

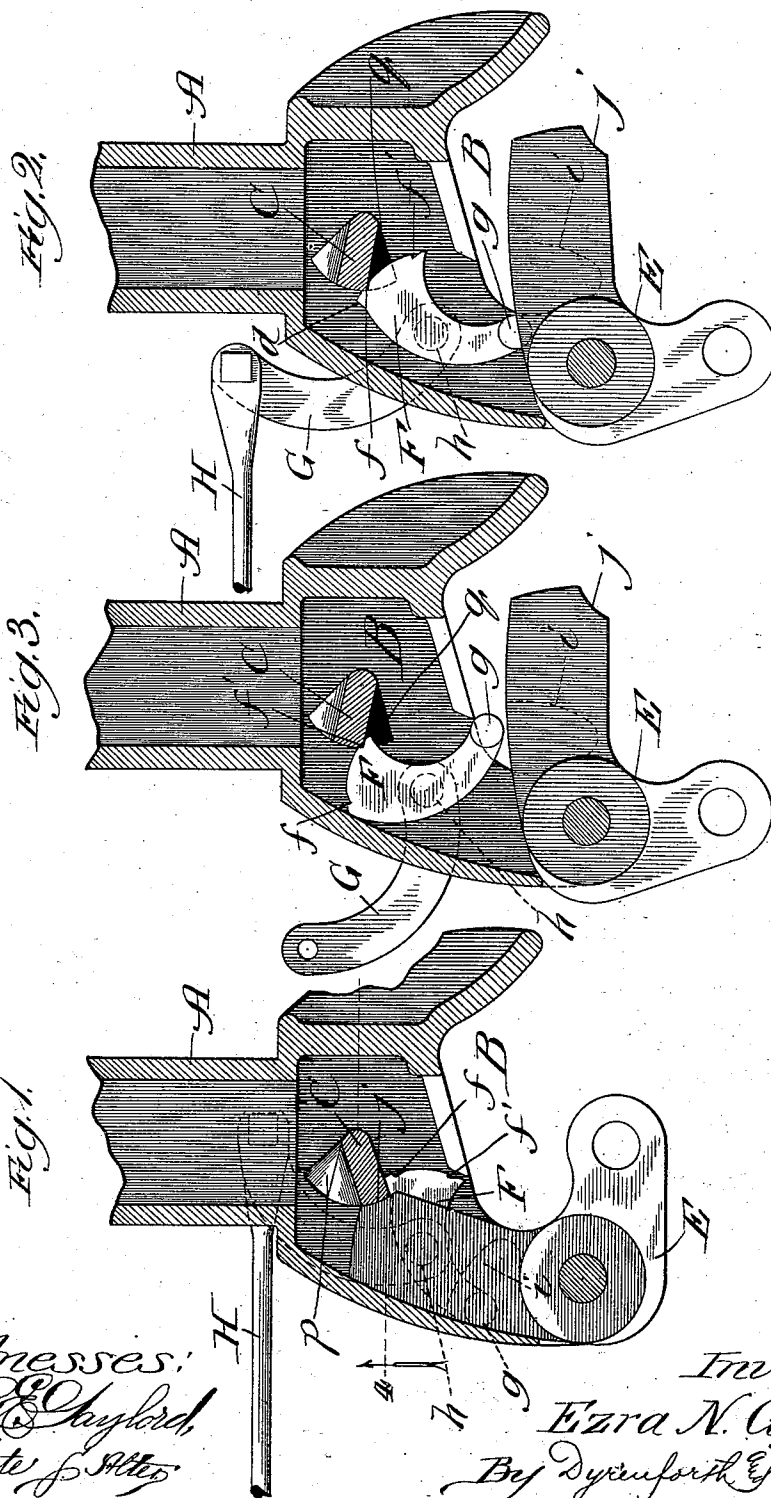
(No Model.)

2 Sheets—Sheet 1.

E. N. GIFFORD.
CAR COUPLING.

No. 548,914.

Patented Oct. 29, 1895.



Witnesses:
E. N. Gifford,
Att'y in fact

Inventor:
Ezra N. Gifford,
By Dyrenforth & Dyrenforth,
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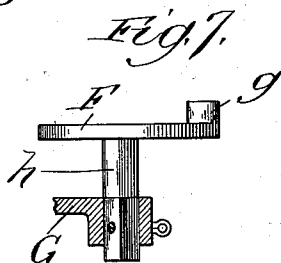
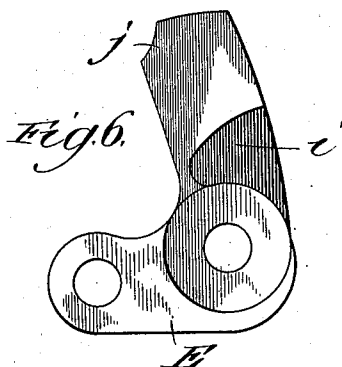
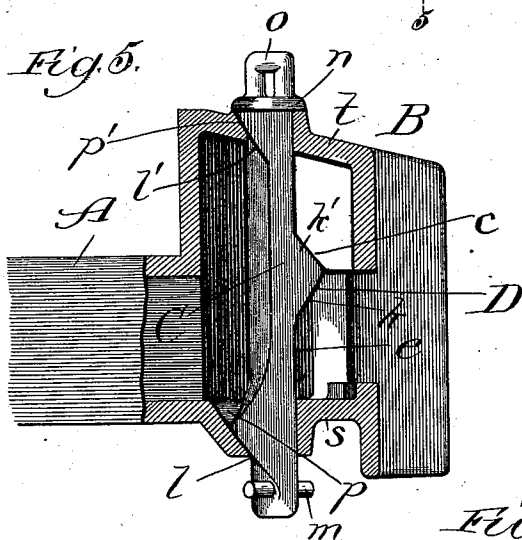
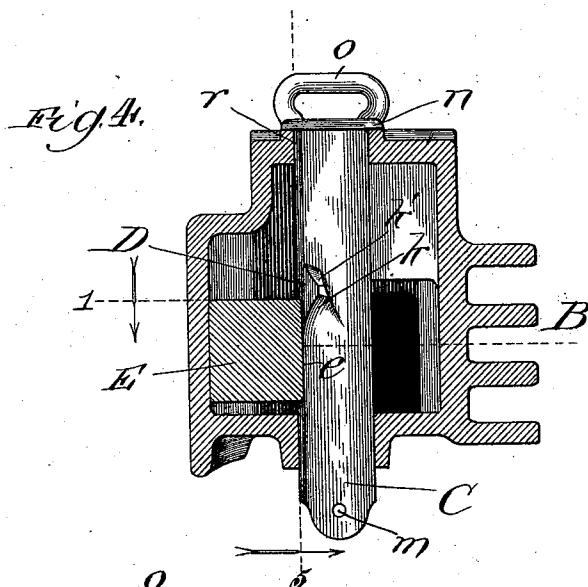
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2 Sheets—Sheet 2.

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CAR COUPLING.

No. 548,914.

Patented Oct. 29, 1895.



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UNITED STATES PATENT OFFICE.

EZRA N. GIFFORD, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
WILLIAM GILCHRIST, OF SAME PLACE.

CAR-COUPLING.

SPECIFICATION forming part of Letters Patent No. 548,914, dated October 29, 1895.

Application filed July 29, 1895. Serial No. 557,467. (No model.)

To all whom it may concern:

Be it known that I, EZRA N. GIFFORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Car-Couplers, of which the following is a specification.

The object of my invention is to produce a car-coupler of the general class known as the "Master Car-Builders' type," wherein certain difficulties which have existed in all car-couplers of that class heretofore devised shall be wholly obviated; also, to accomplish this end in the simplest possible manner and with the smallest number of parts possible, and also to have the construction and arrangement of parts of exceptional strength and durability, easily operated, and prompt, certain, and effective in their action.

The nature of my improvements will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a horizontal section of my device, showing the operating parts in coupled position; Fig. 2, a similar view showing the operating parts in uncoupled position; Fig. 3, a similar view showing the operative parts also in uncoupled position, but with the uncoupling cam-lever at the extreme outer limit of its throw after having opened the knuckle; Fig. 4, a vertical cross-section taken on the line 4 of Fig. 1 and viewed in the direction of the arrow; Fig. 5, a vertical longitudinal section taken on the line 5 of Fig. 4 and viewed in the direction of the arrow; Fig. 6, a detached bottom plan view of the knuckle; and Fig. 7, a detached broken view, partly in section, of the uncoupling cam-lever and the arm attached thereto for throwing it into and out of operative position.

A is the draw-bar, and B the draw-bar head, bifurcated, as usual, to form the recessed jaws *t* and *s*, between and within which the principal operating parts are mounted. The upper jaw *t* is provided with a sectoral opening *r* and the lower jaw *s* with a sectoral opening *q* of similar form, provided on its rear side with an inclined spiral shoulder *p*, forming the short section of a screw-plane. The upper sectoral opening is provided with a spiral

shoulder *p'*, corresponding with the shoulder *p* in the lower opening. Extending vertically through the openings last described is a bar C of peculiar construction, which serves as the lock and which constitutes in its association with other parts one of the leading features of my invention. This bar is provided at its upper end with a handle *o* and head *n* and toward its lower end below the lower jaw with a cross-pin *m* or analogous agent operating, while permitting ample vertical play, to serve as a stop to prevent withdrawal of the bar. Toward its lower end the bar C is provided with a spiral shoulder *l* and on the lower side of the head *n* with a corresponding spiral shoulder *l'*, which, like the shoulders *p* and *p'*, form sections of screw-planes, and which in the operation of raising and lowering the bar C travel on the shoulders *p* and *p'*, causing the bar to turn for a certain distance upon its longitudinal axis both in rising and falling. On the other hand it will be obvious that by reason of the shoulders referred to a turning action exerted upon the bar C must incidentally cause it to rise or descend, as the case may be. About midway of the height of the bar C and toward the front face thereof is a beveled projection D, the upper and lower faces *k* and *k'* of which are sections of contrary screw-planes, as shown. The purpose of this projection will appear hereinafter.

E is the knuckle, pivotally mounted in the forward end of the head in the usual way, and it is of the usual construction, except that the tongue or locking-arm has its outer corner cut away, as shown at *j*, and is provided on its under surface with a cam-recess *i*. Intermediate between the knuckle E and the lock C is the uncoupling cam-lever F, which is pivoted at about its center through the lower jaw *s* by means of a spindle *h*, upon the lower end of which, below the lower jaw *s*, is rigidly mounted the curved arm G. To the outer end of the arm G the uncoupling hand-lever H is pivotally connected, and this lever is to be understood as sliding in one or more suitable guides on the car, as may be desired. The end of the uncoupling cam-lever F which is adjacent to the knuckle is provided with a stud *g*, which enters the cam-recess *i* on the under face of the tongue or locking-arm of

the knuckle E, and its opposite end with two notches f and f' , the function of which is to engage the locking-bar C in certain positions, as will be hereinafter described.

5 In order that the operation of my improved coupler may be clearly understood, let the parts be supposed to be in the position shown in Fig. 1 and that it is desired to uncouple and place the parts in position for automatic
10 recoupling. In this figure it will be seen the knuckle E is not only in coupled position, but is also securely locked there by reason of the fact that the curved edge j of the locking-arm is in engagement with the abutting curved
15 face e of the locking-bar, from which it cannot be released except by turning the locking-bar out of abutting position. It will be seen that, theoretically, the locking-bar at the edge farthest from its abutting edge merely
20 rocks in the operation of turning against the narrow end of the sectoral openings, though practically it has more or less play at this point, since it fits somewhat loosely. On the other hand, the abutting or locking edge in
25 the operation of turning passes through the whole or a large part of the arc described by the wide end of the sectoral opening. The turning of the locking-bar can only take place in conjunction with the incidental rising of
30 the locking-bar by reason of the spiral shoulders l and p , hereinbefore referred to, and this fact is taken advantage of to give still further security to the locking through the medium of the beveled projection D, having spiral
35 faces—that is to say, when in locked position the side of the lower portion of this projection bears against the upper edge of the locking-arm of the knuckle, and in order to permit the turning of the locking-bar to the position shown in Fig. 2 it is necessary that it
40 be raised sufficiently to permit the locking-arm to clear this projection. The spiral form of the planes k k' of this projection has thus far no function, their function only coming
45 into play in the act of coupling, when the locking arm strikes the locking-bar and clears it by turning and incidentally raising it, as will be hereinafter described. For the purpose of thus turning and lifting the locking-bar C the hand-lever H is pulled outward
50 to the position shown in Fig. 2, the presence of the corresponding knuckle upon the other car preventing the further outward throw of the parts. In the absence of any
55 corresponding knuckle in engagement the parts can be thrown to the position shown in Fig. 3; but obviously in practice this can take place only after the cars have been uncoupled. In throwing the uncoupling cam-lever F from the position shown in Fig. 1 to the position shown in Fig. 2 it swings upon
60 its pivot, causing the stud g to describe an arc within the cam-recess i of the knuckle without, however, engaging the wall of that cam-recess. Hence the only function performed by the unlocking cam-lever F in that movement is upon the locking-bar C—that is

to say, in the movement referred to the inner curved end of the unlocking cam-lever engages the adjacent angle of the locking-bar C and turns that bar to the position shown in Fig. 2, bringing the angle referred to into the notch f . As before explained, the turning of the locking-bar causes it to rise in its bearings by reason of the fact that the spiral
75 shoulder l upon the locking-bar travels upon the corresponding spiral shoulder p in the draw-bar head, thus carrying the bar out of locked position. The knuckle is then wholly loose upon its pivot, and hence in position for
80 uncoupling. Understanding the uncoupling to have taken place, the knuckle will naturally have assumed the position shown in Fig. 2.

When the knuckle is in the position shown in Fig. 2, it is not only in uncoupled position, but is also in the proper position for switching; but, as has been mentioned, the knuckle at this time swings loosely upon its pivot and cannot be depended upon to remain in that
90 position, but may easily be caused to swing to the position shown in Fig. 1, when it is not in position for recoupling. Assuming this to have happened, it is necessary that some means be provided for readily restoring it to
95 the proper position for recoupling, and this is done by simply exerting a further pull upon the hand-lever H, thereby throwing the unlocking cam-lever to the position shown in Fig. 3. In this movement the stud g of the
100 unlocking cam-lever, which would then be near the inner extremity of the recess i , will travel along the wall of that recess, thus throwing the locking-arm to the position shown in Fig. 2. This done, the unlocking
105 cam-lever may be returned to the position shown in Fig. 2, which leaves the entire device in position to be thrown back to the position shown in Fig. 2 in the act of switching.

To place the parts in proper position for
110 coupling, the hand-lever H must be thrust inward to the position shown in Fig. 1, while the knuckle is in the position shown in Figs. 2 and 3. Under these circumstances the locking-bar C will obviously have the position shown in
115 Fig. 1 without being in engagement with the locking-arm of the knuckle, and the unlocking cam-lever F will obviously be idle. Then the impact with the knuckle on the other car throws the locking-arm inward, causing it to
120 strike against the edge of the locking-bar C and turn the latter to the position shown in Figs. 2 and 3 for the passage by it of the locking-arm to the position shown in Fig. 1, and as soon as the end of the locking-bar reaches the
125 recessed part j of the locking-arm it falls by gravity and incidentally turns back to the position shown in Fig. 1, thereby locking the parts in coupled position. From this it will be seen that even without the projection D the
130 locking could be automatically effected; but there is an advantage in not only having the locking-arm operate indirectly to raise the locking-bar by turning it, but also having it

operate positively to lift the bar by engaging the spiral face *k* on the lower side of the projection D. It is also an advantage to have the upper spiral shoulder *k'*, which bears against a corresponding rib or shoulder *c* on the inner wall of the draw-bar head. The shoulders *k'* and *c* act in conjunction with the shoulders *p* and *l* and *p'* and *l'* in guiding the locking-bar both in its rise and descent, thus forming in effect sections at intervals of the same screw-plane or parallel screw-planes, and thereby giving strength and stability to the lock as well as forming an accurate spiral guide.

It has already been intimated that the projection D, with its incidental spiral faces, may be omitted. It will also be obvious that one or the other of the remaining spiral engaging parts, preferably the shoulders *p'* and *l'*, may be omitted; but my invention requires some construction by which a spiral shoulder on some portion of the locking-bar shall travel upon a corresponding shoulder in the draw-bar head, to the end hereinbefore explained. As to the sectoral openings in the upper and lower jaws of the bifurcated draw-bar head, it should be observed that the locking-bar passes wholly through both these openings and incidentally in its operation describes a sector. Any form of openings suitable to permit the proper movement of the locking-bar is obviously the equivalent of the particular form shown, and is hence intended to be included by the term "sectoral" appearing in the specification and claims, since whatever the form only a certain sectoral portion of it would be the effective or necessary part and all beyond the limits of that part would be mere surplus. It will further be seen that the notches *f* and *f'* in the inner end of the unlocking cam-lever may be omitted without materially affecting the operation of the device, though their presence is desirable. It will further be obvious that the cam-recess *i* in the locking-arm of the knuckle may be located in the opposite side of that arm with suitable modification of the unlocking cam-lever, in order to permit the proper engagement, or that this recess, whether on the one side or the other, may be supplanted by a rib of the proper form; and, in general, I desire to have it understood that I do not limit myself to any special form in the mere matters of detail in the case of ordinary mechanical features, since these may be readily varied by any one possessed of the requisite mechanical skill.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a car-coupler, the combination with the bifurcated draw-bar head and the knuckle pivotally mounted therein, of a locking-bar, substantially uniform in cross-sectional dimensions throughout its length, extending vertically, in the path of the locking-arm of the knuckle, through openings in the upper and lower jaws of the draw-bar head of such form as to permit the locking-arm in its movement to describe the sector of a circle, a spiral shoulder on the locking-bar, and a corresponding spiral shoulder on the draw-bar head with which the said shoulder on the locking-bar engages, substantially as described.

2. In a car-coupler, the combination with the bifurcated draw-bar head provided with the knuckle E pivotally mounted therein, of a locking-bar, substantially uniform in cross-sectional dimensions throughout its length, extending vertically, in the path of the locking-arm of the knuckle, through openings in the upper and lower jaws of the draw-bar head, of such form as to permit the locking-arm in its movement to describe the sector of a circle, a spiral shoulder on the locking-bar, a corresponding spiral shoulder in the draw-bar head with which the shoulder on the locking-bar engages, and means for raising and turning the locking-bar to release the locking-arm, substantially as described.

3. In a car-coupler, the combination of the bifurcated draw-bar head having sectoral openings through its upper and lower jaws and with the knuckle E pivotally mounted in the draw-bar head, of a locking-bar extending vertically through the said sectoral openings in the path of the locking-arm of the knuckle, and provided with a spiral shoulder engaging with a corresponding spiral shoulder in the draw-bar head, whereby in the act of coupling the locking-arm strikes, turns and raises the locking-arm, and the latter after it has been cleared by the locking-arm returns by the action of gravity to its normal position, thereby locking the knuckle in coupled position, of means for releasing the locking-arm from engagement with the locking-bar to permit uncoupling, comprising a cam-lever engaging the locking-arm to turn and raise it, and means for operating the said cam-lever, substantially as described.

4. In a car-coupler, the combination with the bifurcated draw-bar head provided with sectoral openings through its upper and lower jaws and with a knuckle E pivotally mounted in said jaws and provided on its locking-arm with a cam-guide, of a locking-bar extending vertically through said sectoral openings in the path of the locking-arm of the knuckle, and provided with one or more spiral shoulders engaging one or more spiral shoulders in the draw-bar head, whereby in the act of coupling the locking-arm strikes, clears and is in turn locked by the locking-bar, of a cam-lever F pivotally mounted in the draw-bar head between the fulcrum of the knuckle and the locking-bar, and in position to engage the locking-bar at its inner end and to engage the cam-guide on the locking-arm of the knuckle at its opposite end, and means for operating the said cam-lever to release the locking-bar consisting of an arm G rigidly connected to the lower end of the pivotal spindle of said cam-lever F, and a hand-lever H pivotally connected to the outer end of said arm G, substantially as described.

5. In a car-coupler, the combination with

the bifurcated draw-bar head having sectoral openings through its upper and lower jaws, and with the knuckle E pivotally mounted therein, of the locking-bar C in the path of the locking-arm of the knuckle, having spiral shoulders *l* and *l'* engaging with corresponding shoulders in the draw-bar head, whereby in the act of coupling the said locking-bar is engaged by the said locking-arm and turned and incidentally raised thereby, and when cleared descends by gravity and serves as a lock, in combination with a spiral shoulder *k* upon the said locking-bar, which is engaged by the end of the locking-arm of the knuckle, substantially as described.

6. In a car-coupler, the combination with the bifurcated draw-bar head provided with sectoral openings through its upper and lower jaws, and with the knuckle E pivotally mounted in the draw-bar head and provided upon its locking-arm with a cam-guide, of the locking-bar C extending through both sectoral openings and provided with spiral shoulders *l* *l'* and *k'* engaging corresponding spiral shoulders *p* *p'* and *c* in the draw-bar head, unlocking cam-lever F pivotally mounted upon the lower jaw by a spindle *h* extending through the same and adapted at its inner end to engage the locking-bar, and at its outer end to engage the cam-guide on the knuckle, an arm G rigidly mounted upon the lower end

of the spindle *h*, and a hand-lever H pivotally connected to the arm G, substantially as described.

7. In a car-coupler, the combination with the bifurcated draw-bar head provided with sectoral openings through its upper and lower jaws, and with the knuckle E pivotally mounted in the draw-bar head and having the curved edge *j* and the cam-recess *i* upon its locking-arm, of the locking-bar C extending through both said sectoral openings and retained therein by a stop *m* and provided with a lifting handle *o* and with spiral shoulders *l* *l'* and *k'* engaging corresponding spiral shoulders *p* *p'* and *c* in the draw-bar head, and with the spiral shoulder *k* to engage the free end of the locking-arm of the knuckle, unlocking cam-lever F pivotally connected to the lower jaw of the draw-bar head by means of the spindle *h* passing through the same and having at its inner end the notches *f* and *f'* and at its outer end the stud *g*, arm G rigidly connected to the spindle *h* below the draw-bar head, and hand-lever H pivotally connected to the arm G, substantially as described.

EZRA N. GIFFORD.

In presence of—
M. J. FROST,
J. H. LEE.