

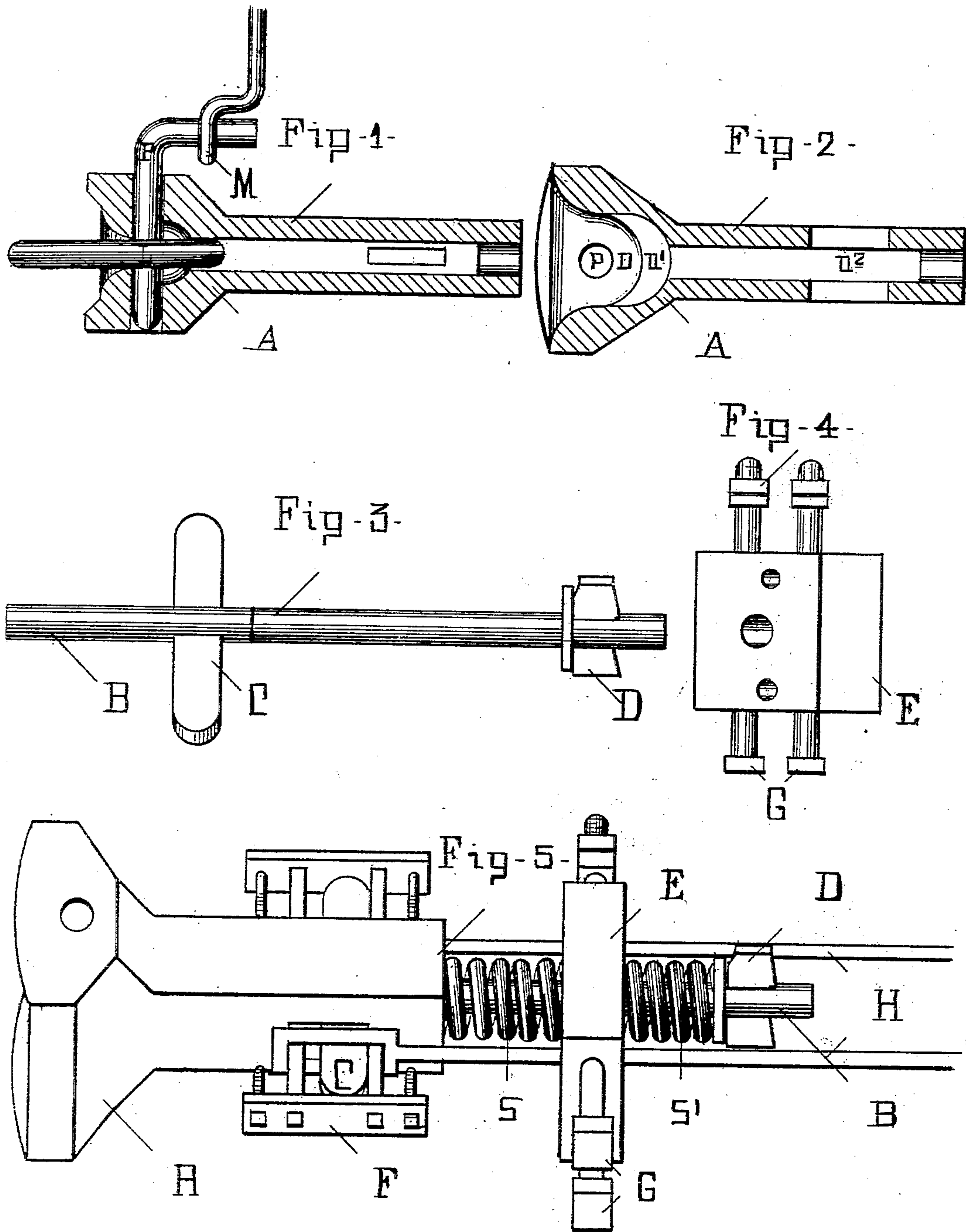
(No Model.)

J. R. AVERY.  
CAR COUPLING.

2 Sheets—Sheet 1.

No. 504,690.

Patented Sept. 5, 1893.



Witnesses  
F. W. Johnson  
Herbert Loughridge.

*James R. Avery* Inventor

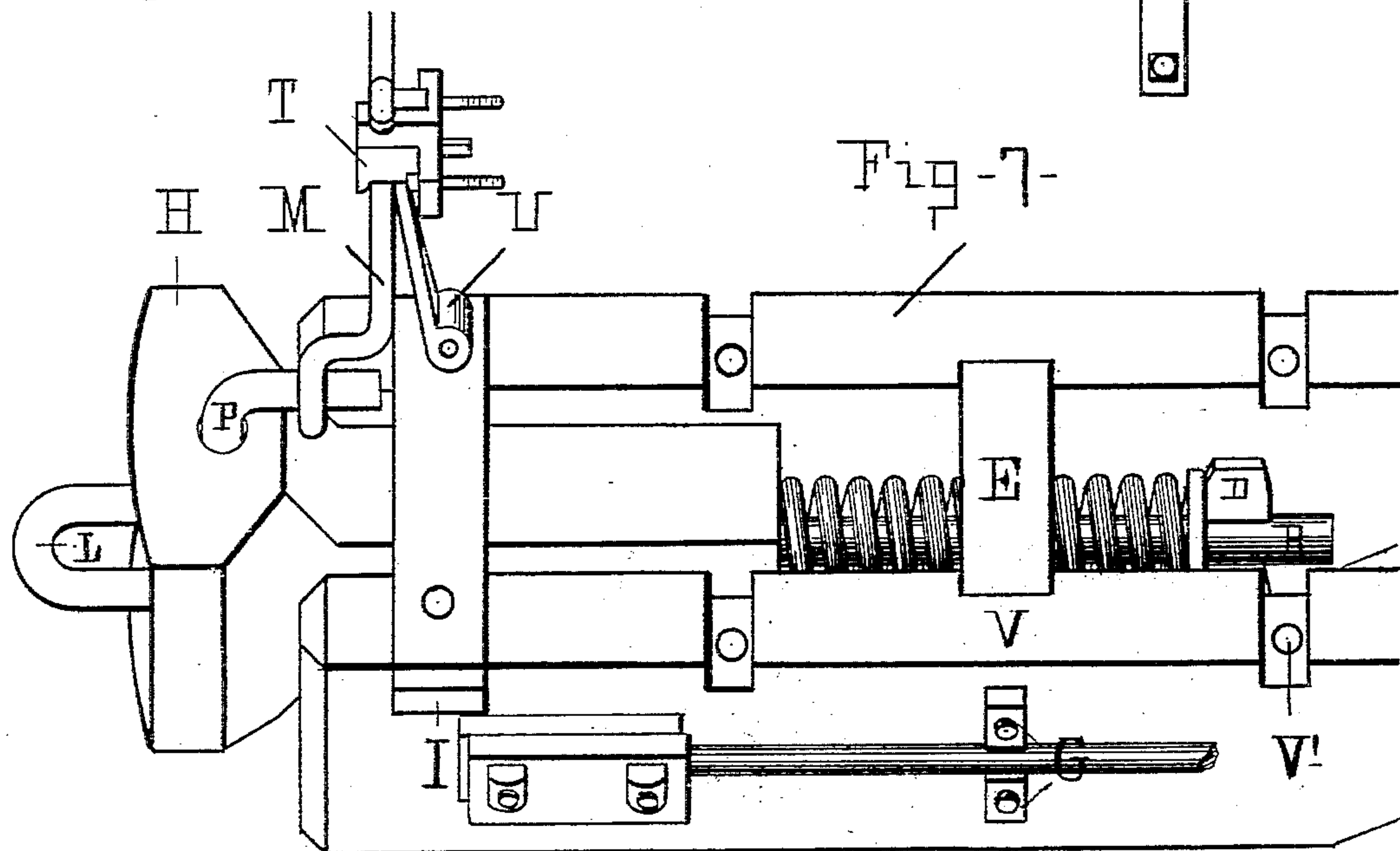
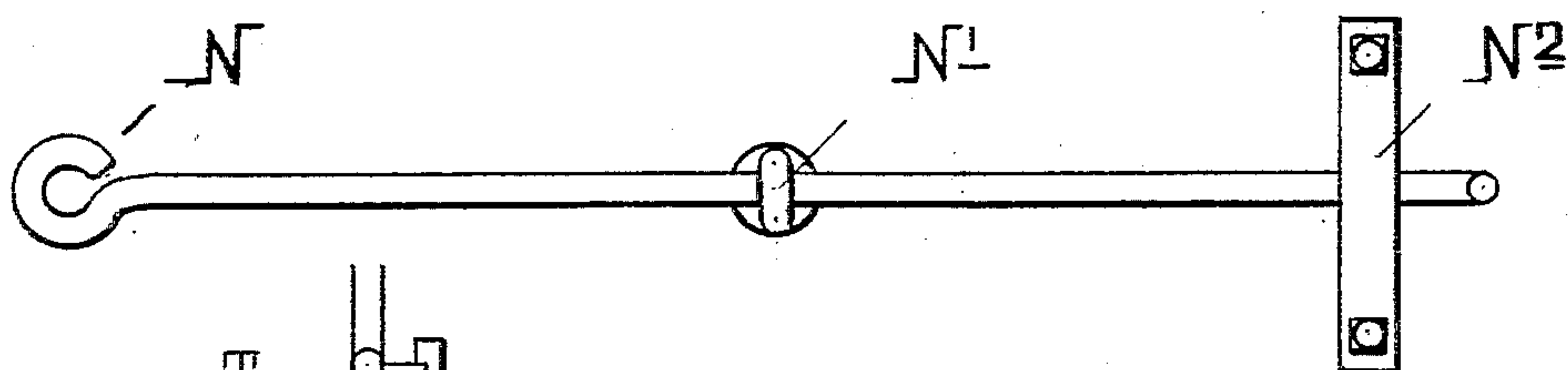
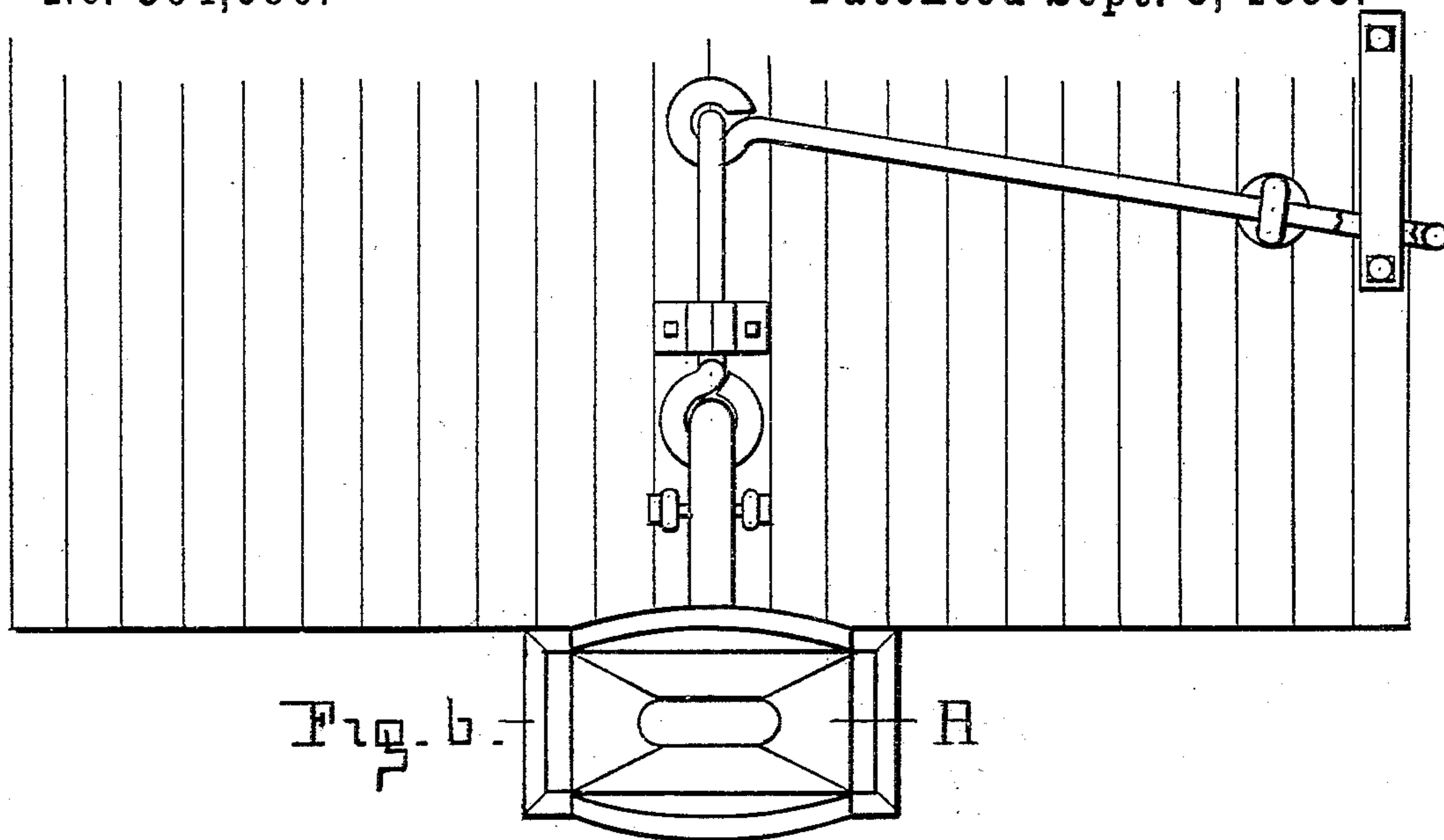
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*Herbert Longridge*

INVENTOR

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# UNITED STATES PATENT OFFICE.

JAMES R. AVERY, OF LOUISVILLE, KENTUCKY.

## CAR-COUPLING.

SPECIFICATION forming part of Letters Patent No. 504,690, dated September 5, 1893.

Application filed July 12, 1892. Serial No. 439,738. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES R. AVERY, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Car-Couplings, of which the following is a specification.

My invention relates to the link and pin type of car-coupling, and consists in its geometrical development and in providing means for secure combination, attachment, automatic coupling protection against thrust and draft, the elimination of undue friction, to overcome inertia without resistance, receive and utilize momentum without surprise, and consequent injury, allow freedom of traction and to uncouple with ease, convenience and dispatch in safety; and the objects of my improvements are, the execution of every function attributable to the office of a car-coupler in harmony, and with assured safety to life, limb, and property while coupling, running, and uncoupling cars. I attain these objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1, is a vertical longitudinal sectional view, of the coupler in combination with the link and pin. Fig. 2, is a section, horizontal, longitudinal view of the coupler. Fig. 3, is a detail view of the draw-bar provided with the bolt, washer and key. Fig. 4, is a detail view of the cross-beam or spring abutment. Fig. 5, is a detail view of the coupler and draw-gear in combination. Fig. 6, is a perspective view of the coupler, coupling pin, and uncoupling device in combination. Fig. 7, is a detail view of the coupler and attachments in combination with the draft timbers.

Similar letters refer to similar parts throughout the several views.

A represents my coupler which I provide with a cylindrically round, straight smooth vertical pin hole, for the easy insertion and withdrawal of the coupling pin and its uniform bearing while engaged therein; with the link cavity A having its walls, entrance and opening thereto formed geometrically by the blending of elliptical, concave, cylindrical, convex and converging oblique, plane walls, for the reception, guidance and holding of the coupling link, in position normally for auto-

matic coupling; with the sub-cavity  $a'$  in crescent form, horizontally and vertically corresponding in dimensions with the entrance to the link cavity  $a$ , and blending therewith, to receive the inner end of the link for a greater elevation of its outer end and for holding links in position that are longer than the standard link required for this coupler for automatic coupling; with the hollow extending therefrom longitudinally through the stem or neck of the coupler which may be either round or square preferably round as illustrated, to afford greater strength thereto and with the transverse slot  $a^2$ , therethrough of a length greater than the width of the bolt C, engaged therein, to permit a limited longitudinal movement of the coupler A, upon the draw-bar spring rod or bolt B, limit the action of the buffer spring S, thereon place the link and distribute the unspent force of thrust upon the draft timbers of the car. The front end or portion of the draw-bar B I have fashioned and proportioned to fit closely the hollow in the neck of the coupler and provided it with transverse slot and bolt C; and all of that portion of the draw-bar not engaged in the neck of the coupler I have fashioned perfectly round and provided it with a washer, the vertical slot and key therein near the rear end. The cross beam E, (spring abutment,) consists of a block of wood or other suitable material metal or composition preferably wood, having two holes made through it longitudinally and parallel each to the other at a distance apart sufficient for the passage of the stem of the draw-bar spring rod or bolt through a transverse hole or bearing made through the center of said block between the bolts G, engaged in the longitudinal parallel holes aforesaid. On each side of the central bearing near each end a hole or slot is provided for the passage of the draft rod H, in connecting the coupler with the king bolt transom or body bolster of the car or two couplers with each other or the draw timbers at one end of a car, with those at the other end.

The bolts forming part of my cross beam or spring abutment, I provide with threaded nuts for attachment and adjustment to the draft timbers.

I provide the draft timbers V, for my coup-



ling in pairs of equal and uniform proportions with a saddle or transverse groove and a shoulder each in the upper edge near the front end. A transverse horizontal slot, a vertical transverse groove bearing on the inner side with two holes through therefrom one vertically above the other on a line with the center of the groove bearing, to receive and engage the bolts G, in combination with the block E; two transverse grooves  $v'$ , in the upper edge of each draft timber and lower edge of the floor timber corresponding and similar to receive and engage jointly in combination lugs that provide additional bearing for the bolt passing therethrough, connecting the draft with the floor timbers of a car.

To combine and operate my invention I place the ends of the cross-beam (spring abutment) E, in the vertical groove bearings of the draft-timbers, insert the bolts G, and secure them with the nuts provided therefor. I place in the saddle at the front end of the draft timbers a right angled carry-iron I, and secure it with bolts and nuts. Having so connected a pair of draft timbers I attach and secure them to the floor timbers of the car as provided with bolts, bearings and nuts. To the front end of the car against the shoulders of the draft timbers I attach and secure a plate of iron or steel, dead wood or blocks with bolts, nuts or screws, either or both as may be preferred to provide additional resistance to draft. Thus prepared, I place the draft rod H, on each side in the bearings made through or connected with the cross-beam and king-bolt transom or body bolster of the car, place the neck or stem of the coupler in position on the carry-iron, insert the draw-bar spring rod or bolt B, into the hollow neck of the coupler and bearing at the center of the spring abutment  $c$ , having the buffer spring S, thereon interposed between the end of the coupler and the cross beam  $c$ , and the draft spring  $S'$ , on the rear end against said abutment, secure the draw-bar in the neck of the coupler with the bolt C, and guard F. In the use of the guard F, having a plate provided with two square bolts secured thereto and parallel each to the other and bolt holes near each end of said plate, provided with round bolts and nuts or screw bolts, the square bolts or short bars provide end walls to the horizontal transverse slot in the draft timbers and bearings for the lateral rods H engaged thereby. The round bolts secure the guards thereto. I provide either draft timbers with the guard, and draft rod H engaged thereon or by inserting the bolt C, through the other slot into the slot of the draw-bar until its center is engaged therein, then apply the other guard and secure as the first. The square bolts fit against the end walls of the slot closely and are engaged by the draft-rods H, place a washer on the rear end of the draw-bar spring rod or bolt B, against the rear end of the draft spring  $S'$ , and insert the key D, in the vertical slot provided therefor,

secure the draft rods to the transom or body bolster or each to the other and rear edge of the king-bolt transom or body bolster with a bar and nuts provided therefor, or connect with continuous rods extended from the coupling or draft timbers at the opposite end of the car. I then provide the coupler with the pin P, made of cylindrically round wrought iron, steel or other suitable metal proportioned to conform to the pin hole and bent at a right angle for engagement in the pin hole of the coupler, with the uncoupling rod M, and a ball or gravity catch U, in combination, preparatory to coupling. The uncoupling rod M, engaging the pin P, I secure to the end of the car on a straight line with the center of the coupling pin hole and vertical thereto with the separable bearing T, consisting of two sections each equally provided, having a vertical bearing for the rod M, a pin projection at the back of each section and a bolt-hole provided with a bolt. The vertical rod M, in addition to the eye at its lower end the horizontal and vertical angles respectively therefrom, I have provided with the pin or short rod M, projecting from it for engagement with the lateral angled rod N. To uncouple from the side of the car with this combination, bear down upon the outward end of the rod N, and from the top of the car, lift the rod M, the pin is withdrawn from the link cavity, the catch U, falls under the shoulder of the vertical rod M, against the end of the pin P, thereby suspends said pin with the lower end of its vertical portion engaged in the upper wall of the pin hole while its upper horizontal portion is engaged in the eye of the vertical rod M, and with the gravity catch U. in such position that two couplers in similar condition in combination with a car either of which being provided with the coupling link L, if brought into contact the outer end of the link will strike within the opening to the entrance of the link cavity of the approaching coupler and guided by the converging walls thereto enters the link cavity, the couplers press against each other, the bolts C being impinged against the rear wall of the slot in the draft timbers and closely engaged by the slot in the draw-bar prevents its rearward movement, the coupler is forced rearward thereon, the spring S, yields to the pressure until the bolt C is impinged against the front wall of the slot  $a^2$  of the coupler A thereby moving the link forward into its cavity and at the same time the pin rearward pushing back the gravity catch U, releases the vertical rod which falls carrying with it the coupling pin which passes through and engages the link L, thus coupling automatically, concurrently the thrust is cushioned, the force distributed and the spring protected. The link L, is also made of cylindrically round wrought iron, steel or other suitable metal having the same diameter as that of the pin and is to the entrance to its cavity as the pin to the pin hole, its length equal to twice the depth



of its cavity and its width equal to the diameter of the pin hole plus twice the diameter of the pin.

Referring to Letters Patent No. 367,128, issued to me July 26, 1887, for improvements in car-coupling, Figs. 2. and 3. of the drawings made part thereof are similar in appearance to Figs. 1. and 2. of the drawings made part hereof. The former, represents a mechanical development of my coupler, for which Letters Patent were issued to me April 14, 1885, No. 315,884, and November 10, 1885, No. 330,284, while the latter represents a geometrical solution or development, of the link and pin type, of car coupler determined with mathematical accuracy as to form, configuration and proportion and capable of increase or decrease uniformly and proportionately. I am also aware that continuous draft rods have been and are now employed, in the combination of car-coupling, to receive draft direct, as principal and not subsequent to the operation of the spring or springs as auxiliary, in accordance with the spirit of my invention as herein set forth.

Having thus illustrated and described the construction, combination, attachment, and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a car-coupler, an angled coupling-pin, having uniform diameter and coupling-link of like diameter, the inner ends of the link being semicircles conformed to the periphery of the pin and proportioned thereto as the pin-hole is to the pin, substantially as set forth.

2. A car-coupler having a vertically straight pin-hole of uniform diameter and a link-cavity having elliptical-concave, cylindrical-convex, and oblique converging walls, the configuration blending and assuring the proper reception guidance and union of the pin and link, substantially as set forth.

3. A car-coupler having its sub-cavity made to conform to the end of the coupling-link, proportionately as the pin-hole to the coupling-pin, substantially as and for the purposes specified.

4. In a car-coupling, a coupler having a cylindrical hole of uniform diameter, longitudinally through the center of its neck or stem bisecting the rear or back wall of the sub-cavity therein, a transverse slot through said neck or stem bisecting the walls of said hole of a length sufficient to allow a limited longitudinal movement of a bolt or bar engaged therein with a draw-bar, spring or bolt, substantially as and for the purposes set forth.

5. In a car coupling, the spring rod or bolt, of uniform diameter, having two transverse slots, one vertical to the other, the longer of the two slots having a bolt or bar for combination with the transverse slot in the neck of the coupler impinged against its rear wall and a key for the other slot for combination, with follow plates having a spring interposed,

or with a spring abutment having a spring interposed between it and the coupler and between said abutment and a washer or other abutment impinged against said key.

6. In a car coupling the bolt or bar engaged by the draw-bar, the spring rod or bolt, in the transverse slot through the neck of the coupler and in the transverse slot in or through the draw timbers of the car, impinged against the rear wall of each slot, in combination to prevent the rearward movement of said draw bar, rod or bolt, permit the operation of the spring or springs to place the link, release the pin, cushion thrust, cause automatic coupling and receive the unspent force imparted by thrust, substantially as and for the purposes specified.

7. In the combination of a car coupling, the cross beam or spring abutment, having a hole through its center, to receive and engage the draw bar, rod or spring bolt, of a car coupler and transverse thereto, a hole above and below and parallel to each other, provided with bolts therein, to strengthen, connect and secure it to the draft timbers of the car substantially as and for the purposes set forth.

8. In a car coupling, the cross beam spring abutment made of any suitable material, metal, wood or composition having a hole or bearing through its center, engaging the draw bar, spring rod or bolt, a hole above and below transverse thereto having a rod or bolt each therein to strengthen the said abutment connect with and secure to the draw timbers having a bar on the outside of each, secured thereto by rods or bolts, provided with nuts to protect and prevent the draw timbers from spreading.

9. In combination with a car coupler, the draw timbers of a car, having a transverse slot provided therein or there through, opposite and parallel each to the other, to receive and engage the bolt or bar impinged against the rear wall of said slots the neck of the coupler having a transverse slot and the draw bar, spring rod or bolt having a slot near the latter slot to prevent the rearward movement of said draw-bar, rod or bolt, assure the operation of the spring or springs thereon, place the coupling link, release the pin, cushion thrust, cause automatic coupling and afford resistance to unspent force received from thrust substantially as described.

10. In a car-coupling—a coupler having a vertically straight coupling-pin-hole of uniform diameter a coupling-link cavity, having elliptical concave, cylindrical-convex, and oblique converging walls—the configuration blending and assuring the proper reception, guidance and union of the pin and link, a sub-cavity conforming to the end of the coupling link therein proportionately as the pin-hole to the coupling-pin, a cylindrical hole of uniform diameter longitudinally through the center of its neck or stem bisecting the rear wall of the sub-cavity, a transverse slot through said neck or stem bisecting the walls



of said hole of a length sufficient to allow a limited longitudinal movement of a bolt or bar engaged therein with or by a draw-bar, spring-rod or bolt, substantially as and for the purposes set forth.

11. In combination with a car coupler and transom or body bolster of a car the draw rod or rods employed to resist draft and strengthen the coupling.

12. In a car coupling, the lateral rods, connecting the transom or body bolster of the car, with the transverse slot in the draw timbers or guards engaged therein, to receive draft subsequent to the operation of the spring or springs and provide increased strength to the coupling.

13. The guards F. in combination with the draft timbers of a car substantially as and for the purposes herein set forth.

14. In a car coupling the lateral rods connecting the transom or body bolster of a car with the guards in the transverse slot of the draw timbers or with the bolt or bar engaged in the transverse slot in the neck of the coupler and transverse slot in the draw bar spring rod or bolt, to provide increased strength to the coupling and protection to the spring or springs in combination.

15. In a car coupling the draft timbers of a car, having a transverse slot each opposite and parallel, provided with lateral draft rods engaged therein or thereby, to prevent the rearward movement of the draw-bar engaged in the neck of the coupler, permit and assure a limited movement of the coupler thereon rearward and a limited forward movement of both, also afford protection to the spring or springs, in response to thrust and draft respectively, the cross beam or spring abutment, having a hole through its center, to receive and engage the draw-bar, rod or bolt of a car coupler and transverse to, said hole, above and below holes parallel to each other, provided with a rod or bolt, each having a nut or nuts connecting it with and securing it to said draft timbers, affording an abutment for the springs engaged upon the draw-bar, spring rod or bolt, in combination substantially as and for the purposes herein set forth.

16. In a car-coupling the combination of a coupler provided with a transverse slot, and having in its neck a draw-bar, spring bolt or rod engaged therein with a sliding bolt or bar inserted in said slot, and draw-rods connected by slotted or looped ends therewith, whereby the pull first actuates the spring or springs of the spring bolt, rod or draw-bar, and subsequently acts upon the draft-rods, substantially as set forth.

17. In a car coupling, the coupler having a straight cylindrically round pin hole of uniform diameter, for the easy insertion and withdrawal of the coupling pin, a link cavity made to conform therewith, proportionately,

by the blending of elliptical, concave, cylindrical convex and oblique converging walls, to receive, direct and hold the coupling link, in position normally for automatic coupling; a sub cavity, to receive the inner end of the link for a greater elevation of its outer end and made to conform thereto proportionately as the pin hole to the pin, also for automatic coupling with links that are longer than the standard; a cylindrically round hole of uniform diameter extending therefrom longitudinally through the neck of the coupler, and a transverse slot therethrough, having a spring rod or bolt engaged in said longitudinal hole with the bar or bolt in said transverse slot, impinged against its rear wall and of a width less than the length of the slot and equal to the depth of the sub cavity to cushion thrust, place the link, release the pin, cause automatic coupling and provide greater strength to the coupling substantially as described.

18. The guards F. draft timbers V. cross beam E. and draft rods H. in combination substantially as and for the purposes herein set forth.

19. In combination the draft timbers V., cross beam E., angled carry iron I., draft rods H., coupler A., draw bar B., spring S., bolt C., guards F., spring S', a washer and key D., substantially as and for the purposes herein set forth.

20. In combination with a car, the draft timbers V., provided with a spring abutment E., angled carry-iron I., guards F., draft rods H., with bar and nuts, coupler A., with pin P., draw bar B., with bolt C., spring S and S', washer and key D., uncoupling device, with vertical rod M., and gravity catch U., substantially as and for the purposes herein set forth.

21. In a car coupling, the draft timbers V., spring abutment E., angled carry iron I. draft rods H., guards F., coupler A., draw bar B. bolt C., springs S and S', washer, key D., link L., and pin P., rod M., bearing T., gravity catch U., and rod N. in combination substantially as and for the purposes herein set forth.

22. In combination with the transverse slot, in the draft timbers of a car, a right angled parallelogram, forming end walls thereto, and a bearing for a draft rod and a guard to a bolt engaged therein substantially as and for the purpose herein set forth.

23. In combination with the car and coupler, the coupling pin P., vertical rod M., lateral rod N., bearing T., and gravity catch U., substantially as and for the purposes herein described.

24. The bearing T. substantially as herein described.

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