No. 860,229. PATENTED JULY 16, 1907.

J. H. McPHERSON.

TROLLEY STAND.

APPLICATION FILED JAN. 31, 1907.

2 SHEETS—SHEET 1.

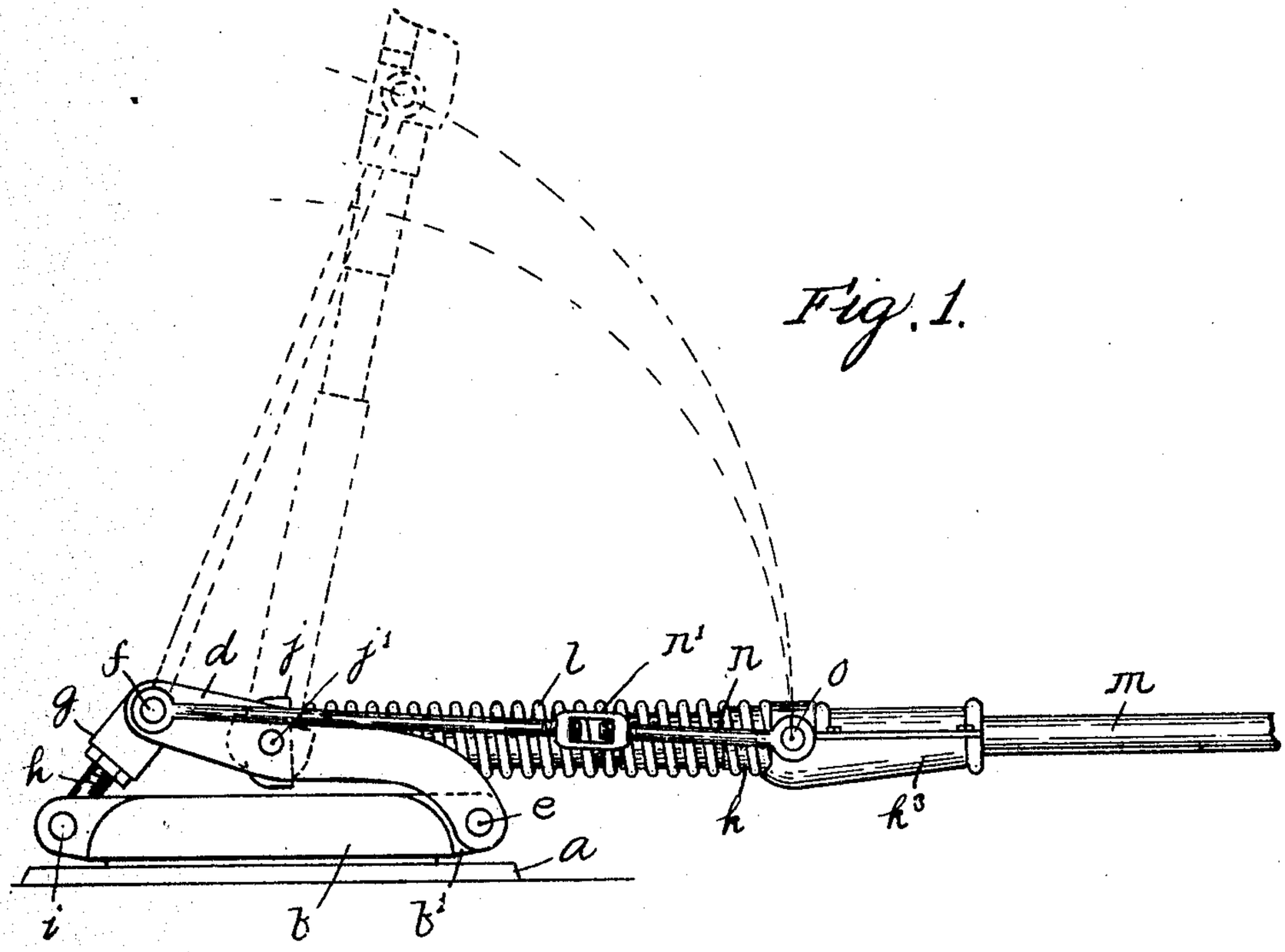

Fig. 1.

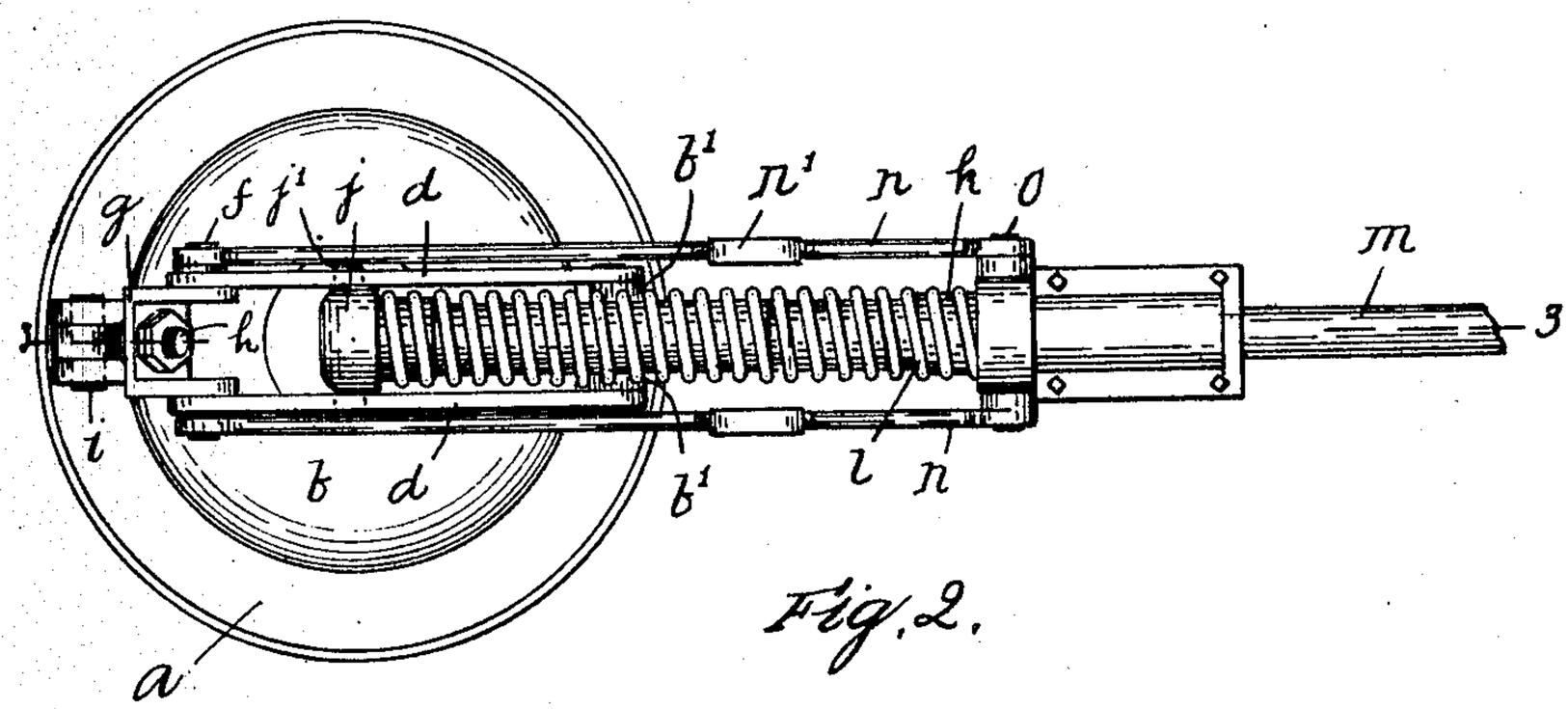

Fig. 2.

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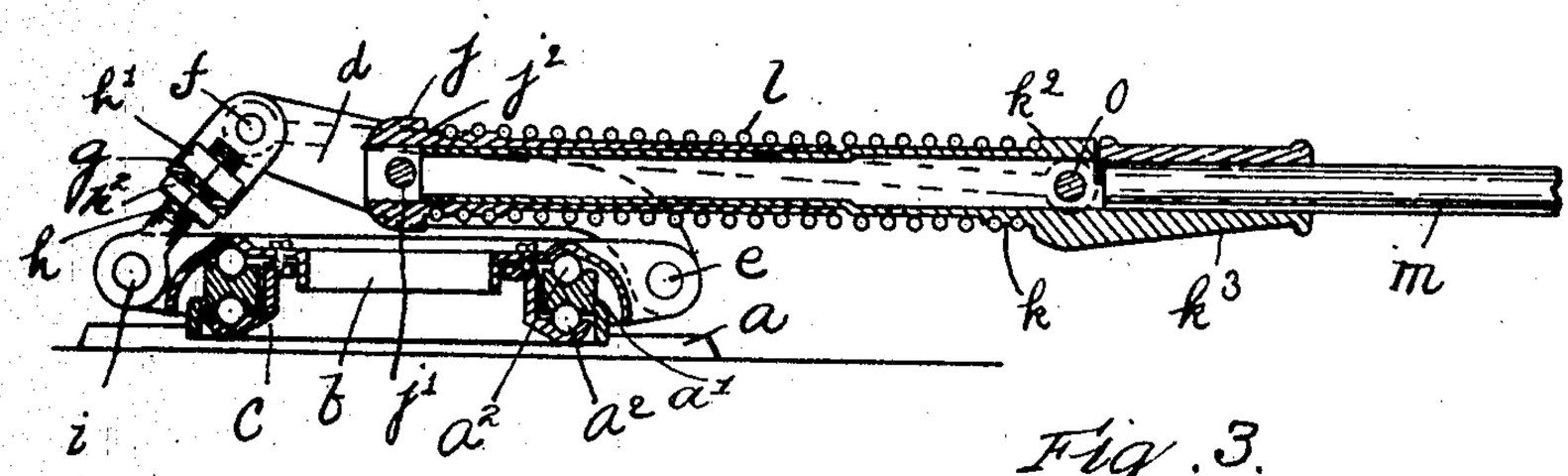

Fig. 3.

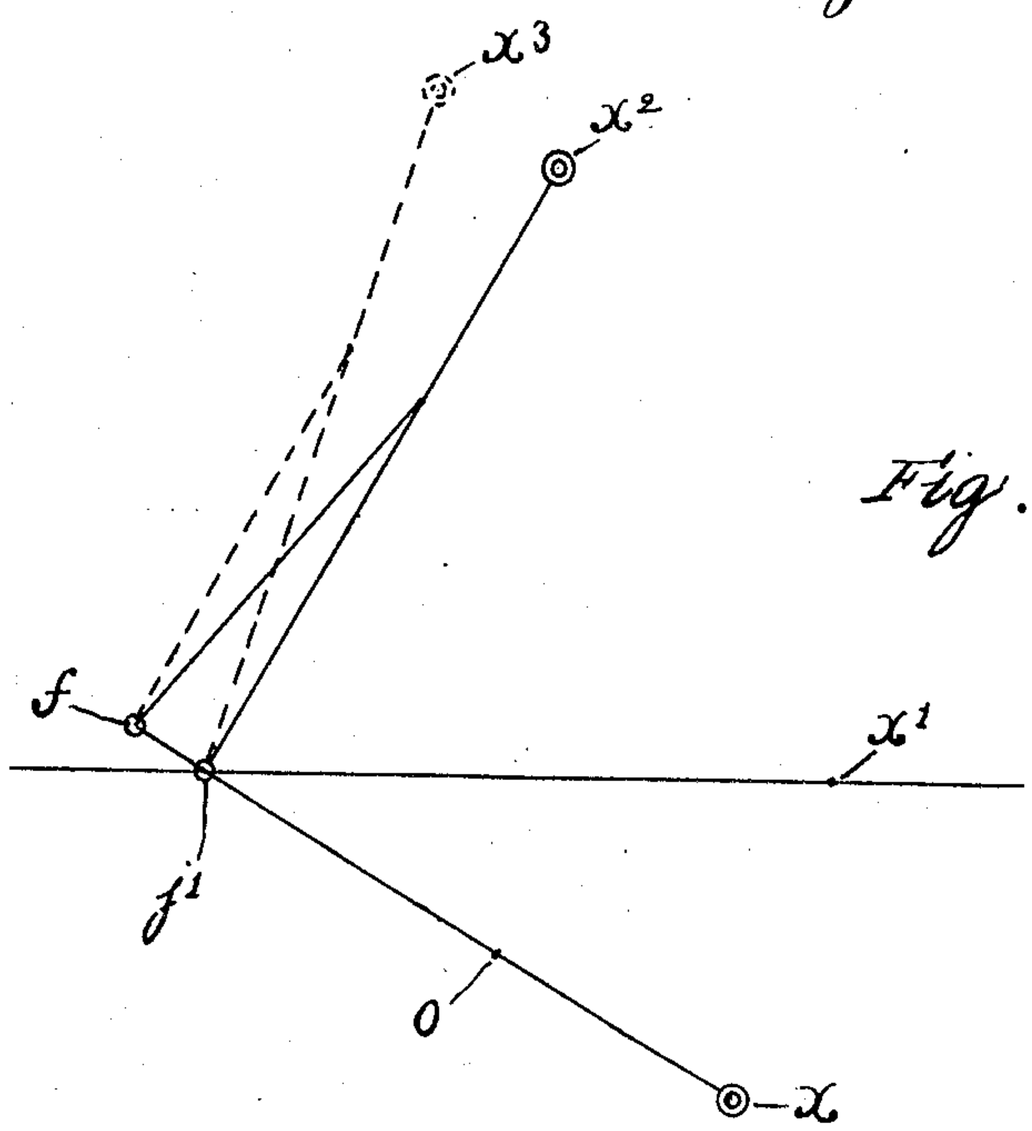

Fig. 4.

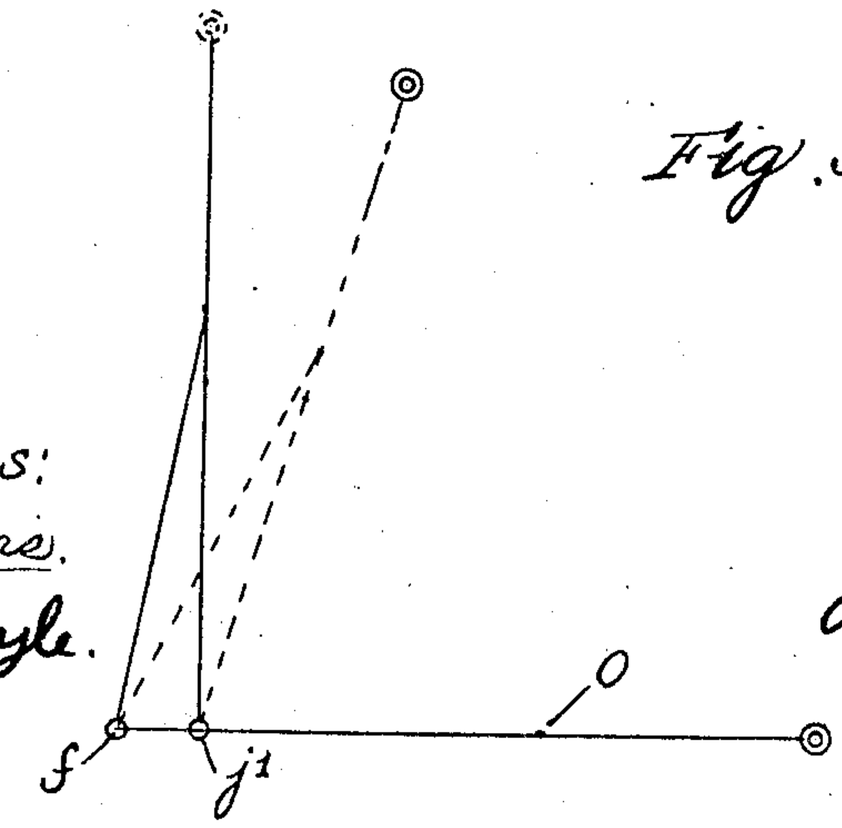

Fig. 5.

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UNITED STATES PATENT OFFICE.

JAMES H. McPHERSON, OF HAVERHILL, MASSACHUSETTS.

TROLLEY-STAND.

No. 860,229. Specification of Letters Patent. Patented July 16, 1907.

Application filed January 31, 1907. Serial No. 355,023.

To all whom it may concern:

Be it known that I, JAMES H. McPHERSON, of Haverhill, county of Essex, State of Massachusetts, have invented an Improvement in Trolley-Stands, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

Trolley stands, as generally employed, are adapted and arranged to move up and down through an arc, the limits of which are approximately the poles horizontal and vertical positions. It is desirable that the upward pressure at the trolley wheel be as light as practicable when the pole is in its lowest position and that in the highest position in which it will be held while in contact with the trolley wire the wheel shall be pressed thereagainst with the required force. When the trolley whee lleaves the wire by accident the pole is usually thrown upwardly with considerable force so that the pole is often broken by striking a cross arm, or damage is otherwise caused.

The principal object of my invention is to provide a form of trolley stand, in which the upward pressure caused by the lifting spring upon the trolley wheel is decreased as the pole is lowered, with means for adjusting the leverage through which the spring acts so that it may be caused to exert its maximum effect in pressing the trolley wheel upward while in a predetermined position, and to exert its minimum effect in pressing it upward in another position, or to vary said effect in any position without adjustment of the spring.

Further objects are to improve the construction of these devices in certain particulars, as will hereafter appear.

I accomplish these objects by the means shown in the accompanying drawing, in which,

Figure 1 is a side elevation, and Fig. 2 is a plan view of a trolley stand made according to my invention. Fig. 3 is a central sectional view on the line 3—3 of Fig. 2. Figs. 4 and 5 are diagrammatical views illustrating different positions and adjustments of the parts.

The base *a* of the trolley stand, which is adapted to be secured to the top of a car, is provided with an annular flange *a'* having a circular ball race formed in the upper and lower side thereof, and a support *b* is also provided above said base having a ball race in the under side thereof corresponding to the upper ball race in the flange *a'*. A ring *c* is secured to the support *b* and is provided with a ball race corresponding to the lower ball race of said flange *a'*, and suitable bearing balls a^2 are provided in said ball races so that said support *b* is rotatably mounted upon the base *a*.

A pair of arms *d* are mounted on pivots *e* secured in ears *b'* on the support *b* at one side thereof, said arms being connected at their opposite ends to a cross bar *g*, by means of pivots *f*. A bolt *h* is pivoted at *i* to the support *b* and said bolt passes through the middle of the cross bar *g*, nuts *h'* and *h''* being provided on said bolt at opposite sides of said cross bar so that the latter may be raised or lowered by adjusting said nuts. Adjustment of the cross bar *g* upon the bolt *h* causes the front end of the arms *d* to be raised and lowered about the pivots *e* as a center. A tubular socket *j* is pivoted at *j'* between the arms *d*, said socket having a tubular pole section *k* telescopically mounted therein. A spring *l* is mounted on the socket *j* and section *k* between the abutments or shoulders j^2 and k^2, formed thereon, respectively, the portions of said socket and pole section adjacent said shoulders being also provided with spiral grooves to receive the coils of the spring, so that said spring is firmly secured at each end to said socket and section respectively. The outer or opposite end of the section *k* from that which is slidably mounted within the socket *j* is provided with a clamp k^3 in which the pole *m* is mounted and rigidly secured, said pole being adapted to carry the usual trolley wheel thereon at its outer end. A pair of links *n*, having intermediate turn-buckles *n'*, are pivoted at adjacent ends in axial alinement on the lugs *o*, formed on the clamp k^3, the opposite ends of said links being mounted on the pivots *f* of the cross bar *g*.

The action of the above described apparatus is as follows: When the parts are assembled, the spring *l* is placed under compression to the desired extent by adjustment of the turn-buckles *n'* and said spring, by pressing against shoulder *k'*, acts to swing the pole upward, the socket *j* swinging on the pivot *j'* as a center, so that the pole is always in a radial position with reference to said pivot *j'*. Although this radial position is maintained, the links *n* cause all points on the pole *m* and section *k* to move about the pivot *f* as a center. The pole section *k* is thus withdrawn from socket *j* as it is lifted, so that the length of the pole is thus increased, as indicated in dotted lines in Fig. 1, and in the diagrammatical views, Figs. 4 and 5. The lever through which the spring *l* acts in lifting the pole is of a length equal to the perpendicular distance from the pivot *f* to the center line of the pole, or to a straight line through the axes of pivots *o* and *j'*.

To illustrate, if the pole were drawn down, (assuming that the construction permitted it), to such a point that the center line of the pole intersects the axis of the pivot *f*, then there would be no tendency to raise the pole, as the parts would then be on what is ordinarily termed "dead centers," such position being indicated at *x* in Fig. 4. When the pole has been swung up to the horizontal position, indicated at *x'* of Fig. 4, the spring is then able to act to lift the pole through a lever the length of which is equal to the length of a perpendicular line from point *f* to the horizontal line through point *j'*. It will be apparent that, as the pole is swung up, this leverage will be increased, so that the mechanical advantage which the spring has in swing-

ing up the pole is increased as the pole is swung up from position x, and reaches its maximum when the pole is moved up until its center line is perpendicular to the dead center position x, see position x^2, Fig. 4, the length of the lever through which the spring acts being then equal to the distance between pivots b and j'. While the spring loses tension as it expands, the parts are so adjusted that the increasing mechanical advantage of the spring more than counteracts its loss of tension during said movement so that when the pole is in said position x^2, of Fig. 4, the trolley wheel is being pressed upward with the maximum force. Further movement in the same direction, for instance to the position x^3, of Fig. 4, will permit the spring to expand still more, while the leverage will then be reduced, and the spring is so constructed and arranged that it will lose its tension soon after it has passed beyond the position corresponding to position x^2, so that there will then be no further tendency to lift the pole, but, if by reason of momentum of the parts the pole tends to swing upwardly or forwardly to a greater extent, this motion will be retarded, as the tendency will then be to stretch the spring beyond the position in which it is set. The upward movement of the trolley pole beyond a certain point will thus be gradually arrested by a spring cushion.

If the cross bar g is adjusted down, it will be apparent that the pivot f will be lowered through a greater distance than the pivot j', as both parts will be moved about the pivot e as a center, with the result that the line connecting the centers of the pivots j' and f will approach a horizontal position as the arms are lowered, and, when the cross bar has been adjusted down until this line is in a horizontal position, as indicated in Fig. 5, then the pole would be on the "dead center" when it is also drawn down to the horizontal position. In practice it is not desirable to adjust the parts to this position but the best results are secured by adjusting them so that the upward pressure on the wheel is at the minimum necessary to raise it when in its lowest position.

With the above described construction, therefore, the parts may be so adjusted that the desired upward pressure at the wheel may be exactly secured when the pole is in a certain position without adjustment of the spring, and by merely vertically adjusting the cross bar g.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A trolley stand comprising a base, a socket pivoted thereon and having an abutment, a spring on said socket engaging said abutment at one end, a pole slidable in said socket and having a shoulder disposed to be engaged by the opposite end of said spring, and a link pivoted at one end to said pole and at the other end to said base adjacent said socket pivot and at one side of the line of the pivot of said pole and the pivotal connection between the link and pole, substantially as described.

2. A trolley stand comprising a base, an inclined arm pivotally mounted thereon at one end, a trolley pole pivoted on said arm at an intermediate portion thereof, a spring on said pole, a stationary and a movable abutment on said pole between which said spring is located, a link pivotally connected at one end to said movable abutment and at the other to the oposite end of said arm from its pivoted end, and means for adjusting the inclination of said arm, substantially as described.

3. A trolley stand comprising a base, an inclined arm pivotally mounted thereon at one end, a trolley pole pivoted on said arm at an intermediate portion thereof, a spring on said pole, a stationary and a movable abutment on said pole between which said spring is located, a link pivotally connected at one end to said movable abutment and at the other to the opposite end of said arm from its pivoted end, and a screw threaded bolt connecting said arm and said base for adjusting the inclination of said arm, substantially as described.

4. A trolley stand comprising a base, a pair of arms pivotally mounted at their adjacent ends on said base, a cross bar pivotally connected to the opposite ends of said arms, means for adjustably connecting said cross bar to said base, a pole pivotally connected to said arms intermediate their ends, a spring on said pole, said pole having a movable and a stationary abutment against which said spring acts, and a pair of links connected at adjacent ends to opposite sides of said movable abutment and at their opposite ends to said arms adjacent said cross bar, substantially as described.

5. A trolley stand comprising a base, a pole pivoted thereon, having thereon a stationary and a longitudinally sliding abutment, a spring on said pole connected at its ends to said abutments, a link pivotally connected at one end to said sliding abutment and at the other to said base at one side of the line of said pole pivot and the pivot of said links with said abutment, said parts being so adjusted that upward movement of said pole beyond a predetermined point will cause said spring to be stretched against its tension, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES H. McPHERSON.

Witnesses:
L. H. HARRIMAN,
H. B. DAVIS.