(No Model.)

C. A. POOLEY.

CAR COUPLING.

No. 491,589. Patented Feb. 14, 1893.

Fig. 1.

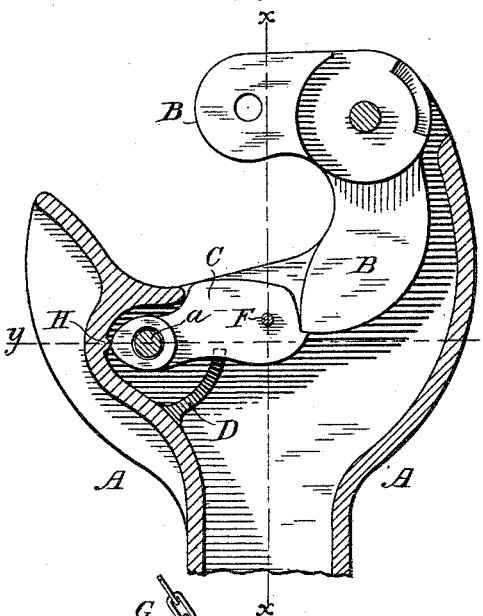


Fig. 2.

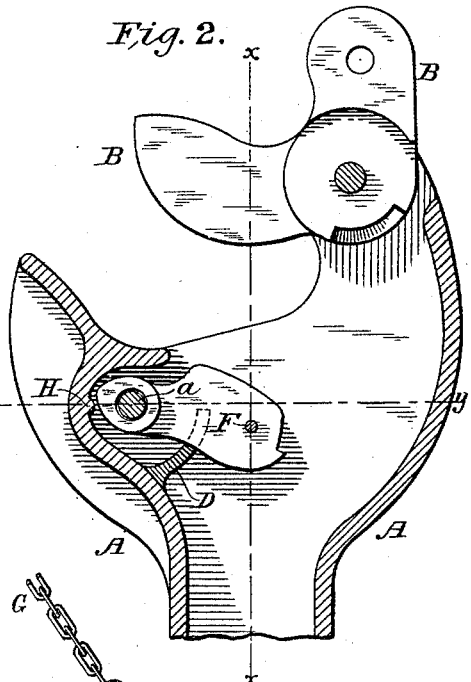


Fig. 3.

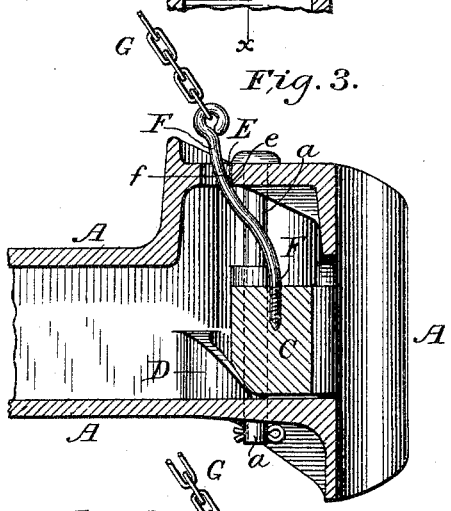


Fig. 4.

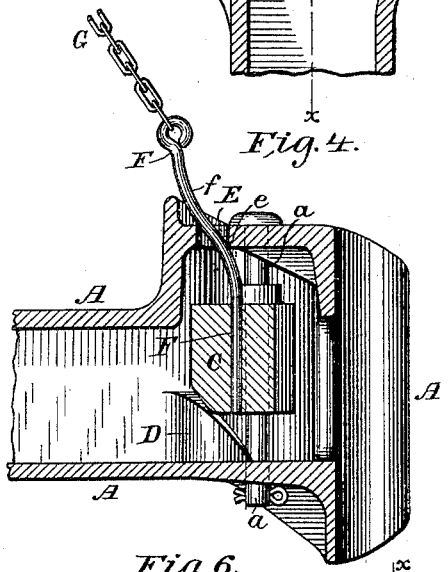


Fig. 5.

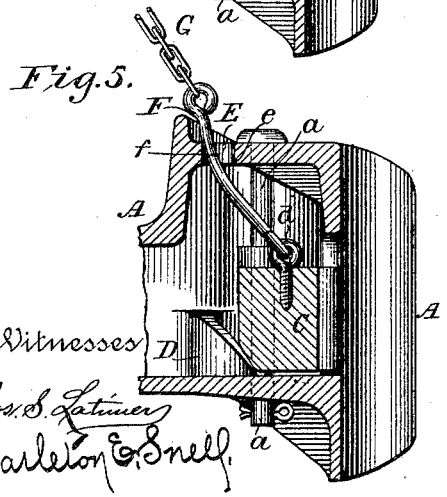
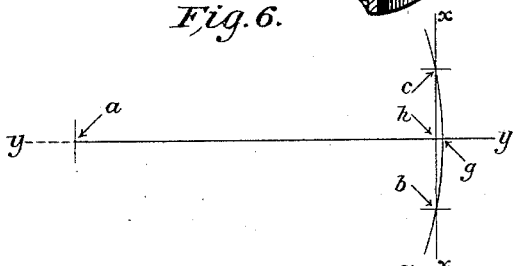


Fig. 6.



Witnesses

Jos. S. Latimer

Carleton E. Snell.

Inventor

Charles A. Pooley

by Arthur O'Brien

his Attorney

UNITED STATES PATENT OFFICE.

CHARLES A. POOLEY, OF BUFFALO, NEW YORK.

CAR-COUPLING.

SPECIFICATION forming part of Letters Patent No. 491,589, dated February 14, 1893.

Application filed February 16, 1892. Serial No. 421,721. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. POOLEY, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Vertical-Plane Car-Couplers, of which the following is a specification.

This invention relates to that type of vertical-plane car-couplers wherein the coupling jaw is locked in its coupled position by a swinging lock pivoted within the drawhead; and the invention consists in improved means for swinging the lock backwardly to withdraw the same from engagement with the coupling jaw in the uncoupling operation.

Heretofore it has been customary to provide an incline within the drawhead on which the swinging lock heretofore employed rides. When the lock is swung back, it rides upwardly on the incline at the same time that it swings inwardly, and then when it is free to move it rides down the incline automatically under the influence of gravitation, at the same time swinging on its pivot. It thus moves down the incline automatically in the act of coupling. To be swung backwardly and upwardly, however, in the act of uncoupling, an extraneous force must be applied, and this extraneous force must be so applied that the lock will be given its double movement, that is to say, so that the lock will both be swung on its pivot and at the same time be moved upwardly. In order to thus swing the lock backwardly and upwardly, it has been customary to use a chain attached at one of its ends to the lock, passing upwardly through an aperture or opening in the top of the drawhead and extending thence above the drawhead to any convenient handling device at any convenient point of manipulation. But in the use of such chains practical difficulties occur. In passing through the aperture in the top of the drawhead, the links of the chain are apt to be caught under the margins of the aperture, and kinks are liable to occur in the chain within the drawhead, in both of which contingencies the lock is operated, if at all, only with difficulty. In order also to insure positively and with certainty the backward swinging as well as upward lifting of the lock, it has been usual when a chain is employed to provide a guiding incline within the drawhead above the lock and parallel with the incline below the lock, so that the lock swings between parallel inclined guides which compel the lock to swing in the proper path. This upper incline above the lock is difficultly made, adds materially to the expense of the coupler, and at the same time makes it difficult to place the lock in position within the drawhead.

In order to overcome the difficulty arising from the operating chain catching under the margins of the opening in the top of the drawhead, it has been proposed to provide an elongated curved slot in the top of the drawhead through which the chain passes, said slot being concentric with the axis of the swinging pawl and directly above the path of travel of the point of connection between the chain and the lock. While this construction avoids the catching of the links of the chain under the margins of the opening in the drawhead, it introduces the added objection of presenting a large opening in the drawhead through which cinders, dust, snow and rain enter the interior of the drawhead. This is a very serious objection, since the snow and rain cause the parts to rust, and the rust together with the dust and cinders collecting in the interior of the drawhead soon prevent the free swinging of the lock and thus render the entire coupler inoperative and useless. With this construction moreover, it is necessary in order to insure the backward as well as the upward movement of the lock to provide an incline above the lock with its attendant disadvantages. It is evident that if no upper incline above the lock were provided a pull upon the chain in a substantially or approximately vertical direction (such as is ordinarily and most conveniently the case) would tend simply to lift the lock and would have little or no tendency to swing the lock backwardly on its axis. Consequently, in order to resolve this approximately vertical pull into two forces, one of which shall lift the lock and the other of which shall swing it backwardly, the upper incline above the lock is necessary.

The objects of the present invention are to enable an upper incline above the lock to be entirely dispensed with, to avoid the use of a chain extending through the opening in the top of the drawhead, and to enable the opening in the drawhead through which the oper-

ating instrumentality extends to be reduced to a minimum size so as to practically exclude dust, cinders, rain and snow from the interior of the drawhead. These objects are secured by placing the opening in the drawhead back of the position of the axis on which the lock swings, and in providing a pin rigid throughout its length, which is connected at one end to the lock at a point (when said lock is in its normal locking position) forward of the position of the axis on which the lock swings, and which extends in an upwardly and backwardly inclined direction corresponding approximately with the direction in which the lock moves, and out through the opening in the drawhead. This pin terminates above the drawhead, so that it is accessible above the drawhead, and extends at all times and in all positions of the lock through the opening in the drawhead, and consequently its shank portion is the only part which can never come in contact with the margins of the opening in the drawhead.

The invention also consists in a particular means for taking off the strain upon the pivot pin or pivots of the swinging lock, while at the same time permitting absolute freedom from friction in the movement of the swinging pawl or lock when moving from a locking to an unlocked position, or vice versa. The swinging lock is subject to heavy strain only when it is locked with the coupling jaw, and consequently it is only when in this position that any such relieving means are necessary. Accordingly, the present invention includes suitably disposed bearing surfaces on the shell or casing of the drawhead, which co-operate with the swinging lock only when the latter is locked with the coupling jaw.

The present improvements are illustrated in the accompanying drawings, wherein

Figure 1, is a horizontal section of a vertical-plane coupler showing the parts in their coupled position; Fig. 2, is a similar section showing the lock swung back to its most rearward position; Fig. 3, is a vertical section showing the parts in their coupled position; Fig. 4, is a vertical section showing the lock swung back to its most rearward position; Fig. 5, is a vertical section showing a modification in the connection between the lock and the operating pin.; and Fig. 6, is a diagram illustrating the operation of the lock.

A, is the drawhead, B the coupling-jaw, C the lock co-operating with said jaw and pivoted within the drawhead so as to swing on a vertical axis *a*, and D, a bottom incline within the drawhead beneath the lock, on which said lock rides. All these parts may be of any of the well-known constructions.

E, is the opening in the top of the drawhead, and F, is the operating pin which is connected with the lock and extends through the opening in the drawhead.

The location of the opening in the top of the drawhead, and of the connection between the lock and operating pin, is as follows:—The line *x*—*x* in Figs. 1, and 2, and in the diagram Fig. 6, is drawn parallel with the longitudinal axis of the coupler and consequently parallel with the direction of draft. The line *y*—*y* in the same figures is drawn perpendicular to line *x*—*x*—, and extends through the axis *a*, on which the lock swings. The vertical plane passing through this line is considered the position of the axis of the lock, and anything forward of this line *y*—*y* is herein considered forward of the position of the axis of the lock while anything back of this line is herein considered as back of the axis of the lock. Now the location of the opening E, should be (see Fig. 6) at a point *b*, back of the line *y*—*y*, and the location of the connection between the lock C, and the pin F, (when the lock is in its forward normal locking position shown in Figs. 1, and 3,) should be at a point *c*, forward of the line *y*—*y*; and the longitudinal distance between said points *b*, and *c*, should be equal (or substantially equal) to the extent of the forward and backward travel of the lock. Preferably, and where possible, the longitudinal distance between point *b*, and line *y*—*y*, should be equal to the longitudinal distance between line *y*—*y*, and point *c*, for reasons which will hereinafter appear. This preferred construction and arrangement is that shown in the drawings.

The operating pin F, is connected to the lock at the upper face thereof. The means of connection between the operating pin and lock is preferably any of the well-known methods of connection (some of which are shown in the drawings) such as will insure a rigid connection between the pin and lock, so that the pin becomes a rigid one. The pin may, however, have a pivotal connection with the lock, as shown in Fig. 5, wherein the pin has an eye at its lower end for connection with an eye bolt *d*, secured to the lock. In any case, however, the pin itself, between its two ends, is a rigid one incapable of bending under the strains (which are not heavy) to which it is subjected. From its point of connection with the lock the pin inclines backwardly, and upwardly, in order that it may extend outward through the opening E, in the top of the drawhead. The upper end of the pin is at all times above the drawhead, and consequently accessible thereabove. At its upper end it is connected with an operating chain G, which leads to any convenient handling device or place of manipulation. Usually the point from which the chain is pulled is above the coupler, so that the chain is pulled in an approximately vertical direction, as is indicated in Figs. 3, and 4.

The general direction in which the shank of the pin extends is substantially parallel with the direction in which the lock moves. It need not, however, be exactly parallel therewith, but may be, and preferably is, slightly curved throughout its length as shown, the shank of the pin curving slightly upward from a line parallel with the path of the lock.

This insures the easy movement of the lock. If the general inclination of the pin were at an upward angle considerably less or greater than that of the path of the lock, the pin would bind against the margins of the opening E, when the lock swings back under the action of the coupling-jaw in the act of coupling.

The operation of the pin is as follows:—When the lock is swung backward under the action of the coupling jaw or slides down the incline under the influence of gravity, the pin F, plays freely up and down in the opening E, the position of the opening and the shape of the pin permitting it. When, however, the lock is swung upwardly and backwardly in the act of uncoupling, the chain G, is pulled from above. If the direction in which the chain is pulled is approximately in line or parallel with the path in which the lock rides on the incline D, the lock will move upwardly along the incline and the operating pin will in consequence freely move in the opening E. Should, however, the line of pull on the chain be nearly or quite vertical, the first effect of a pull on the chain would be to lift the lock vertically until the upper face of the shank of the pin comes in contact with the front lower margin *e*, of the opening E, so that as the pull on the chain is continued the pin is drawn backwardly along and in contact with the margin *e* of the opening E. In this manner the backward movement of the lock as well as its upward movement is secured, no matter in what direction the chain may be pulled. Since the point of manipulation at which the chain is pulled is above the opening E, the upper end of the pin exterior to the drawhead is bent so as to occupy a substantially vertical position. The bend *f*, at this point of the shank of the pin is adjacent to the margin *e*, of the opening E, so that the sliding movement of the pin along the margin of the opening (in the cases where it occurs) is gradually initiated and is performed with the least possible friction. This bend also permits the pin to extend above the top of the drawhead without coming in contact with the rear margin of the opening, and thus precludes the necessity of specially shaping the opening for the passage of the pin. The only movable part of the coupler which is thus ever brought into contact with, or extends through, the opening E, is the rigid shank of the pin. In the construction shown in Fig. 5, the limit of movement of the lock is reached before the eye bolt *d*, can reach the opening E.

Since the backward movement of the lock (when it is not effected solely by the line of pull on the chain) is effected by the shape of the pin and its co-operation with the margin of the opening, all inclines above the lock and their attendant disadvantages are dispensed with. The only part of the operating device which extends at any time or position through the opening E, is the rigid shank of the pin. Consequently there is nothing to catch beneath the margins of the opening, and no possibility of any kinks or twists in the operating device within the drawhead. The pin F, may be considered as being but an elongated link of the chain G, which is connected above the drawhead with the short links of the chain and within the drawhead to the lock.

Since the pin always occupies a position within the opening E, it consequently partly fills the same, and the only opportunity for the entrance of dust, cinders and the like into the drawhead is through the space around the pin and within the periphery of the opening. This space is reduced to a minimum size by reason of the relative location of the opening and of the connection between the pin and lock to the position of the axis of the lock.

Since the longitudinal distance between the points *b*, and *c* (see Fig. 6) is equal (or substantially so) to the extent of the forward and backward travel of the lock, it follows that when the lock is swung back the point of connection between the lock and pin will move from point *c* to point *b*. In doing this it travels through the arc *c g b* indicated in the drawings having the axis *a*, as its center. In passing through this arc it will be noted that the connection between the pin and lock reaches its greatest distance from the longitudinal line *x—x* at the point *g*, where the arc *c g b* intersects the line *y y*, this distance being the distance between the points *g*, and *h*. The extent of variation from the longitudinal line *x—x*. which is measured by the distance between the points *g* and *h*, determines the size of the opening E, in order to enable it to accommodate the movement of the pin F. The greatest lateral diameter of opening E, need only be equal to the thickness of the pin plus the extent of variation of movement of the pin from a line parallel with the longitudinal axis of the coupler passing through the point of connection between the pin and lock when the latter is in its normal position. It will therefore be evident that this extent of variation will be the least when the illustrated conditions exist, and it will become constantly larger as the point of connection between the pin and lock is moved backward. This "extent of variation" is in practice quite small, so that the opening E, is but slightly larger across than the diameter of the pin, and consequently the space which is left between the pin and the margins of the opening is so small as to practically exclude dust, cinders, and the like. It will further be noted that in case the pin is jointed to the lock as in Fig. 5, the lateral space between the pin and margins of the opening can be still further reduced, since the pin can be swung laterally to a slight extent without interfering with the direction of pull upon the chain from a fixed point above. The longitudinal extent of the opening E, need be only a trifle larger than the diameter of the pin so as to permit its free and easy movement. It will thus be evi-

dent that the opening in the top of the drawhead is reduced to the smallest possible extent consistent with the operating chain being manipulated by a direct pull from a fixed point above the coupler.

The shell of the drawhead is provided with an inwardly-projecting flange, rib or bearing surface H, with which the tail end of the swinging pawl or lock C, is in contact only when it is in its locking position engaging with the coupling jaw. When in this position, the strain of the coupling jaw is imparted through the lock or pawl C, to the rib H, which thus withstands the strain and prevents the strain being borne by the pivots or pivot pin of the pawl or lock. It is only necessary that the pawl or lock should be in contact with the strain-sustaining rib H, at the time when the lock or pawl is engaged by the coupling jaw, and consequently it is desirable that the strain-sustaining part of the drawhead should be an inwardly-projecting rib, flange or bearing surface, since such a rib does not interfere with the free swinging of the pawl or lock, and the formation of rust or the presence of dust or cinders on the adjoining faces of the drawhead and lock or pawl does not affect the free swinging of the pawl or lock.

In former constructions of couplers where the tail end of the swinging pawl or lock has been curved and has fitted in a curved socket in the drawhead constituting a bearing surface for the pawl or lock, the free swinging of the pawl or lock has been seriously impeded by the friction between the pawl and the socket, and by the formation of rust and the presence of dust or cinders between them. These objections are overcome by the present invention, which provides a clear space between the tail end of the pawl or lock and the adjacent surface of the drawhead, while at the same time a strain-sustaining rib, flange or bearing surface is provided which comes into efficient action when needed.

I claim as my invention:—

1. In a vertical-plane coupler, a drawhead, a coupling jaw, and a swinging lock pivoted within said drawhead and co-operating with said jaw, said drawhead having an opening in its top, back of the position of the axis of the lock, in combination with a pin connected with said lock at a point forward of a position of the axis of the lock when the lock is in its normal coupling position, said pin extending from said point of connection through said opening in the top of the drawhead, substantially as set forth.

2. In a vertical-plane coupler, a drawhead, a coupling jaw, and a swinging lock pivoted within said drawhead and co-operating with said jaw, said drawhead having an opening in its top, back of a transverse line intersecting the axis of said lock and perpendicular to the longitudinal axis of the coupler, in combination with a pin connected with said lock at a point forward of said transverse line and at a longitudinal distance forward therefrom substantially equal to the longitudinal distance backward therefrom of the opening in the top of the drawhead, the longitudinal distance between said point of connection of the lock and pin and the opening in the top of the drawhead being substantially equal to the longitudinal travel of the lock, said pin extending from said point of connection through said opening in the top of the drawhead, substantially as set forth.

3. In a vertical-plane coupler having a drawhead and coupling jaw, a swinging lock co-operating with said jaw, said lock having a rigid operating pin connected therewith, said pin extending at all times through an aperture or opening in the top of said draw-head, whereby said pin is always accessible from the exterior of said drawhead, substantially as set forth.

4. In a vertical-plane coupler having a drawhead and coupling jaw, a swinging lock co-operating with said jaw, said lock having a rigid curved operating pin connected therewith, substantially as set forth.

5. In a vertical-plane coupler, a drawhead having an incline, and a coupling jaw, in combination with a lock riding on said incline and co-operating with said jaw, said lock having a rigid pin connected therewith, said pin extending in a direction substantially parallel with said incline and extending at all times upwardly and outwardly through an aperture in the top of said drawhead, substantially as set forth.

6. In a vertical plane coupler having a drawhead and a coupling jaw, a swinging lock co-operating with said pin, said lock having an inclined operating pin connected therewith, substantially as set forth.

7. In a vertical plane coupler, having a drawhead and a coupling jaw, a swinging lock co-operating with said pin, said lock having an inclined operating pin rigidly connected therewith, substantially as set forth.

8. In a vertical plane car coupler, the drawhead having an inwardly-projecting strain-sustaining rib, flange or bearing surface H, and the coupling jaw, in combination with the swinging lock or pawl which engages said coupling jaw, and which when it is in position to be so engaged bears against said rib, flange or bearing surface (and at no other of its positions) and transmits the strain of said jaw to said rib, flange or bearing surface, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES A. POOLEY.

Witnesses:
DONALD BAIN, Jr.,
ALBERT H. JACKSON.