

J. F. ROBERTSON.
 AUTOMATIC CAR COUPLING.
 APPLICATION FILED JULY 19, 1910.

1,061,406.

Patented May 13, 1913.

3 SHEETS—SHEET 1.

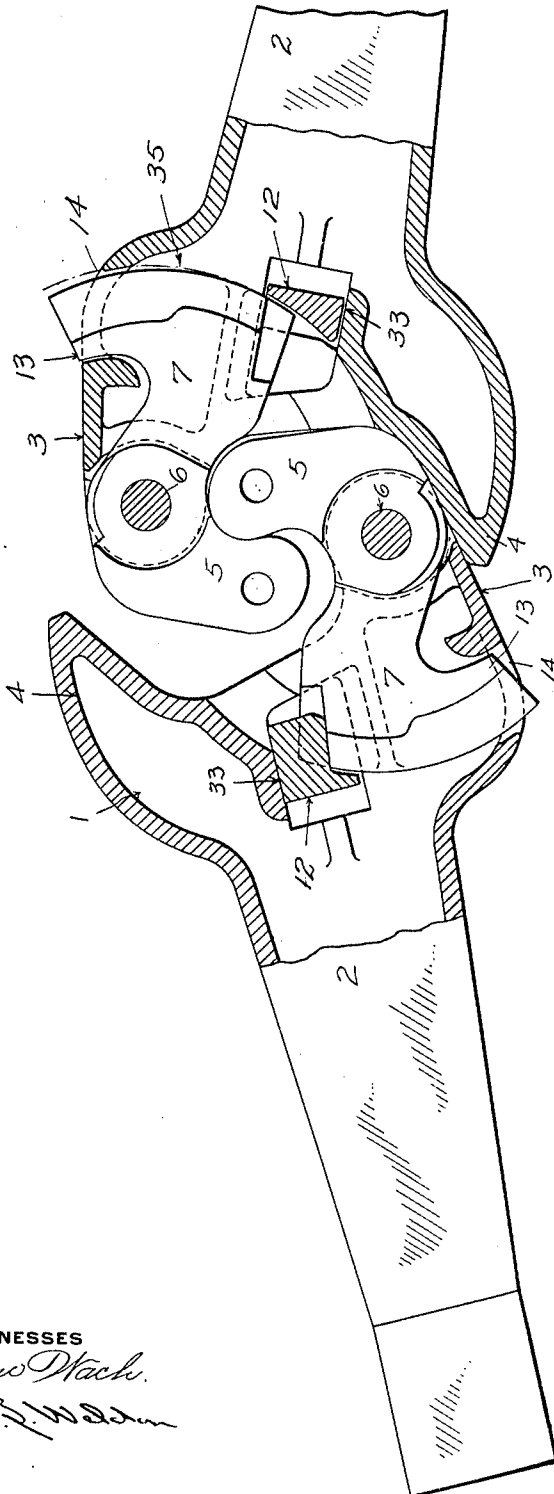


Fig. 1.

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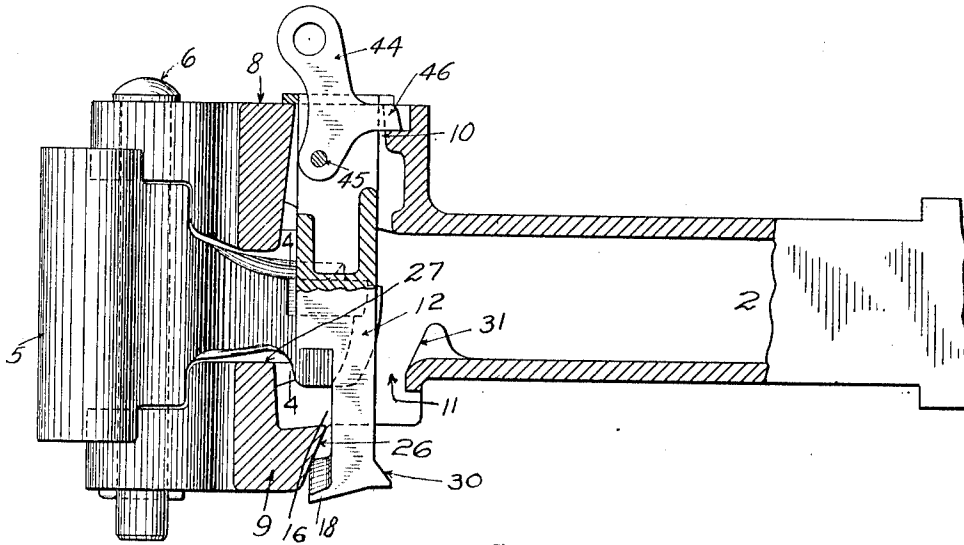


Fig. 2.

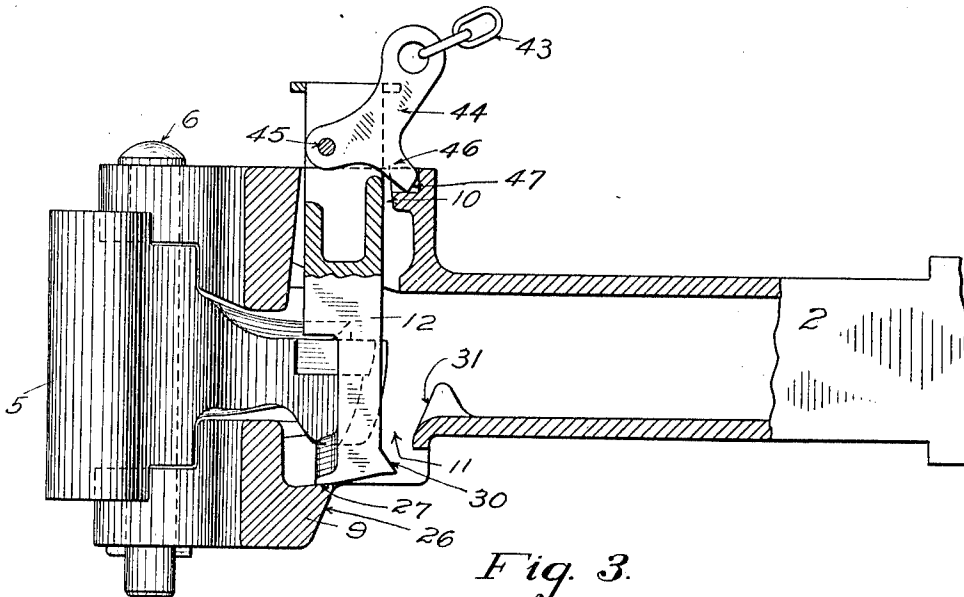


Fig. 3.

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3 SHEETS-SHEET 3.

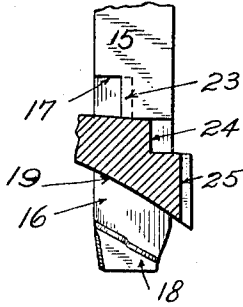


Fig. 6.

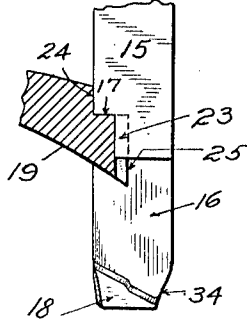


Fig. 4.

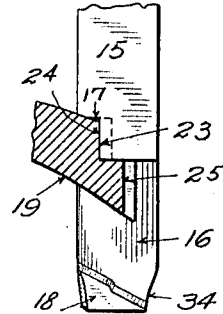


Fig. 5.

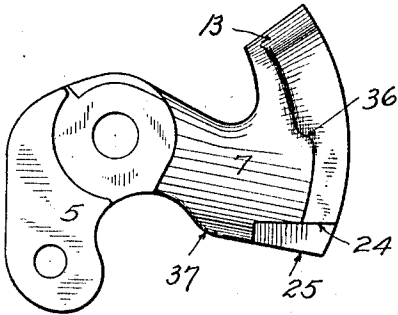


Fig. 8.

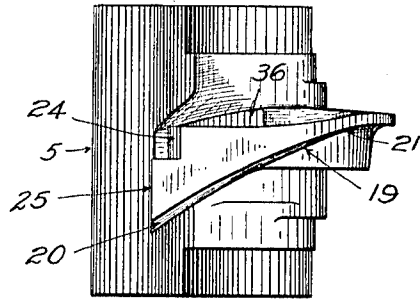


Fig. 7.

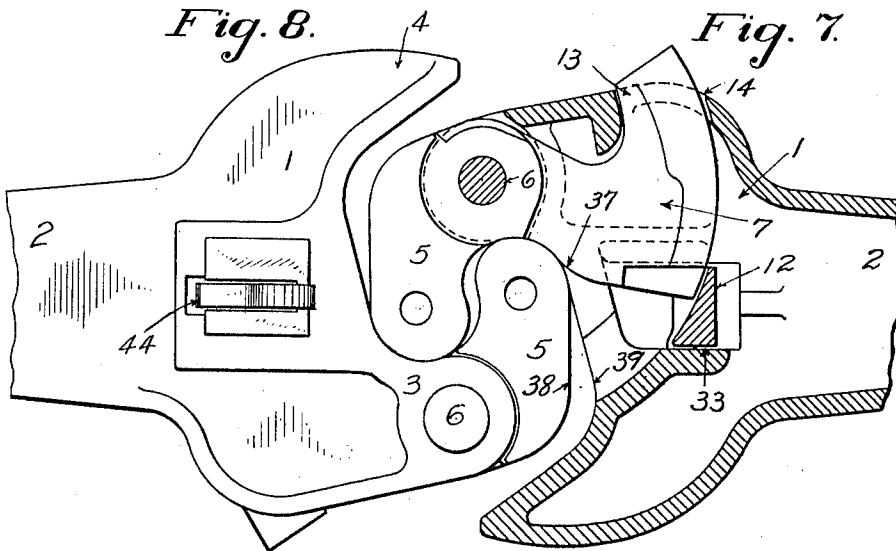


Fig. 9.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC CAR-COUPLING.

1,061,406.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed July 19, 1910. Serial No. 572,683.

To all whom it may concern:

Be it known that I, JAMES F. ROBERTSON, a subject of the King of Great Britain, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Automatic Car-Couplers, of which the following is a specification.

This invention relates to automatic car couplers.

The object of the invention is to improve car couplers of the Master Car Builders' type to render the same more efficient, reliable, and easier, safer and more convenient to operate.

The invention comprises the various features of construction and arrangement hereinafter described and claimed.

In the accompanying drawings Figure 1 is a horizontal section through two of the improved couplers showing them in the position they assume when coupling on a curve, the coupler shown at the right hand side being in full lock position and the other in half lock position; Fig. 2 is a central vertical section through one of the couplers showing the same in full lock position; Fig. 3 is a similar view showing the same when about to assume lock-set position; Fig. 4 is a transverse section on the line 4-4, Fig. 2, showing the coupler in full lock position; Fig. 5 is a similar view showing the same in half lock position; Fig. 6 is a similar view showing the same just previous to throwing the knuckle open; Fig. 7 is a view looking at the inner end of the knuckle; Fig. 8 is a plan view of the knuckle; and Fig. 9 is a horizontal section illustrating the locking of a knuckle when coupling on a straight track.

The drawings show an automatic coupler of the Master Car Builders' type having the usual head 1, provided with a shank 2 for attachment to the draft gear, and provided with the two forwardly projecting arms or horns, to wit: the knuckle-carrying arm 3 and the guard arm 4. The knuckle 5 is pivoted to the arm or horn 3 by means of pin 6. The head is recessed as usual, so that the knuckle tail 7 can swing into the same, and is provided with the usual roof 8 and floor 9 which are provided with alining openings 10 and 11 for the locking member 12. The knuckle tail is provided with the usual lateral projecting portion or hook 13 which when the knuckle is locked extends into a recess or opening 14 in the draw head and

prevents the knuckle from pulling out in case the pin 6 breaks.

The locking member 12 is of simple, solid construction, having its upper portion substantially rectangular in cross section and forming the main locking portion 15, and below the same is cut away to form a recess 16 which permits the tail of the knuckle to pass the locking member when the latter is raised sufficiently for the locking portion 15 to clear the knuckle tail. The recess 16 provides a shoulder 17 which rides on the knuckle tail and holds the locking member elevated when the knuckle is opened. Below the recess 16 said locking member is provided with a projecting portion 18, which preferably is inclined as shown, and which when the locking member is pulled upwardly to its full extent engages the inclined lower face 19 on the segmental knuckle tail and serves to throw the knuckle to open position. The inclined face 19 on the knuckle tail is formed on a twist or spiral. Said face at its lowermost portion, as at 20, slopes upwardly from the front toward the rear, but gradually assumes a horizontal position from front to rear, and at its highermost portion, at 21, is practically horizontal from front to rear. This twist is provided in order that the projection 18 on the locking member may have a full bearing on said inclined face at all times, and is made necessary for the reason that as the locking member is pulled upwardly its lower end swings forwardly, as will hereinafter more fully appear, so that the position of the top face of the projection 18 changes from the time that said projection engages the lower end of the inclined face on the knuckle tail and the time that it reaches the upper end thereof. This twist or double inclination of the face on the knuckle tail gives the projection 18 a broad bearing at all times and prevents wear which would otherwise occur.

The portion 15 of the locking member is cut away on one side at its lower portion to provide a preliminary locking face 23, which extends at an angle to the center line of the coupler, as shown. The knuckle tail is provided with two locking faces 24 and 25, the former being parallel to the center line of the coupler, when the knuckle is locked, and arranged to bear against the flat side face of the locking portion 15 of the locking member, while the locking face 25 projects in advance of the face 24, that

is, toward the center line of the coupler, and is at an angle to said center line as shown, said angle corresponding to the angle of the locking face 23 on the locking member.

5 When the locking member is in full lock position, that is, fully down, its portion 15 engages the face 24 on the knuckle tail and its face 23 engages the face 25 on the knuckle tail, both sets of said locking faces
10 having broad contact due to the similarity of their angles. In case the couplers are presented to each other at a sharp angle, as is the case when attempting to couple on short curves, the knuckle will not be able
15 to swing inwardly far enough to permit of the full lock. In that case, however, the locking member drops to the half lock position, shown in Figs. 1 and 5, with the face 23 on the locking member engaging the face
20 24 on the tail, so effecting a preliminary lock which enables the cars to be pulled out to a straight track where the slacking of the train will cause the knuckle to swing fully inwardly to allow the locking member
25 to drop to full lock position. This preliminary locking dispenses with the necessity of making link and pin couplings on sharp curves and renders the coupler automatic under all conditions. When in half lock
30 position the knuckle is not swung fully into the head, and the face 24 is not parallel to the center line of the coupler but at an angle thereto corresponding to the angle of the locking face 25 when the coupler is in
35 full lock position, but since the locking face 23 on the locking member is at a similar angle there is at half lock a broad contact of the cooperating locking faces.

The knuckle pivoting arm or horn 3 of the
40 draw head is made somewhat longer than in the usual types of car couplers, so that the knuckle is pivoted relatively far forwardly. The knuckle tail is relatively longer and the side locking faces 24 and 25
45 extend farther toward the center line of the coupler, than has been the practice heretofore, so that when the knuckle swings open the end of the knuckle tail lies in fairly close proximity to the guard arm 4, leaving
50 such a small space at this point that when making couplings the knuckle of the opposing coupler cannot enter said space and wedge between the knuckle tail and the guard arm, but is necessarily compelled to
55 contact with the knuckle tail and push the latter toward locking position. The extension of the knuckle tail toward the center line of the coupler also gives a greater overhang of the tail above the projection 18
60 on the locking member, so that when the latter is elevated the projection 18 does not strike against the point of the knuckle tail, which would cause excessive wear, but strikes considerably outward from the point and
65 with an angular flat surface corresponding

to the angle of the lower face of the knuckle tail, as a consequence of which wear is greatly reduced.

When the locking member is fully down the projection 18 thereon underlies the bevel
70 portion 26 on the floor of the drawhead, and in order for said locking member to rise it is necessary that its lower end swing rearwardly. This of itself to some extent prevents the creeping of the locking member
75 to accidentally unlock the coupler. The backward movement of the lower end of the locking member is also resisted by reason of the fact that the locking face 23 on the locking member and the locking face 25 on
80 the knuckle tail are formed at such an angle as to prevent backward movement of the locking member as long as the knuckle tail is forcibly bearing against the locking member as is necessarily the case when the coupler is being pulled upon. The inclination
85 of the cooperating locking faces 23 and 25 therefore also serves to prevent the accidental unlocking of the coupler, and the liability of the locking member creeping upwardly
90 under the varying pulling stresses on the coupler.

When the locking member is lifted sufficiently to free the knuckle its lower end swings forwardly and rests upon the floor
95 of the drawhead at 27, and is thus held in what is known as lock-set position so that the brakeman can release the operating means and leave the lock in such position that when the cars pull apart the knuckle
100 will swing open. The ledge 27 as well as the lower end of the locking member are slightly beveled so that the jolting of the train cannot jar the locking member from lock-set position. Said locking member is
105 provided at its lower end on the rear side with a beveled projection 30 which in the upward movement of the locking member contacts with the rear wall of the opening 11 and pushes the lower end of the locking
110 member positively forwardly over the ledge 27. The lower end of the locking member in the first part of its upward movement is swung toward the rear by the beveled projection 26, and this brings the center of gravity of the locking member out of repose, so that gravity would in any event tend to swing said member into lock-set position. The beveled projection 30 assists in this movement and positively moves the locking
120 member to lock-set position.

In order to prevent the locking member from catching when it drops, the floor of the draw head at the rear of the opening 11 is extended upwardly and beveled as shown at
125 31. The locking member on one of its side faces bears against a continuous vertical wall 33 so that it cannot lodge on that side when dropping. On its opposite side it might lodge on the floor of the draw head
130

and in order to prevent this the lower end of said member is beveled off as shown at 34, which prevents it from catching on the floor of the draw head on that side.

5 The segmental end of the knuckle tail is formed slightly eccentric, as indicated by the dotted line 35, Fig. 1, which is struck around the center of the pin 6. The longer radius of this eccentric is toward the center line of the coupler, so that when the knuckle swings open the end face of the knuckle tail gradually recedes from the locking member so that there is no contact of the end face of the knuckle tail against the locking member, and consequently no friction. This assists in reducing the power necessary to throw the knuckle open. The inclined face 19 on said tail is very steep so that the knuckle can be thrown open with a minimum amount of power and friction.

10 In order to dislodge the locking member from its lock-set position the upper face of the knuckle tail is provided with a cam projection 36 so located and formed that when the knuckle swings to open position the shoulder 17 on the locking member rides over said cam projection and drops down outside of the same. The outer part of the cam is so formed that when the knuckle swings toward locking position the locking member cannot again ride back over said cam, but is engaged by the outer face of the cam and pushed toward the rear, thus dislodging the lower end of the locking member from the ledge 27 and said locking member is then carried entirely by its shoulder 17 on the knuckle tail. Consequently, when the knuckle tail is swung inwardly sufficiently far the locking member drops by gravity and engages the knuckle tail either in half lock or full lock position, depending upon the extent to which the knuckle has been swung inwardly.

15 The knuckle itself is of somewhat different shape than heretofore. The forward face of the tail near the pivotal point is projected toward the center line of the coupler so as to form a fairly prominent projection 37. When coupling on curves this projection 37 is contacted by the end or nose of the cooperating coupler, and the knuckle is swung to half lock position before the outer face 38 of the cooperating knuckle contacts with the front face 39 of the coupler head, as shown on the right hand coupler in Fig. 1.

20 The locking member may be lifted by any suitable means, such, for instance, as the usual chain connected thereto forward of the center of gravity so that when lifted the lower end of the coupling member tends to swing forwardly. As shown the locking member is lifted by means of the usual chain 43 connected to a lever 44 pivoted at 45 in the recessed upper end of the locking

member, said lever between its ends being provided with the rearwardly projecting arm 46 adapted to contact a seat or ledge 47 in the draw head and form a fulcrum for said lever when the chain is pulled upon and serving to lift the pin practically vertically, as fully described and claimed in my application filed March 29, 1909, Serial No. 486,386. The lifting member 44 is located directly in the center line of the coupler, as required by the Master Car Builders' rules. The locking member, however, is set slightly to one side of said center line, that is, it projects farther to one side of the center line than on the other, as shown in Fig. 1, in order to provide for a large and sufficiently strong coupling member. Consequently, the lifting lever 44 is connected to the locking member at one side of the central plane of the latter.

25 The operation of the coupler described will be readily understood from the foregoing description.

30 The several specific improvements do not modify the general operation of the coupler, but improve the same, to increase its efficiency, reliability, and safety, and also to render the same easier and more reliable to operate. It will couple the cars under all conditions, even on very sharp curves, and there is no danger of the wedging of the knuckles when the cars come together. A very strong positive lock is formed and the knuckle is held against pulling out in case the pivot pin should break. The knuckle is positively thrown open by the mere lifting of the locking member, and this can be effected with a minimum amount of power and friction and with a minimum amount of wear. Strong and positive locking is secured both in the half lock and in the full lock position, due to the broad contact of the cooperating locking faces. Creeping or accidental unlocking is largely prevented and the setting of locking member in elevated position is positively secured. The locking member has all of the positions and capabilities of locking members of any of the most improved types of car couplers and in addition thereto provides for the half lock and lock-set position. The parts are all of simple and solid construction so as to give great strength and reduce liability to breakage to a minimum, and are so formed that excessive wear is avoided.

35 What I claim is:

1. In a car coupler, the combination of a recessed head, a knuckle pivoted thereto and provided with a tail projecting into said head, said tail being provided with side locking faces in different vertical planes, one parallel to the center line of the coupler and the other at an angle thereto when the knuckle is closed, and a vertically movable locking member provided with cooperating

locking faces in different vertical planes, one parallel to the center line of the coupler and the other at an angle thereto, the faces of the knuckle tail being each adapted to engage the angular face of said locking member in half lock and full lock position of the coupler, respectively, said head being provided with a vertical opening larger in cross section than the locking member and in which the latter moves, said opening permitting rearward movement of the locking member in releasing the same, and said angular faces being adapted to prevent backward creeping of the locking member under service conditions.

2. In a car coupler, the combination of a recessed head, a knuckle pivoted thereto and provided with a tail projecting into said head, said tail being provided with side locking faces in different vertical planes, the lower face being in advance of the upper face, and a vertically movable locking member provided with cooperating locking faces in different vertical planes, the lower face of said member being in advance of the upper face thereof, the upper set of said cooperating locking faces being parallel to the center line of the coupler and the lower advance set of said locking faces being at such an angle to the center line of said coupler that when the locking member is in half locked position and the knuckle is swung partly open the upper locking face of the knuckle will cooperate with the lower advanced locking face on the locking member and correspond to the angle thereof, said head being provided with a vertical opening larger in cross section than said locking member and in which it moves, said opening permitting rearward movement of the locking member in releasing the same, and said angular faces and said upper knuckle face being adapted to prevent backward creeping of the locking member under service conditions.

3. In a car coupler, the combination of a recessed head, a knuckle pivoted thereto and provided with a tail projecting into the head, said tail having a segmental end portion provided with a lower spiral knuckle throwing face, and a locking member movable in said head and arranged to swing forwardly as it moves vertically and provided with a knuckle throwing shoulder which

when the locking member is lifted engages the lower spiral face of the knuckle tail and throws the knuckle open, said spiral face having a varying incline transversely of the spiral from end to end thereof.

4. In a car coupler, the combination of a recessed head, a knuckle pivoted thereto and provided with a tail projecting into the head, said tail having a segmental end portion provided with a lower spiral knuckle throwing face, and a locking member movable in said head and arranged to swing forwardly as it moves vertically and provided with a knuckle throwing shoulder having an extended upper face which when the locking member is lifted engages the lower spiral face of the knuckle tail with extended bearing contact and throws the knuckle open, said spiral face having a varying incline transversely of the spiral from end to end thereof, and a projection on the back of the locking member arranged when the latter is lifted to engage the head to move the lower end of the locking member forwardly and to maintain full contact of the bearing face on the locking member with the varying inclined face of the knuckle tail.

5. In a car coupler, the combination of a recessed head, a knuckle pivoted thereto and provided with a tail projecting into the head, said tail having a segmental end portion provided with a spiral lower face having a varying transverse incline, said incline being greater to the horizontal at its lower portion than at its upper portion, a vertically moving locking member provided with a projection having a broad upper bearing face inclined to the horizontal when the member is in lowest position, and which, when the locking member is lifted, engages the spiral transversely inclined lower face of the knuckle tail and throws said knuckle open, and a projection on the back of the locking member arranged when the latter is lifted to move its lower end forwardly and maintain full bearing contact between the knuckle throwing faces on the locking member and knuckle tail.

In testimony whereof, I have hereunto set my hand.

JAMES F. ROBERTSON.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."