No. 608,281. Patented Aug. 2, 1898.

F. E. CASE.

TROLLEY.

(Application filed June 30, 1897.)

(No Model.)

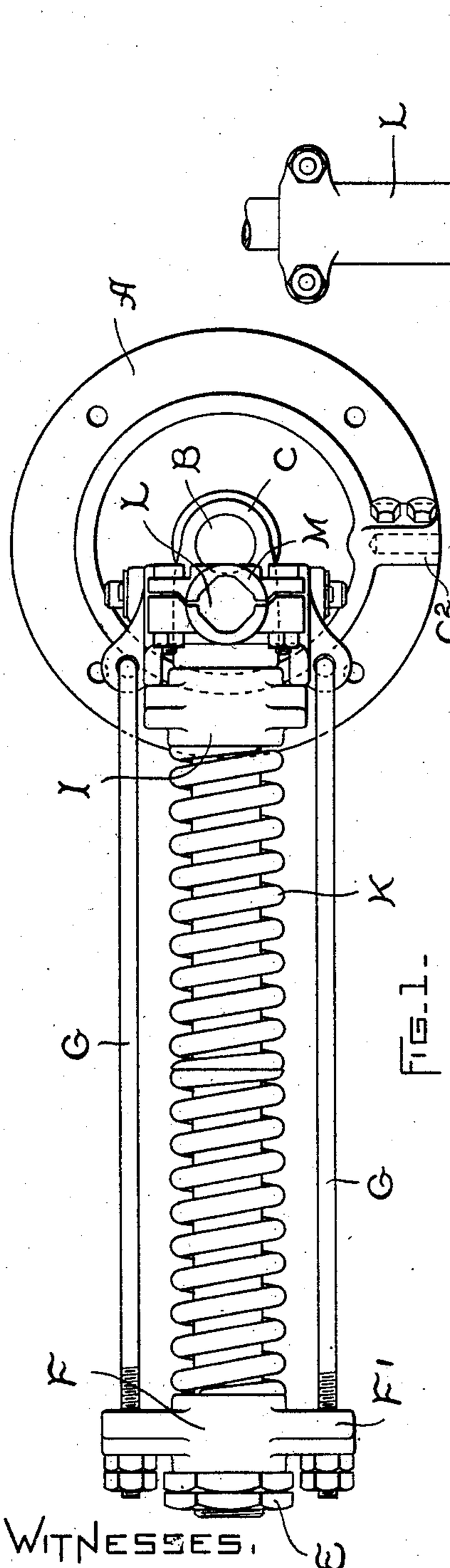

FIG. 1.

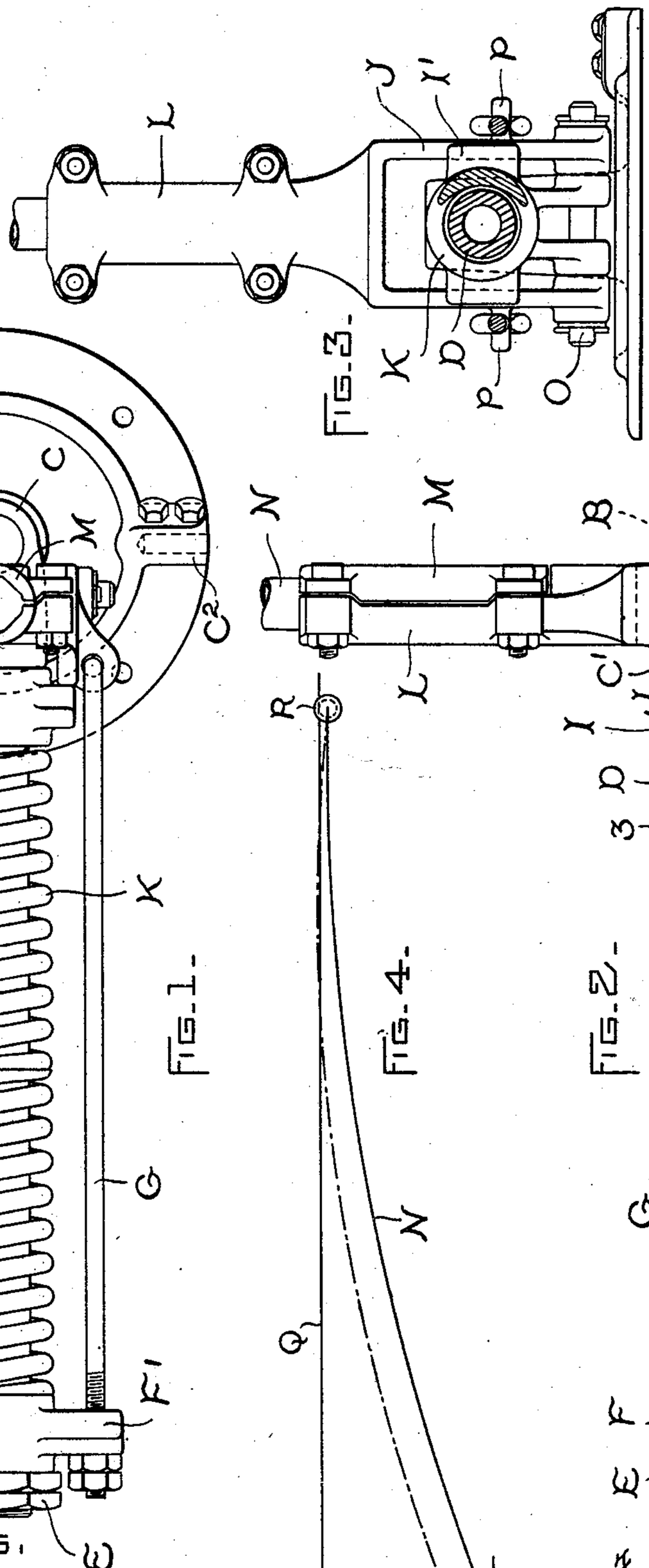

FIG. 3.

FIG. 2.

FIG. 4.

WITNESSES:
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UNITED STATES PATENT OFFICE.

FRANK E. CASE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

TROLLEY.

SPECIFICATION forming part of Letters Patent No. 608,281, dated August 2, 1898.

Application filed June 30, 1897. Serial No. 642,909. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. CASE, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Trolleys, (Case No. 566,) of which the following is a specification.

The present invention relates to trolleys employed on electric railways, and has for its object to decrease the cost of manufacturing by lessening the number of parts employed and to provide a trolley which is adapted for a wide range of movement in its operation, particular reference being made to its operation in the lowest positions.

The present invention is an improvement upon the trolley shown in Patent No. 498,722, dated May 30, 1893, to R. D. Nuttal, and by it I am enabled to dispense with one of the lifting-springs, a sliding cross-head, and rods and utilize instead a single spring or set of springs to lift the trolley-arm and act as a buffer when for any reason the contact-wheel leaves the overhead conductor and flies upward.

In the construction of trolleys it is desirable to make the base or support as low as possible, so that it will not interfere with the operation of the vehicle when the trolley-wire is in close proximity thereto. I have found in trolleys as ordinarily constructed that the principal fault is in locating the pivot about which the trolley-arm moves too high on the stand, so that when the outer or free end of the arm is depressed the trolley-pole, due to the curve therein, strikes the suspended conductor and either throws the trolley-wheel out of contact with the wire or causes excessive arcing by momentarily touching the wire from time to time as the vehicle progresses.

In the accompanying drawings attached to and made a part of this specification, Figure 1 is a plan view of my improved trolley-stand; Fig. 2, a side elevation of the same with the trolley-pole broken away. Fig. 3 is a section on the line 3 3 of Fig. 2, and Fig. 4 is a diagrammatic view illustrating the advantage of my improved trolley.

The base for the trolley consists of a circular casting A, having a vertically-extending stud B. (Shown in dotted lines, Fig. 2.) This stud forms a swivel-support for the casting C, permitting it to turn freely thereon both when it is desired to reverse the trolley and run the vehicle in the opposite direction and to allow the contact-wheel to follow the curves and irregularities in the conductor-wire. To establish electrical connection between the base and other apparatus on the vehicle, a socket C^2 is provided, having set-screws for securing a conductor in place.

In a lug C′ on the casting C is mounted a pipe D, which may be secured in any desired manner. The outer end of the pipe is screw-threaded and provided with nuts E, acting as a stop for the sliding head F. Formed integrally with the sliding head F are outwardly-extending lugs F′, having tapered holes F^2, in which are mounted the side rods G. Mounted upon the inner end of pipe D is a sliding collar I, normally resting against lug C′. Extending laterally from the collar are lugs I′, against which the curved portions J of the fork abut. The pole-socket L consists of a casting having an angular receptacle for the trolley-pole N, and a removable clamp M, secured to the casting by bolts. The lower portion of the socket is provided with a fork the sides of which straddle the casting C. At the lower extremity of the fork are bosses forming bearings for the socket, and extending transversely through the bosses and the casting C is a shaft O, which forms the center of movement of the trolley, which is below the center line of the lifting-spring K. Formed integral with the arms of the fork are lugs P, and rods G are hooked at their inner end to lugs P and held at the outer end, which passes through the cross-head, by screw-threads and adjusting-nuts.

Surrounding the pipe D is a spiral spring K, made in two parts for convenience of manufacture, and under normal conditions is employed for lifting the contact-wheel at the extreme end of the trolley-pole. In addition to this the spring K is employed as a buffer to take up the shock when the contact-wheel leaves the overhead conductor and flies upward.

When the trolley is working under normal conditions, the spring K is compressed from the outer end by the cross-head F. This gives

the required upward pressure to the trolley-wheel on the end of the pole.

With the parts in the position shown the curved lugs J on the fork engage with the lugs I′ on the collar I and prevent the pole from moving farther to the left, except for the buffer action when the trolley leaves the wire. With the lugs J arranged as shown the trolley-pole can move upward until it assumes a vertical position. A further movement will compress spring K from the inner end.

By utilizing the spring K as a buffer as well as for lifting I am enabled to dispense with the second spring, pipe, and cross-head ordinarily employed and situated diametrically opposite from those shown. This decreases the cost of manufacture and maintenance and also makes a trolley which is considerably lighter. I do not, however, limit myself to a trolley so arranged that the spring K acts only as a buffer when the trolley assumes a vertical position. If desired, the spring may be so arranged that the trolley will have only a limited upward movement—as eighty degrees, for example.

In Fig. 4 I have shown diagrammatically the advantage of my improved trolley over others with which I am familiar. Q represents a trolley-wire, and making contact therewith is a wheel R, carried by the other end of pole N. Ordinary trolley-poles when pressed upward so that their contact-wheel engages with the overhead conductor are more or less curved, due to the pressure of the lifting-springs. This is no particular objection so long as the trolley is working under normal conditions; but as soon as the overhead conductor closely approaches the top of the car the tension on the lifting-springs is increased, and the pole bends in a manner similar to that shown in the drawings. The broken and dotted line indicates the ordinary construction of trolley with the center of motion of the pole placed comparatively high and above the center of the lifting-springs, and it will be seen that the pole strikes the conductor Q. This would prevent the operation of the trolley when the conductor dropped to this point. By making the center of motion of the trolley very low I am enabled to provide a trolley which will work between much wider limits than heretofore. Referring to Fig. 4, the center of motion is about six inches lower than is customary and the curve on the pole is somewhat less, owing to the decrease in strain on the lifting-spring, and a safe working distance is provided between the wire and the pole.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a trolley, the combination of a base, a combined lifting and buffer spring extending in one direction only from the base, and a pole-socket pivoted to the base at a point below the center line of the spring.

2. In a trolley, the combination of a base, a single pipe or equivalent frame-piece secured to the base and extending outwardly therefrom, a sliding cross-head mounted upon the pipe, a combined lifting and buffer spring, a pole-socket pivotally secured to the base at a point below the center of the spring, and connecting-links between the cross-head and the pole-socket.

3. In a trolley, the combination of a base, a pipe secured to the base, a sliding cross-head mounted on the outer end of the pipe, a sliding collar mounted on the inner end of the pipe, a combined lifting and buffer spring located between the cross-head and the collar, and adapted to be compressed from each end, a pole-socket pivotally secured to the base at a point below the center of the spring, and means on the socket for engaging with the sliding collar when the pole rises to a predetermined height.

4. In a trolley, the combination of a base, a casting swiveled thereon, a pipe, a cross-head on the outer end of the pipe, a sliding collar provided with lugs also mounted on the pipe, a combined lifting and buffer spring surrounding the pipe and located between the collar and head, and stops for limiting the outward movement of the head, a forked pole-socket pivoted to the base at a point below the center of the spring, and projections on the arms of the fork arranged to strike the lugs on the collar when the trolley is at or near its vertical position.

5. In a trolley, the combination of a casting swiveled upon the base, a pipe mounted in a lug on the casting and extending outward therefrom, a cross-head mounted upon the pipe at the outer end, a sliding collar having outwardly-extending lugs mounted upon the pipe at the inner end, a combined lifting and buffer spring between the collar and head and stops limiting the outward movement of the head, a pole-socket pivoted to the casting at a point below the center of the spring, lugs on the head and pole-socket in which are mounted connecting-rods, and devices on the pole-socket engaging the lugs on the sliding collar when the trolley is at or near its vertical position.

6. In a trolley, the combination of a base, a vertically-extending stud mounted thereon, a casting supported by said stud, a single support extending outward from the casting, a combined lifting and buffer spring mounted on the support, a pole-socket provided with a fork extension on its lower side, the arms of which straddle the casting, and a transverse shaft forming the center of motion of the trolley-pole and socket situated below the center line of the spring.

In witness whereof I have hereunto set my hand this 28th day of June, 1897.

FRANK E. CASE.

Witnesses:
B. B. HULL,
A. F. MACDONALD.