock is normally retained in lock set position when the car is returned to upright condition.

In the present invention, the latch 6 readily swings out of its storage recess 7 within the lock body as the parent coupler is rotated about its longitudinal axis through an angle exceeding 90 degrees out of its normal upright position. At approximately 110 degrees out of normal orientation, the latch 6 may be assumed to be positioned in an orientation relative to the lock body as shown in dot-dash outline in FIG. 4, wherein it is prepared to engage the under surface 36 of the top wall of the coupler head 37. Engagement thereof with the top wall is completed as shown in FIG. 6 as the lock shifts by gravity toward the top wall.

From the relationship of the lock 5 and the knuckle thrower 12 as shown in FIG. 6 it is obvious that the coupler cannot attain the lock-set condition shown in FIG. 5. Experience with the invention has now proved that the coupler always returns to its desired locked condition as shown in FIG. 4 as the car returns to upright position, and that the operating rod mounted on the front end of the car assumes its normal downward position.

FIG. 7 is a view similar to FIG. 6 illustrating a modified latch 40 in a position similar to that of latch 6 in FIG. 6. The latch 40 is of simple elongate configuration and of substantially uniform cross-section. It swings rearwardly about the pin 43 to reach an inoperative position wherein it rests on the bottom of a recess 41 wholly within the lateral elevational contour of the lock. The recess 41 is of simple box-like shape with a front surface 42 extending upwardly and slightly rearwardly, or according to other appropriate contour, to cause the distal end of the latch to lean slightly rearwardly. The latch is thus caused to settle backwardly into the recess 41 under urging of its own center of gravity as an overturned car is returned to normal upright position.

What is claimed is:

1. A knock-out railway car coupler resistant to unlocking at inverted position comprising:
   a head which faces frontwardly in the longitudinal direction of the coupler and has a lock chamber providing a top wall;
   a knuckle pivotally supported by the head having a tail horizontally traversable through a portion of the lock chamber;
   a lock disposed in said chamber and movable therefrom along an ambit between a lower locking position limiting pivotal movement of the knuckle and an upper unlocking position;
   said lock having a body defining a top surface and a recess therein, said recess being elongated in the vertical and longitudinal directions of the coupler;
   a latch connected in pivotal relation with the lock about an axis extending in horizontal transverse relation to said coupler length through a front bottom portion of the recess;
   said recess accommodating said latch substantially within the lateral contour of said body at its normal position of rest wherein the length of the latch is aligned lengthwise of the coupler;
   said lock having stop means engageable by the latch at a position in which it is tilted outwardly from the lock thereby adapting it for engagement with the under side of said top wall;
   said latch being of sufficient length to engage the top wall and prevent movement of the lock from a lower portion of said ambit in which the lock maintains locking relation with the knuckle;

2. The railway car coupler of claim 1 wherein:
   said lock has a leg fixed to and depending from said body and the coupler comprises a knuckle thrower having an upward facing lock seat extending in rearward adjacent relation with the leg;
   said lock leg is notched along its rear side to provide a downward facing shoulder engageable with said lock seat, and when engaged therewith, disposing said lock body at a level freeing said knuckle; and
   said latch is of a length which limits movement of the lock toward said top wall to a degree preventing vertical registry of said shoulder with said lock seat.

3. The railway car coupler of claim 1 wherein:
   said stop means and a latch are relatively constructed to dispose the center of gravity of the latch rearward of a vertical plane containing the pivotal axis of the latch when the latch is fully outwardly tilted relative to the lock body against the stop means.

4. The railway car coupler of claim 1 wherein:
   said latch and lock provide lateral clearance of the latch with the sides of the recesses adjacent said pivotal axis maintaining the latch in substantially friction-free relation with the sides of the recess.

5. The railway car coupler of claim 4 wherein:
   said bearing means comprises bosses on said latch in concentric relation with said axis for engaging the sides of said recess.

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DRAYTON E. HOFFMAN, Primary Examiner.

U.S. Cl. X.R.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,433,369

William J. Metzger et al.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 16, "control" should read -- contour --. Column 2, line 30, after "surface" cancel "lll" and insert -- 11 --. Column 4, line 44, "movmeent" should read -- movement --.

Signed and sealed this 7th day of April 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents