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C. J. GUSTAFSON.

CAR COUPLING.

No. 486,930. Patented Nov. 29, 1892.

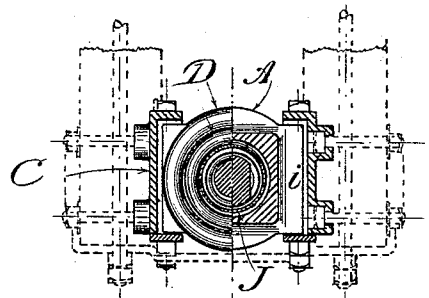

Fig. 5.

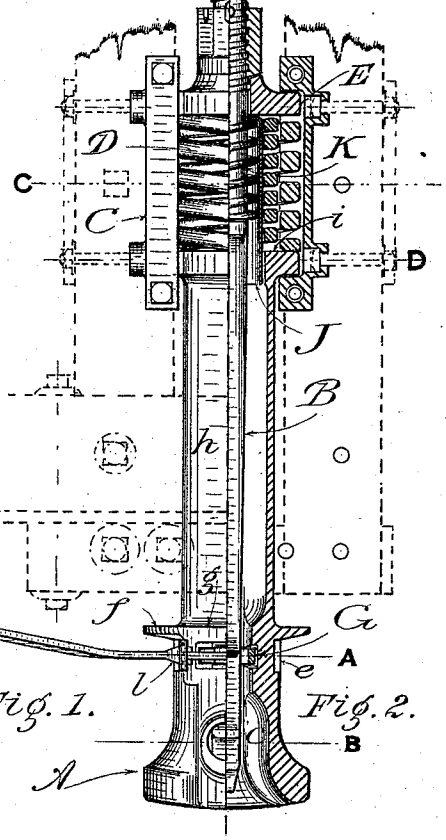

Fig. 6.

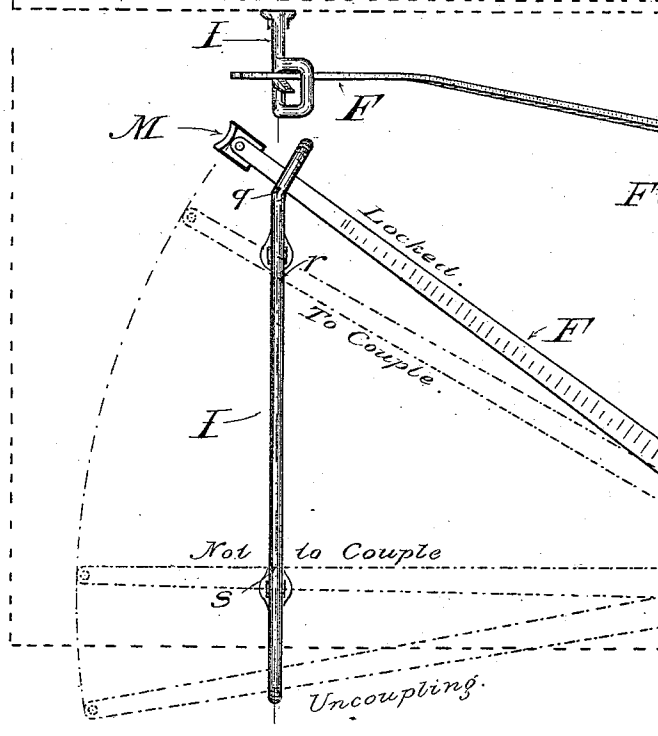

Fig. 1.

Fig. 2.

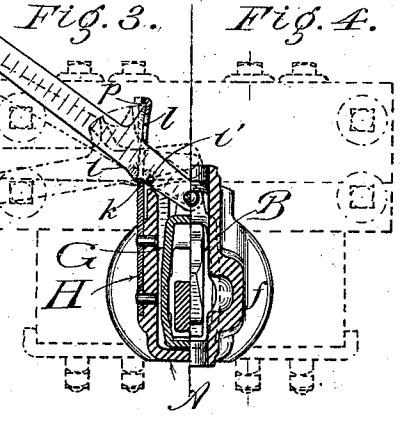

Fig. 3.

Fig. 4.

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(No Model.) 4 Sheets—Sheet 2.

C. J. GUSTAFSON.

CAR COUPLING.

No. 486,930. Patented Nov. 29, 1892.

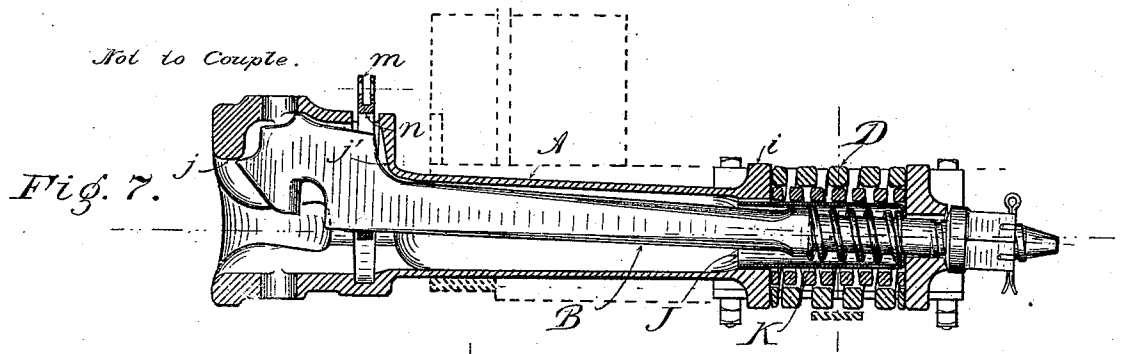

Fig. 7.

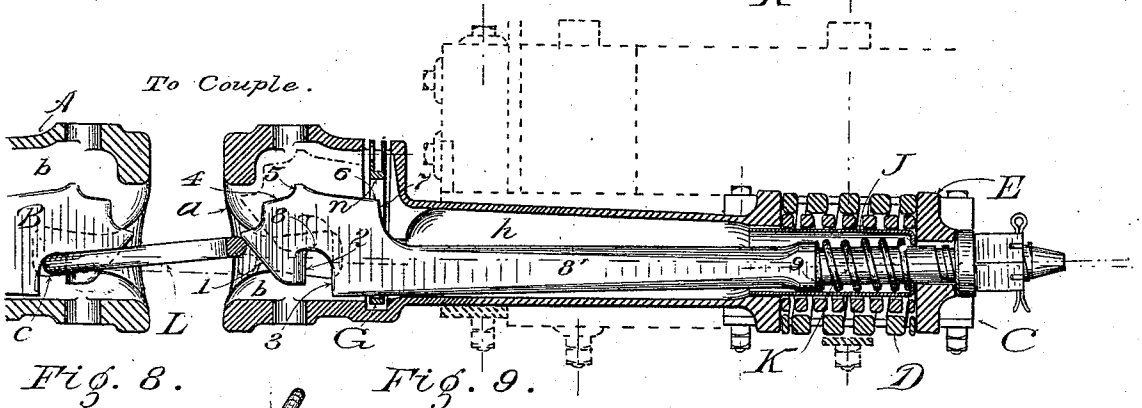

Fig. 8. Fig. 9.

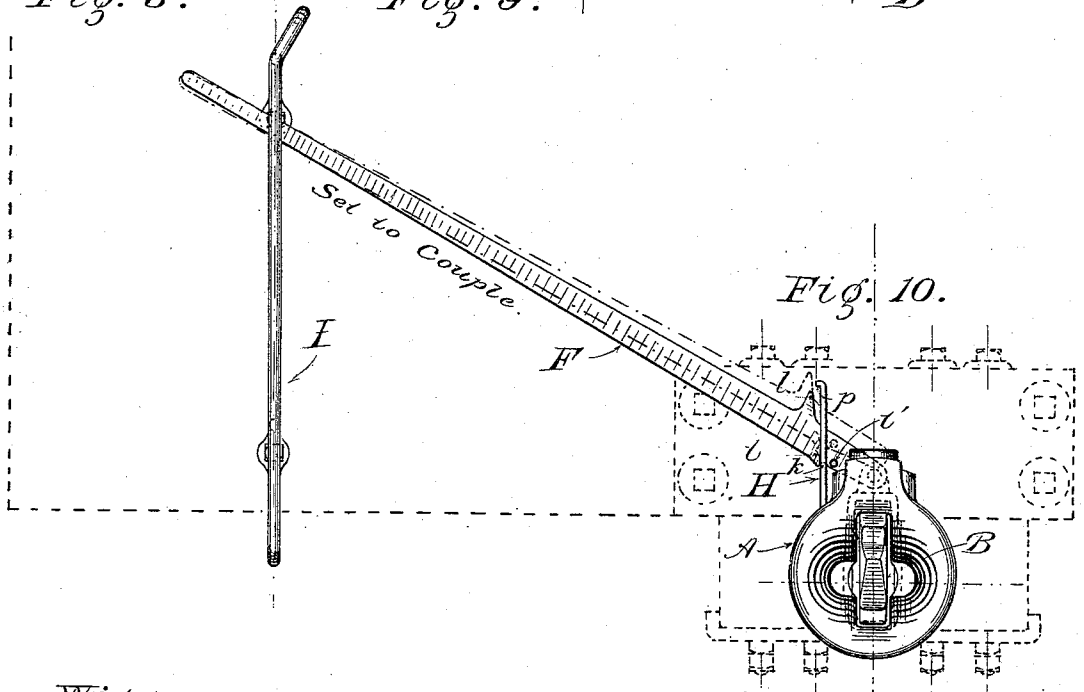

Fig. 10.

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CAR COUPLING.

No. 486,930. Patented Nov. 29, 1892.

Fig. 11.

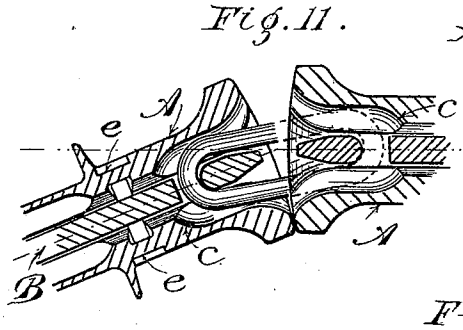

Fig. 12. Fig. 13.

Tension.

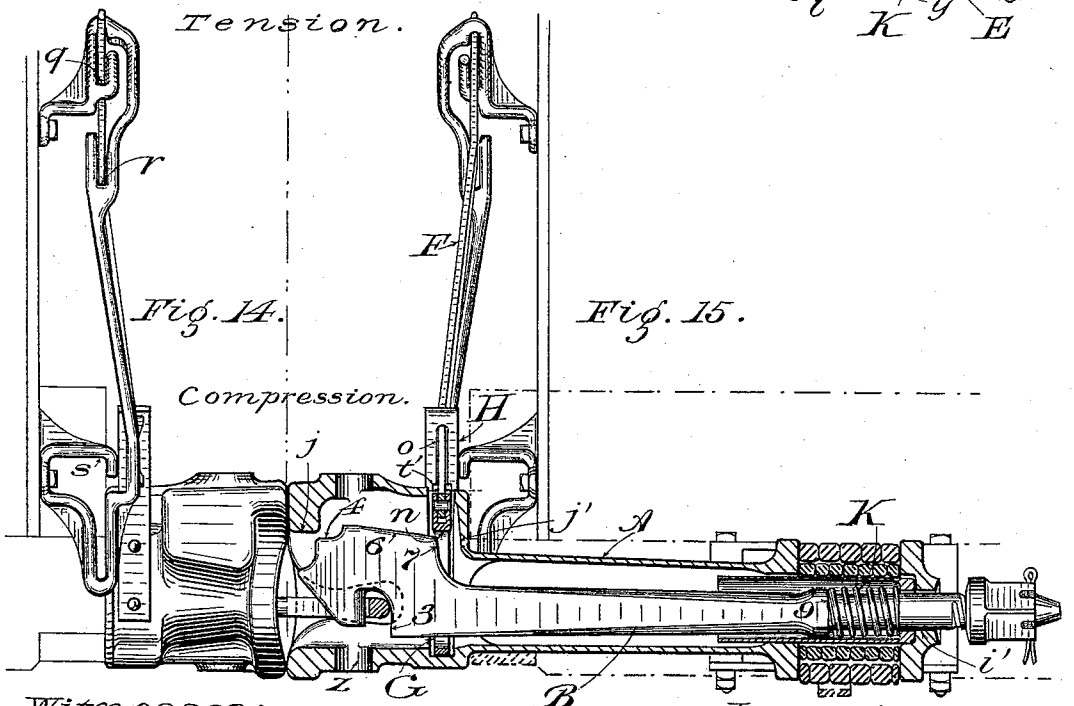

Fig. 14. Fig. 15.

Compression.

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(No Model.) 4 Sheets—Sheet 4.

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CAR COUPLING.

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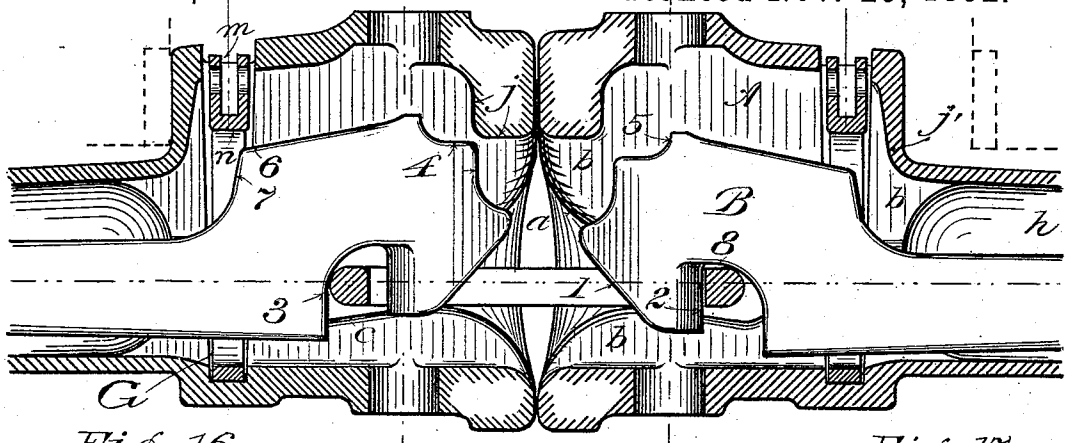


Fig. 16.

Fig. 17.

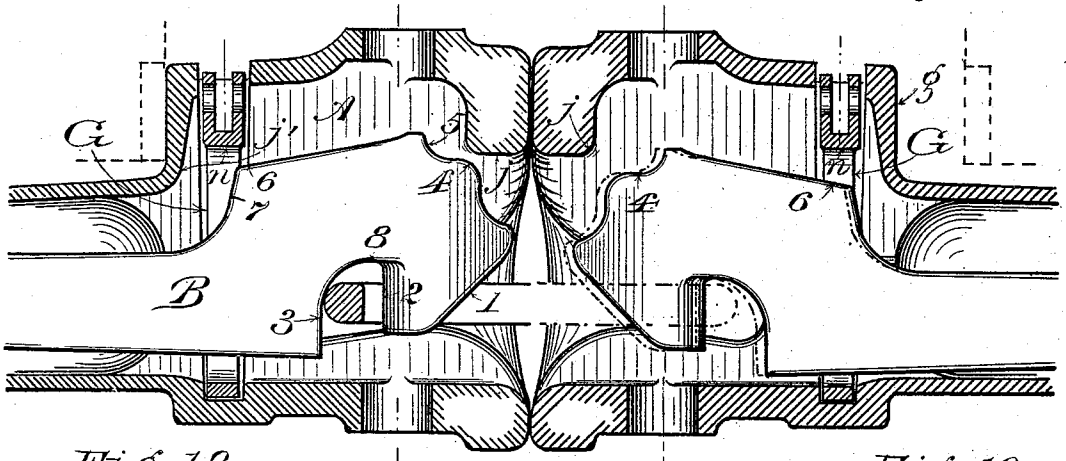


Fig. 18.

Fig. 19.

Fig. 20.

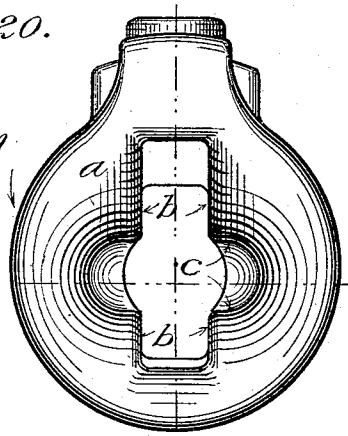
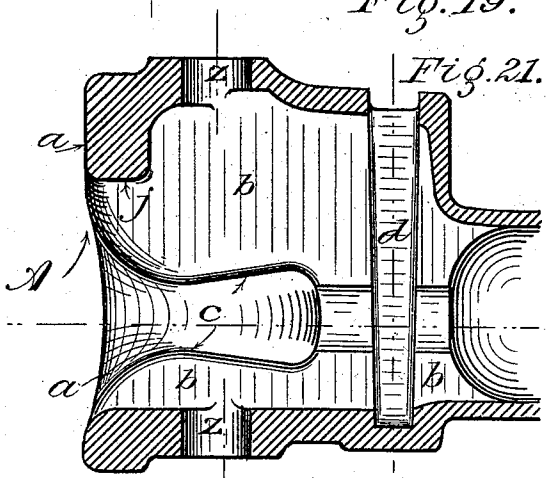


Fig. 21.



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UNITED STATES PATENT OFFICE.

CHARLES J. GUSTAFSON, OF MOBILE, ALABAMA.

CAR-COUPLING.

SPECIFICATION forming part of Letters Patent No. 486,930, dated November 29, 1892.

Application filed February 23, 1892. Serial No. 422,528. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. GUSTAFSON, a citizen of the United States, residing at Mobile, in the county of Mobile and State of Alabama, have invented a new and useful Automatic Car Coupler and Buffer, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a half plan or top view of a coupler complete, showing its attachment to the members of a car in dotted lines. Fig. 2 is a horizontal half-section showing the general arrangement of parts in their normal position, as in Fig. 1. Fig. 3 is a half elevation or front view showing the arrangement of the uncoupling-lever and its action in the different positions indicated in dotted lines with section through buffer on line A. Fig. 4 is a half front elevation of coupler with its section through B. Fig. 5 is a transverse vertical half-section through draft-rigging on line C. Fig. 6 is a half-section, as above, through D. Fig. 7 is a longitudinal vertical section through buffer, showing hook set to uncouple and draft-rigging in normal position. Fig. 8 is a longitudinal vertical section of buffer, showing position of hook with link held in position to enter opposite coupler. Fig. 9 is a longitudinal vertical section through coupler, showing hook set "to couple" and draft-rigging in normal position. Fig. 10 is a front elevation or face view showing the hook in position in the buffer and the uncoupling-lever set in position to couple. Fig. 11 is a horizontal section through two couplers, showing the range of horizontal deflection. Fig. 12 is an external side view of coupler in "tension" with part of the uncoupling-lever removed. Fig. 13 is a longitudinal vertical section of coupler, showing the relative position of its several parts in tension. Fig. 14 is an external side view of coupler in "compression" with the uncoupling-lever locked in position on its bracket. Fig. 15 is a longitudinal vertical section of coupler, showing the relative position of its several parts in compression. Fig. 16 is a longitudinal vertical section through buffer-head, showing the position of hook when using a hook and link of exact length, draft-springs in compression, as in Fig. 15. Fig. 17 is a similar section showing the position of the hook in the buffer-head when using a hook and link of exact length, draft-springs in "normal" position, as in Fig. 9. Fig. 18 is a similar section showing hook when using a "short" hook and link, draft-springs in compression, as in Fig. 15. Fig. 19 is a similar section showing hook when using a short hook and link, draft-springs in normal position, as shown in Fig. 9. Fig. 20 is a face view of buffer-head in detail. Fig. 21 is a longitudinal vertical section of the buffer-head in detail.

Similar letters refer to identical parts throughout the different views. Capitals refer to elementary parts and small letters and figures refer to details or features of same.

This coupler embodies the principle of an independent "buffing member" and a separate and distinct "tension member," both together forming a combination buffer and draw-bar, arranged in combination with an "uncoupling device," as shown on the drawings, and operated as hereinafter described. The buffing member consists of the buffer A, sliding in its guide or stop C and acting on the springs D. The tension member consists, essentially, of the draw-hook B, mounted inside of the buffer A and acting on the springs D, a common link L being used in coupling to opposite coupler. The uncoupling device consists, essentially, of the lever F, attached to the yoke G and mounted in the fulcrum-plate H and bracket I.

The essential features of the buffer A consist of its inwardly-receding curved surface or mouth *a*, joining the vertical recess or hook-pocket *b* and the horizontal recess or link-pocket *c*, and the downwardly-extending "locking-rib" or surface *j*, Figs. 20 and 21. This face or mouth is so formed that a link striking an opposite draw-bar at any point within its range will be guided in all directions, vertically and horizontally, toward the center of its mouth and under its hook, Figs. 8 and 9.

The buffer-head is provided with the uncoupling-yoke recess or pocket *d*, also the recess *e* on the outside for the reception of the uncoupling-lever fulcrum H. The buffer is also provided with the lugs or brackets *f* on the side forming, with the top shoulder *g*, a continuous "dead-stop" all around the neck, joining the shank or stem *h*, which continues

back, joining the lugs *i*, thus forming the "front follower-plate" in one piece with the buffer. Inside the shank *h*, at the end *i*, is a circular opening parallel to the axis of the buffer and forming a guide or support for the forward end of the coupling-spring case J, which latter supports the draft-springs D. The inside face of the back follower-plate C may have a circular opening *i'*, forming a support for the back end of the coupling-spring case J, which latter also acts as a sort of thimble or support for the draft-springs D.

The essential features of the hook B consist in the lifting-incline 1, the tension-surface 2, the compression-surface 3, the tension locking-surface 4, the tension safety-stop 5, the compression locking-surface 6, and the compression safety-stop 7. The above-mentioned features may be said to form the head of the coupling-hook which joins the stem or shank 8', which extends back, forming the tail-pin in one piece. A shoulder 9 is provided near the tail-pin end of this hook, against which the coupling-spring K acts, reacting against the back end of its case J, which is carried either on the tail-pin end of the coupling-hook or in the circular opening *i'* of the back follower-plate E, which is in turn supported in the follower-guide C. It will be noticed that the tail-pin end of the hook is provided with a very shallow thread of rectangular section with rounded corners and of very coarse pitch, on which thread a loosely-fitting nut is screwed and secured in position with a spring cotter-pin passing through the open slots in the back end of the nut and into the corresponding hole in the tail-pin, thus providing means for adjustment of the length of the hook in reference to the buffer. A globe and socket seat is shown for the nut and follower-plate, thus providing a good bearing for the hook in any position within the range of its motion. A common key bearing on a collar to correspond to the socket or globe seat of the follower, can obviously be substituted for the nut and adjustments, if necessary, made by additional liners or washers.

The essential features of the lever F consist of its fulcrum-seat *k* and heel *t*, the projection or prong *l*, and the reacting stop or pin *t'*.

The yoke G is simply a loop embracing the hook B, Fig. 3, and is provided with a suitable jaw or brackets *m* at its upper end for attachment to the lever F. The inner surface or shoulder *n* is also an important feature, as hereinafter described.

The fulcrum-plate H is in the nature of a spring, provided with the slot *o* to receive the lever F, which is free to move vertically in above-mentioned slot, the lower end or bottom of which forms the fulcrum proper. The fulcrum-plate is further provided with the locking surface or shoulder *p* for the purpose hereinafter described, and is secured to the buffer-head, as shown.

The lever-bracket I consists, essentially, of the lock-rest *q*, the coupling-rest *r*, and the uncoupling-rest *s*. It is secured to the body of the car, and the principle by which it acts as "keeper" of the lever F in any of the positions shown in Fig. 3 is a sort of "pig in the pen" principle, retaining the lever by restricting its motion, as will appear more clearly in what follows, and by reference to Figs. 13 to 15.

From the foregoing description of details it appears that the hook B is free to be raised or lowered inside of the buffer A by means of the uncoupling device when the draft-springs D are in their normal position, Figs. 7 and 9, or when in a state of compression, Fig. 15, or it may be raised by the entering link, Figs. 8 and 9, its motion not being cramped by the draft-springs or the case J in either position.

The longitudinal motion of the buffer is limited to that due to compression or buffing only, its range being from normal, Fig. 9, to extreme compression, Fig. 15. The longitudinal motion of the hook in reference to the buffer is practically limited to that due to tension only, as its motion conforms nearly to that of the buffer in compression, and its range is from normal, Fig. 9, or compression, Fig. 15, to extreme tension, Fig. 13.

To automatically couple, the lever F is placed in the coupling-rest *r*, Figs. 3 and 10. The entire weight of the hook is then resting on the inside end of the contained link, holding it down on the surface *c* of the link-pocket, Fig. 8, thus holding the outer end of said link slightly above the horizontal, directing it into the opposite buffer and under its hook B, Fig. 9.

By pressure or impact of the entering link against the inclined surface 1 of the opposite hook the latter is raised to the position shown in dotted lines, Fig. 9, from which position it falls into the entering link when the latter has passed beyond the tension-surface 2 or strikes the compression-surface 3 of the hook, Fig. 15.

The coupling-spring K is always in a state of compression, and acts in coupling by means of its shoulder 9 in combination with the compression-surface 3, thus keeping the hook with its contained link well forward in the mouth of the buffer, Fig. 8, and resists the thrust of the entering link, Fig. 9. As the hook rises in obedience to the pressure of the entering link it will come in contact with the surface or shoulder *n* of the yoke G, Fig. 9, and will raise it, together with the coupling-lever F, as shown in dotted lines, Fig. 10, and the locking-prong *l* of the lever will be entirely free and clear of the locking-shoulder *p* of the fulcrum-plate, the vertical motion of the lever in the fulcrum-slot *o* being guided laterally by the heel or surface *t* of the lever. It is obvious that with a proper adjustment of hook or length of link a certain amount of slack may be left between buffers, Figs. 13 and 15, or the arrangement may be such as to just take up all slack, thus obtaining a

practically-taut coupling, Figs. 16 and 17; or the coupling may be made with a hook and link comparatively too short, thus forcing the two faces of the buffers together with a pressure produced by compression of the draft-springs, Figs. 18 and 19. This latter arrangement may be accidental and even desirable under some circumstances, as the hook is then kept more completely under the locking-rib *j* in compression, Fig. 18, and is more completely brought under the same surface in tension, Fig. 19, thus keeping the hook under this positive lock *j* in all positions when the link is liable to rise. This arrangement will also hold the cars more steady and reduce swaying and rough riding. With the buffers thus closely coupled a certain amount of slack will form in the draft-rigging, which may not be undesirable even in passenger-trains.

Coupling with a link really too short—*i. e.*, too short to admit of the possibility to again uncouple—is impossible for obvious reasons, as the vertical part of the locking-surface 4 of the hook will in such a case come in contact with the vertical part of the locking surface or rib *j* of the buffer, where the hook will be held by friction through pressure of the coupling-spring K. Even if the link should come with sufficient impact to strike the compression-surface 3 of the hook, the friction on the latter due to this extreme compression of the spring K will be such as to prevent the hook from falling into the link and thus prevent coupling. Coupling with other drawbars of any type in common use is accomplished in the ordinary way, except that the link in this case requires no guiding. Coupling on curves presents no difficulties, and horizontal flexibility is equal to any reasonable requirement for same, as shown in Fig. 11. The hooks are well supported above and below the link in the sides of the recess *b* in resisting side pull. Coupling with common pin in case of breakage or removal of hook is provided for in the openings Z of the buffer-head, the draft-springs being then supported on the draft-timber tie *y*, in addition to the case J.

To lock the hook over its contained link after coupling, the lever F is brought from its coupling-rest *r* upward and into the lock-rest *q*, Figs. 1, 13, 14, and 15. The yoke G is then in position shown in Figs. 16 to 19 with its surface *n* covering the compression locking-surface 6 of the hook in all positions except in extreme tension, Fig. 13. The prong *l* of the lever F in the locked position is forced over against the fulcrum-plate H, springing it out of its normal position laterally at its upper end, with the prong *l* completely covered by the locking-surface *p*, beyond which no vertical motion of the prong *l* or lever F, in obedience to any rising tendency of the hook, is possible without further springing the fulcrum-plate with its lock-shoulder *p* clear of the prong *l*, which is possible only as the result of extraordinary pressure of hook—as, for instance, in consequence of a link raising the hook in the act of coupling, with the lever left in the locked position through ignorance or design, but not through accident, as the lever would always be left in the uncoupled position after uncoupling and placed in the rest *r* for again coupling. The action of the fulcrum-spring H is also to hold the lever down in its locking-rest *q*. The stop M, Fig. 3, is also provided, offering additional security in retaining the lever in its locked position. The stop *t'* of the lever F performs a similar function in counteracting the spring of the fulcrum-plate H.

To uncouple or to set the hook not to couple the lever F is brought from its locked position and placed under the rest *s*, corresponding to the positions to uncouple or not to couple, as shown in dotted lines, Fig 3. The lever F being attached to the yoke G and mounted on the fulcrum H, as heretofore fully described, the hook will thus be lifted to the position shown in Fig. 7, with the lever in its extreme or uncoupled position. Uncoupling is possible by operating the lever F, as above described, with the coupler ranging from normal position, Fig. 9, to extreme compression, Fig. 15.

When the coupler is in a state of compression, the compression-surface 3 of the hook is pressed upon by the contained link, keeping the hook back inside of the buffer and the locking-surface 4 of the hook clear of the locking-rib *j* of the buffer, as shown in Figs. 15 and 16. Hence, as before stated, uncoupling is possible in extreme compression, even when using a hook and link too short, as shown in Fig. 18, where the locking-rib *j* overlaps the tension locking-surface 4, and which here acts in conjunction with the surface *n* of the yoke in preventing the rising of the hook, yet enough power can be exerted through the lever F to pass the hook over the slightly-rounded surfaces *j* and 4, raising the hook, and pressing it back against its coupling-spring K.

The arrangement of the hook and link in relation to buffer can be such as to offer no such resistance to uncoupling, however, and still retain a taut coupling, Figs. 16 and 17, or "short" link.

When the coupler is in a state of tension, the locking-surface 4 of the hook is pulled under the locking-rib *j* of the buffer, Fig. 13, and uncoupling by any means is impossible.

As before intimated, the arrangement of the bracket I is such that, although the position of the lever F is not positively secured, except in the rest *q* or locked position, the sides of the rests are so formed that the lever must be sprung to one side or the other of its normal position, and the openings through which the lever must pass to become displaced are so tortuous and contracted as to require guidance by hand, and all surfaces are so formed near the openings as to cause

the lever, on striking at any point, to rebound toward its normal seat or rest in the center—for instance, to pass the lever upward from the rest *s*, Fig. 13, the lever must pass through the curved opening *u* and around the point *v*. The weight of the hook, with the lever in position *s*, or "not to couple," will be resting on the hook, Fig. 7. Hence the weight of the lever will be overbalanced and its tendency will be upward. When the lever is in the coupling-rest *r*, however, the hook will be resting on the buffer or on its contained link, Figs. 9 and 8, and the tendency of the lever will then be downward and into its rest *r*. Hence to pass the lever from its coupling-rest *r* downward the point *w* must be passed in the same manner that the point *v* was passed. In the same manner the lever is brought to or from its locked position or rest *q* around the point *x* and against the additional resistance of the spring-plate H, as before fully explained.

In service the proper position for the lever is in its locked position, except in coupling or uncoupling, as provided for above.

In construction the hook B is inserted through the mouth of the buffer, but in service will not pull out of the same, as the depth of its link-space 8 is such as to keep the hook slightly raised off the bottom of the buffer when resting on its contained link, thus bringing the vertical face of the tension-stop 5 to overlap onto the vertical face of the rib *j* of the buffer, thus relieving the draft-springs D of any further compression; also relieving the strains on the hook to a great extent by offering an additional point of resistance or support *j* and positively preventing the possibility of the hook being pulled out of the buffer in case of breakage of the hook or any of its attachments.

As before indicated, the buffer A is in one piece with the front follower or buffer-lugs *i*, and its position is therefore fixed as regards all possibility of "pulling out." It will also be seen that it is absolutely impossible for the hook to rise off the link in tension, as heretofore fully explained, also shown in Fig. 13.

The compression safety-stop 7 of the hook is intended to relieve the coupling-spring K of undue compression in unforeseen emergencies; but the bottom of the link-recess *c* is so arranged as to furnish a stop for too long a link, as in an ordinary draw-bar, Figs. 11 and 12.

In compression the hook B is independent of all buffing, being subject to the compression of the coupling-spring K only, as shown in Fig. 15.

In tension the buffer A is independent of all tension, except in emergencies, as heretofore fully explained. The vertical surface 7 of the hook also answers the purpose of a safety-stop for the buffer-head in case of a breakage of the latter at its neck or at any point back of the vertical surface *j'*, which will then come in contact with the stop 7 of the hook, and the buffer will thus be prevented from falling on the track.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a car-coupler, the buffer A, forming one piece with the front follower or lugs *i*, which latter are used in combination with the draft or buffer springs D and are supported in the follower-guide C.

2. In a car-coupler, the buffer A, having the side lugs *f*, forming a continuation of the top lug or bracket *g*.

3. In a car-coupler, the buffing member A, having the vertical recess *b b*, intersecting the horizontal recess *c* and extending above and below the top and bottom surfaces *c*, respectively, forming the walls *b*, in combination with the locking-rib *j*.

4. In a car-coupler, the buffing member A, having the downwardly-extending rib *j* and shoulder *j'*, in combination with the cushioned tension member B with its corresponding shoulders 4, 5, and 7, respectively.

5. In a car-coupler, the shoulder *j'* of the buffing member, in combination with the shoulder 7 of the tension member.

6. In a car-coupler, the longitudinally-independent tension member B, in combination with the longitudinal cushion or coupling-spring K.

7. In a car-coupler, the longitudinally independent and cushioned tension member B, in combination with the independent buffing member A.

8. In a car-coupler, the longitudinally-cushioned tension member B with its compression locking-surface 6, in combination with the surface or shoulder of a locking coupling or uncoupling device.

9. In a car-coupler, the longitudinally-independent longitudinally-cushioned tension member B, mounted as shown and described, in combination with the buffer A, mounted substantially as shown on accompanying drawings and described in this specification.

10. In a car-coupler, the combination of the independent buffer A and cushioned tension member B, in combination with the locking coupling or uncoupling device consisting of the yoke G, the lever F, the fulcrum H, the bracket I, and the stop M.

11. In a car-coupler locking, coupling, or uncoupling device, the lever F, having its fulcrum-seat *k*, heel *t*, and safety-pin *t'*, and prong *l*, in combination with the spring-fulcrum H, having its slot *o* and shoulder *p*.

12. In a car-coupler locking, coupling, or uncoupling device, the lever F with its shoulder *l*, in combination with the yoke G with its locking-shoulder *n*.

13. In a car-coupler locking, coupling, or uncoupling device, the bracket I with its rests *q r s* for the purpose explained, in combination with the lever F and fulcrum-spring H.

14. In a car-coupler locking, coupling, or

uncoupling device, the stop M, in combination with the lever F and fulcrum-spring H.

15. In a car-coupler, the case J, in combination with the buffer-spring or draft-spring D, the back follower E, the tension member B, and the compression member A, all arranged substantially as shown on accompanying drawings and described in this specification.

16. In a car-coupler, the buffing member A, having the downwardly-extending locking-rib *j*, in combination with the locking-surface 4 and safety-stop surface 5 of the longitudinally-independent and longitudinally-cushioned tension member B.

17. In a car-coupler, the longitudinally-independent and longitudinally-cushioned tension member B and the compression surface or shoulder 3, in combination with the longitudinal cushion or coupling spring K, all arranged as shown on accompanying drawings and operating as described in this specification.

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Witnesses:
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GEO. W. DALY.