

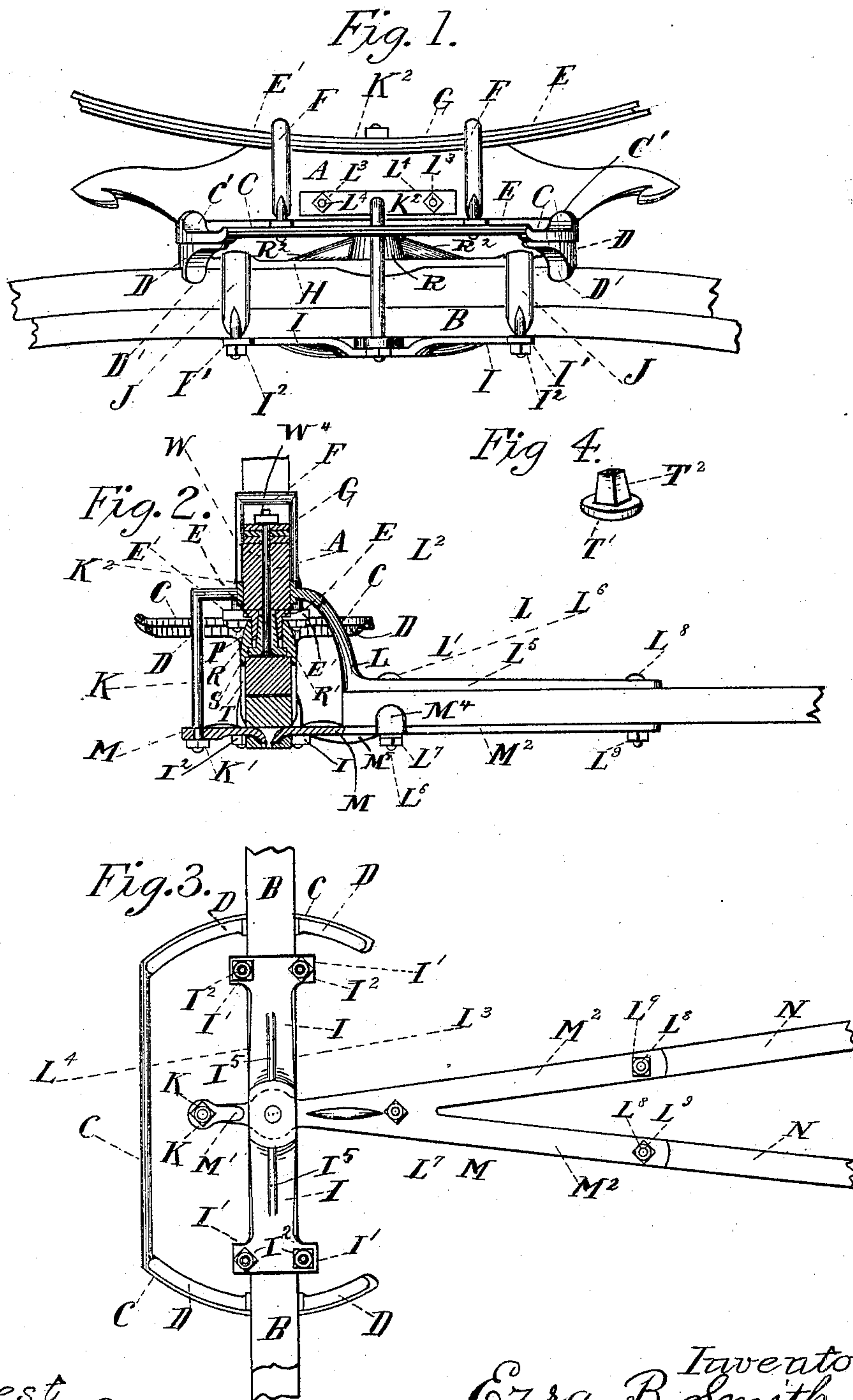
(No Model.)

2 Sheets—Sheet 1.

E. B. SMITH.  
FIFTH WHEEL.

No. 474,151.

Patented May 3, 1892.



Attest  
Harvey Abbey  
M. L. L. McDuncan.

Inventor:  
Ezra B. Smith  
per Wm. Hubbell Fisher,  
Attorney.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

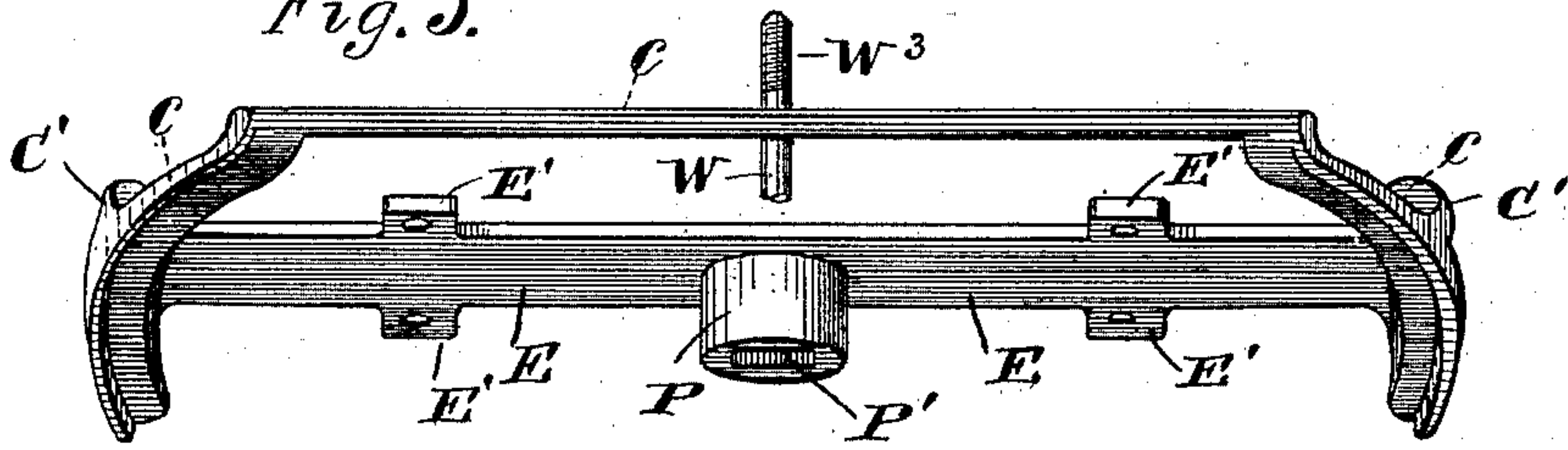


Fig. 6.

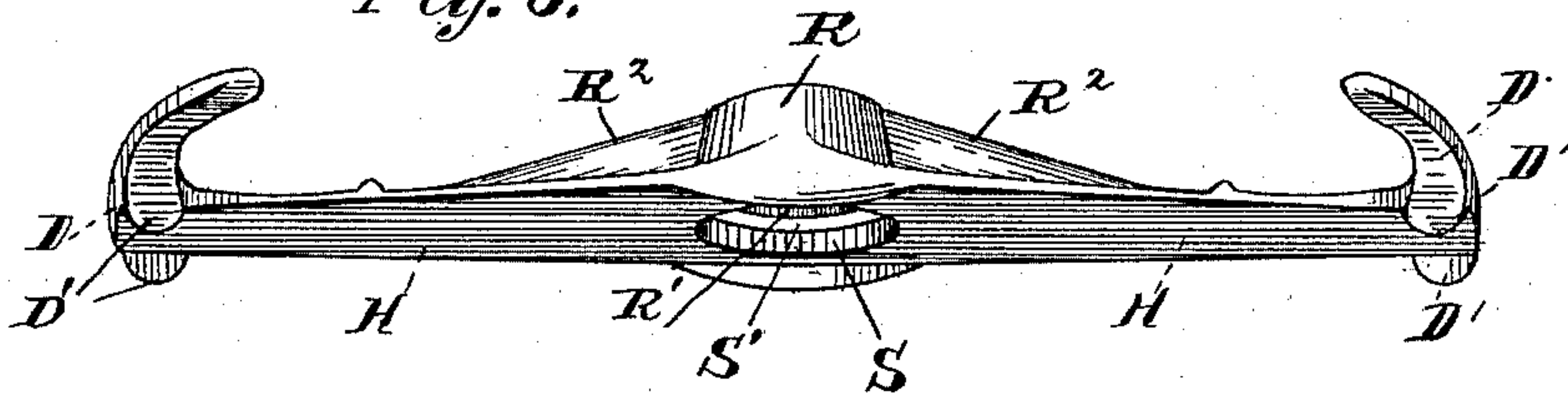


Fig. 7.

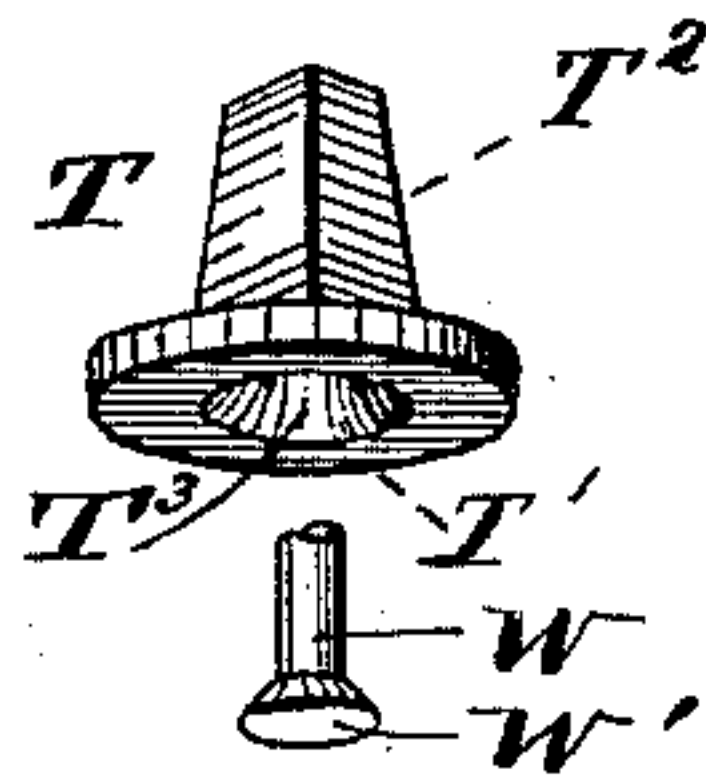


Fig. 8.

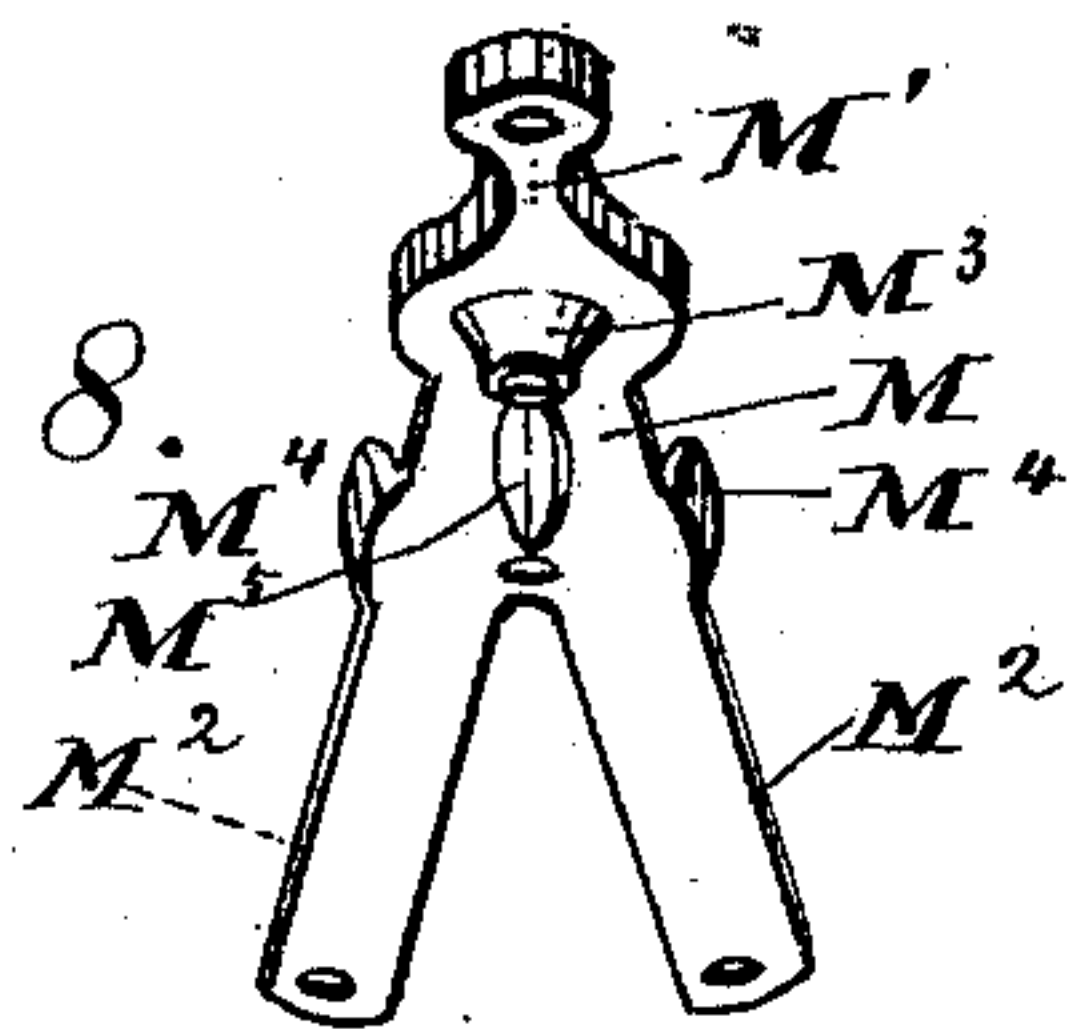
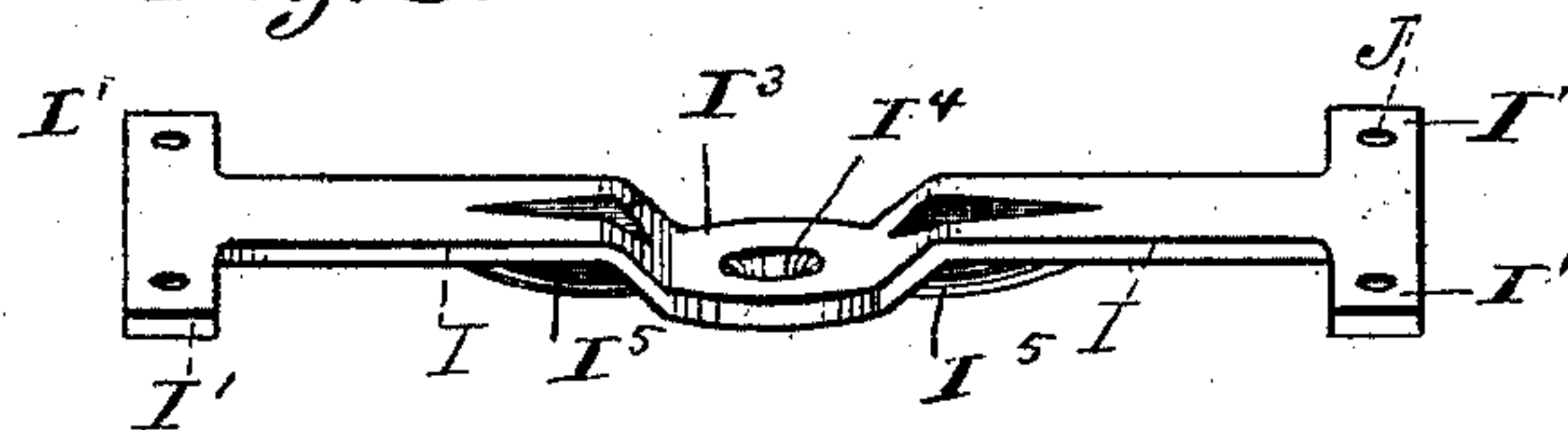


Fig. 9.



Attest  
Nancy Abbey  
M. L. L. McQueen.

Inventor.  
Ezra B. Smith,  
per Wm. Hubbell Fisher,  
Attorney.



# UNITED STATES PATENT OFFICE.

EZRA B. SMITH, OF CINCINNATI, OHIO, ASSIGNOR TO AMELIA KOEHLER SMITH, OF SAME PLACE.

## FIFTH-WHEEL.

SPECIFICATION forming part of Letters Patent No. 474,151, dated May 3, 1892.

Application filed December 8, 1890. Serial No. 373,977. (No model.)

*To all whom it may concern:*

Be it known that I, EZRA B. SMITH, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new Improvements in Fifth-Wheels, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings, making a part of this specification and to which reference is hereby made, Figure 1 is a front elevation of a portion of the axle and head-block and of an elliptic or semi-elliptic spring, as the case may be, supported on the said head-block, and a fifth-wheel combined therewith, illustrating my invention. Fig. 2 is a view showing, partly in section and partly in side elevation, the structure which appears in Fig. 1. In this figure the spring, head-block, fore axle, the upper fifth-wheel, lower plate of novel construction and the novel devices interposed between the head-block and axle and hereinafter specified are shown in vertical central transverse section. Fig. 3 is a view of the bottom or under side of the structure illustrated in Fig. 1. Fig. 4 is a view in perspective of a locking or king-bolt piece interposed, as aforementioned, between the fore axle and head-block and showing two sides and the flange or ring of said piece, the top and adjacent edge and the top of said flange being seen. Fig. 5 is a view in perspective of the upper fifth-wheel and the novel devices connected to said wheel, the view being designed to exhibit the side and bottom of the said devices. In this view there is also seen the upper portion of the king-bolt bolt. Fig. 6 is a perspective view of the lower half of the fifth-wheel and the novel devices connected thereto, the view being designed to show more particularly the under side of the said devices. Fig. 7 is a view in perspective showing two sides and bottom of the said locking or king-bolt piece. In said figure is also seen in perspective the lower portion of the king-bolt bolt. Fig. 8 is a view in perspective of the lower or under perch-iron and its forward extension or arm and the novel

device connected therewith, the view exhibiting the side and bottom of said novel device and its location on said under perch-iron. Fig. 9 is a perspective view showing the top and one edge of the plate directly beneath and connected to the axle and the novel construction of this plate to carry out the objects of my invention.

A indicates a head-block, of any suitable form, and B indicates the fore axle. C points out the upper half or segment of the fifth-wheel, and D indicates the lower half or segment of said fifth-wheel. On the under side of the head-block and in juxtaposition therewith is located a plate E, rigidly secured to and preferably integral with the upper half C of the fifth-wheel, one end of this plate being joined to said upper half of the fifth-wheel at one side of the king-bolt and the other end of this plate being joined to said upper half or segment of the fifth-wheel at the other or opposite side of the king-bolt. This plate is secured to the head-block by suitable means. The preferred means are as follows, viz: The forward edge of this plate E is provided with perforated lugs E', and the rear edge is provided with similar perforated lugs E'. Clips F F pass over the top of the head-block and down its sides. Each lower end of a clip F passes through its adjacent lug E' and is secured in place by a nut screwed thereon below the lug in the usual manner. The upper half C of the fifth-wheel is thereby held securely to the head-block. Where the arrangement of springs on the vehicle is such as that an end spring is connected to the head-block, the clips F F may embrace that part, as G, of the spring which lies next to and upon the head-block and securely hold the spring in place on the head-block, substantially as shown in the drawings. The upper half C of the fifth-wheel is at each side provided with a pair of the usual lugs C' C', and in the recess between adjacent lugs is received the lower edge of the head-block A to subserve the functions ordinarily performed by the same. The lower half D of the fifth-wheel is likewise provided with similar lugs D' D', and between each of two adjacent lugs the upper portion of the axle-bed is received, for the purposes ordinarily intended. On the



upper side of the axle-bed is a plate H, extending between the opposite portions of the lower half D of the fifth-wheel and having its ends respectively fastened to the respective adjacent portions of the said lower half D of the fifth-wheel. The plate H and the said lower half of the fifth-wheel are preferably integral. In the present illustrative instance the upper segment or half C of the fifth-wheel is not curved at the front, but continued across in front of the head-block by a straight piece. In the lower half of the fifth-wheel any front piece is omitted, and this lower half consists of two opposite short segmental pieces D D. As such construction of the upper and lower halves of the fifth-wheel for the economy of metal is quite common, further mention thereof is omitted.

At the bottom of the axle and having its length parallel to the length of the said axle is a plate I. This plate is provided at or near each end with perforated lugs I'. Clips J J extend over the top of the plate H and over the sides of the axle, and their respective ends respectively pass through the respective perforated adjacent lugs I' of the strap I and are secured in position by nuts I<sup>2</sup>. Each clip is prevented from slipping laterally along the strap H by means of adjacent lugs H' H', between which clip J sets. At the mid-length of the plate I and between it and the under side of the axle is the under perch-iron M. From the latter extends forward an arm M'. The free end of this arm M' is perforated, and through this perforation passes the free end of the front brace K, secured to the arm M' by a nut K'. The upper end of this brace is provided with a flat plate K<sup>2</sup>, whose long axis is horizontal, and which plate is bolted to the head-block.

The lower perch-iron has the usual outlying lugs M<sup>4</sup>, between which the perch fits. These lugs aid in preventing the perch from lateral displacement relatively to the perch-iron M. The rear end of this lower perch-iron, where a double perch M is employed, has the usual well-known double piece or fork M<sup>2</sup> M<sup>2</sup>, which fork takes the place of the well-known single piece used on a single perch.

The upper rear perch-iron L is provided with the arm L', which latter extends up to the rear side of the head-block and is there provided with a flat plate L<sup>2</sup>. This plate is similar in form to the plate K<sup>2</sup> and is bolted to the head-block. In the present instance this plate L<sup>2</sup> is secured to the head-block by bolts L<sup>3</sup> and nuts L<sup>4</sup>, the bolts L<sup>3</sup> passing through both of said plates and through the head-blocks and secured thereto by the nuts L<sup>4</sup>. This upper perch-iron, when used for a double perch, has the usual well-known fork, having limbs L<sup>5</sup>, corresponding to the fork M<sup>2</sup> M<sup>2</sup> of the lower perch-iron. This fork of the upper perch-iron takes the place of the well-known upper single piece applied to a single perch. The upper and lower perch-irons and the perch between them are secured

together by bolts L<sup>6</sup> and nuts L<sup>7</sup> and a bolt or bolts L<sup>8</sup> and nuts L<sup>9</sup>.

Thus far all of the construction described is not new and has been described in order to enable the reader to arrive at a better understanding of the features of my invention and their application, now to be specified, namely: The upper or head-block plate E is centrally provided with a hollow journal P, which extends downward from the said plate. There is a vertical central passage or opening P' of a square form in this hollow journal, and said opening preferably tapers somewhat from bottom to top. The upper side of plate H on the axle-bed is provided with a hollow bearing or sleeve R, and the opening R' within said sleeve is of a size just sufficient to receive the hollow journal P and allow the latter to turn therein. In this plate H, directly below the hollow bearing R, is a large circular opening or recess S. A shoulder S' is thereby formed between the opening R' and the vertical wall of this larger opening S. A locking or king-bolt piece T (see Figs. 2 and 7) consists of a ring or annular portion T' and a square central tapering key or projection T<sup>2</sup>. When the locking piece is in position, the annular portion T' occupies the recess S and turns therein, and at the same time the tapering key or projection T<sup>2</sup> is located in and fits the square opening P' of the hollow journal P. The top T<sup>2</sup> of this tapering plug does not quite reach the upper end of the opening P', for a reason hereinafter specified. The base of this annular portion T' is above the top side of the axle-bed. Through the locking or king-bolt piece T is a vertical central passage-way T<sup>3</sup> of a size to admit the passage through it of the king-bolt bolt W, and the lower end of this passage T<sup>3</sup> is countersunk, and in said countersunk portion of said passage is received the head W' of the king-bolt bolt W. The king-bolt bolt passes up through the passage-way T<sup>3</sup> and through the center of the head-block A, and through the portion G of the spring, where the latter is present. A nut W<sup>4</sup> is screwed on the upper end of the king-bolt bolt and contributes toward holding the spring when present in position on the head-block. This nut W<sup>4</sup>, in conjunction with the king-bolt bolt W and the head W' of the latter, secures the locking-piece in position within the opening P', and likewise secures the journal P within the opening R'. The upper side of the ring or flange T' is brought into contact with the shoulder S' of opening S. Thus this upper side of said ring T' and the under surface of shoulder S' constitute the bearing-surfaces between the head-block and front axle at and in the vicinity of the king-bolt, while the undersurface of the upper half of the fifth-wheel and the top surface of the lower half of the fifth-wheel touch each other and constitute the other bearing-surfaces of the pivotal connection between the front axle and head-block. It will be observed that as the lower half D of the fifth-wheel turns the shoulder



S' of opening S turns upon and against the flange T', the latter being one with the upper half of the fifth-wheel as regards rotary motion around the king-bolt. As fast as the adjacent surfaces of the shoulder S' and flange T' wear, such wear may be easily and quickly provided for by screwing down the nut of the king-bolt bolt.

Among other important advantages is the following, viz: The king-bolt bolt is relieved of all transverse breaking strain, and therefore is not at all liable to break. This breaking strain is borne by the journal P, plate E, sleeve R, plate H, and locking or king-bolt piece T. As these parts are of a much greater diameter (breadth) than the king-bolt bolt and are thick and strong, the liability of their breaking under a strain transverse to the longitudinal axis of the king-bolt bolt is greatly lessened. Hence the security of the pivotal connection between the front axle and the head-block is greatly increased and the safety of the occupants of the vehicle, of which said pivotal connection forms a part, will be greatly promoted.

In furtherance of improved pivotal connection between the head-block and front axle the lower plate I is provided with a recess I<sup>3</sup>, and in this recess is provided a countersunk opening I<sup>4</sup>. From the under side of the lower perch-iron M extends a round lug M<sup>3</sup>, diminishing in size from top to bottom. The forward end of the lower perch-iron M is located in the recess I<sup>3</sup> and there rests upon the upper surface of the plate I, and the tapering lug M<sup>3</sup> neatly fits in the countersunk opening I<sup>4</sup>. The plate I being fastened to the front axle turns with the latter and around the tapering pivot-lug M<sup>3</sup>. It will be observed that this pivot-lug M<sup>3</sup> performs the office of a pivot at the lowerside of the axle, and hence obviates the necessity of the presence of a king-bolt at this point. Furthermore, the entire pivotal structure is braced in the line of the fifth-wheel and below the axle. All twisting of the axle is thereby prevented and breakage from this cause is obviated. Upon the plate H, at each side of the sleeve R, is preferably found a rib or fin R<sup>2</sup>, formed integral with the strap and sleeve. The plate I is also provided on its under side with fins or ribs I<sup>5</sup> at each side of the opening I<sup>4</sup>. These various fins or ribs, as well as the customary fin M<sup>5</sup> on the lower perch-iron M, are for the purpose of strengthening the parts to which they are connected at the points where said parts are subjected to a breaking pressure or strain.

While the various features of my invention are preferably employed together, one or more of the said features may be employed without the remainder, and in so far as applicable one or more of said features may be used in pivotal structures, establishing the connection between the head-block and fifth-wheel other than the one herein specifically set forth.

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

1. In a pivotal connection between the head-block and axle, the combination of the head-block, journal P, secured thereto, axle and sleeve R, secured thereto, concealed locking or king-bolt device T, fitting the opening of journal P and having flange bearing against surface S' of sleeve R, and king-bolt bolt passing through said locking device, journal and sleeve, and head-block, substantially as and for the purposes specified.

2. In a pivotal connection between the head-block and axle, the combination of the head-block, journal P, secured thereto, axle and sleeve R, secured thereto, concealed locking or king-bolt device T, fitting the opening of journal P and having flange bearing against surface S' of sleeve R, and king-bolt bolt passing through said locking device, journal and sleeve, and head-block, the head of the king-bolt bolt fitting the countersunk opening T<sup>3</sup> in the locking or king-bolt device T, and the nut W<sup>4</sup> on the king-bolt bolt above the axle, substantially as and for the purposes specified.

3. In a pivotal connection, the head-block and axle and fifth-wheel, and the journal P, connected directly to the plate E; attached to the upper half of the fifth-wheel, and the sleeve R, connected to the plate H, and the angulated concealed locking or king-bolt device T, entering the angulated opening in journal P and engaging therewith, and king-bolt bolt, securing together the said axle, sleeve, locking device, journal, and head-block, substantially as and for the purposes specified.

4. In a pivotal connection between the head-block and axle, the combination of the head-block, journal P, secured thereto, axle and sleeve R, secured thereto, concealed locking or king-bolt device T, fitting the opening of journal P and having flange bearing against surface S', the king-bolt bolt passing through said locking device, journal and sleeve, and head-block and securing the same together, and the upper perch-iron L, rigid with the head-block, and the lower perch-iron M, connected by a pivotal connection to the axle, the two irons combining to prevent the axle from twisting away from the head-block, substantially as and for the purposes specified.

5. In a pivotal connection of the head-block and axle and fifth-wheel, the front brace being bolted to the head-block and bracing the lower pivotal connection below the axle, which last-named connection consists of the lower perch-iron having the pivotal lug entering opening I<sup>4</sup>, and plate I, containing said opening and secured to the axle, in combination with an upper pivotal connection in the vicinity of the fifth-wheel, and flanges each side of the axle-cap for strengthening the king-bolt counterbore, substantially as and for the purposes specified.

6. In a pivotal connection of the head-block,



axle, and fifth-wheel, the front brace K, bolted to the head-block and bracing the lower pivotal connection below the axle, which last-named connection consists of the lower perch-iron having the pivotal tapering lug  $M^3$ , entering and fitting the countersunk opening  $I^4$ , the plate I, containing the said opening  $I^4$  and secured to the axle, in combination with the upper pivotal connection for retaining the upper side of the axle and the head-block always together at their longitudinal centers, substantially as and for the purposes specified.

7. In a pivotal connection of the head-block and axle and fifth-wheel, the lower pivotal connection below the axle, consisting of the plate I, provided with the recess  $I^3$ , forming a depressed central portion, the said depressed central portion being provided with the tapered opening  $I^4$ , the plate being secured to the under side of the axle, and the lower perch-iron lying in the recess of the plate I and upon the depressed portion of the latter, substantially as and for the purposes specified.

8. In a pivotal connection of the head-block and axle and fifth-wheel, the lower pivotal connection below the axle, consisting of the plate I, provided with the recess  $I^3$ , forming a depressed central portion, the said depressed central portion being provided with the tapered opening  $I^4$ , the plate being secured to the under side of the axle and the lower perch-iron lying in the recess of plate I and upon the depressed portion of the latter and having the pivotally-tapering lug entering opening  $I^4$  and fitting closely therein, substantially as and for the purposes specified.

9. In a pivotal connection between the head-block and axle, the combination of the head-block, journal P, secured thereto, axle and sleeve R, secured thereto, locking device T, fitting the opening of journal P and having flange bearing against surface  $S'$  of sleeve R, and king-bolt bolt passing through said locking device, journal and sleeve, and head-block, and the lower pivotal connection below the axle, consisting of the lower perch-iron, having the pivotal lug entering the opening  $I^4$ , and plate or strap I, containing said opening and secured to the axle, substantially as and for the purposes specified.

10. In a pivotal connection between the head-block and axle, the combination of the head-block, journal P, secured thereto, axle and sleeve R, secured thereto, locking device T, fitting the opening of journal P and having flange bearing against surface  $S'$  of sleeve R, and king-bolt bolt passing through said locking device, journal and sleeve, and head-block, and the lower pivotal connection below the axle, consisting of the lower perch-iron having the pivotal tapering lug  $M^3$  and the strap or plate I, secured to the axle and provided with countersunk opening  $I^4$ , in which said lug  $M^3$  is received, substantially as and for the purposes specified.

11. In a pivotal connection between the head-block and axle, the combination of the

head-block, journal P, secured thereto, axle and sleeve R, secured thereto, locking device T, fitting the opening of journal P and having flange bearing against surface  $S'$  of sleeve R, and king-bolt bolt passing through said locking device, journal and sleeve, and head-block, and the lower perch-iron having the pivotal tapering lug  $M^3$ , and the strap or plate I, secured to the axle and provided with countersunk opening  $I^4$ , in which said lug  $M^3$  is received, and upper perch-iron rigid with the head-block, and brace at front for guarding against separation of head-block and axle, substantially as and for the purposes specified.

12. In a pivotal connection between the head-block and axle, the combination of the head-block, journal P, secured thereto, axle and sleeve R, secured thereto, locking device T, fitting the opening of journal P and having flange bearing against surface  $S'$  of sleeve R, and king-bolt bolt passing through said locking device, journal and sleeve, and head-block, and the lower pivotal connection below the axle, consisting of the lower perch-iron having the pivotal tapering lug  $M^3$ , and the plate I, secured to the axle and provided with countersunk opening  $I^4$ , in which said lug  $M^3$  is received, and upper perch-iron L, rigid with the head-block, and forward brace K, connected below to the extension of the lower perch-iron and rigidly secured to the head-block, substantially as and for the purposes specified.

13. The combination of the vehicle head-block, axle-cap, top and bottom fifth-wheel friction-plates, concealed adjustable king-bolt device, and the plate H of the bottom friction-plate provided with hollow sleeve R, having opening  $R'$  for the reception of the hollow journal P, the sleeve being connected to the plate H not only at its base, but also by means of the strengthening-flanges  $R^2$  on each side thereof, substantially as and for the purposes specified.

14. The combination of the vehicle head-block, axle-cap, top and bottom fifth-wheel friction-plates, concealed adjustable king-bolt device, and the plate H of the bottom friction-plate provided with hollow sleeve R, having opening  $R'$  for the reception of the hollow journal P, the sleeve being connected to the plate H not only at its base, but also by means of the strengthening-flanges  $R^2$  on each side thereof, the extremities of the said bottom friction-plate H being provided with the circles of the lower fifth-wheel, substantially as and for the purposes specified.

15. The combination of the vehicle head-block, axle, journal P, top and bottom fifth-wheel, friction-plates, king-bolt device of angular form fitting angulated recesses in journal P, substantially as and for the purposes specified.

16. The combination of the vehicle head-block, axle, journal P, top and bottom fifth-wheel friction-plates, concealed king-bolt de-



vice of angular form fitting angulated recesses in journal P, and the king-bolt bolt passing through the angular king-bolt device, substantially as and for the purposes specified.

17. The combination of the head-block, axle, journal P, and concealed king-bolt device T, interlocking with journal P for preventing the rotation of the said king-bolt device independently of the axle, substantially as and for the purposes specified.

18. The combination of the head-block, axle, journal P, and concealed king-bolt device T, interlocking with journal P for preventing the rotation of the said king-bolt device independently of the axle, the latter being provided with the king-bolt bolt rotatable with the king-bolt device, substantially as and for the purposes specified.

19. The combination of the head-block, axle, sleeve R, journal P, and concealed king-bolt device T, interlocking with journal P for preventing the rotation of the said king-bolt device independently of the axle, the king-bolt device being provided with a flange and

king-bolt bolt passing up through the head-block and king-bolt devices and above the spring or block, provided with a nut whereby the axle, journal P, sleeve R, and king-bolt and friction-plates and perch-irons are secured together, substantially as and for the purposes specified.

20. In a pivotal connection of the head-block and axle and fifth-wheel, the lower pivotal connection below the axle, consisting of the plate I, provided with the recess I<sup>3</sup>, forming a depressed central portion, the said depressed central portion being provided with the opening I<sup>4</sup>, the plate being secured to the under side of the axle, and the lower perch-iron lying in the recess of plate I and upon the depressed portion of the latter and having the pivotal lug entering opening I<sup>4</sup> and fitting closely therein, substantially as and for the purposes specified.

EZRA B. SMITH.

Attest:

GIDEON C. WILSON,  
K. SMITH.