(No Model.)

J. J. WOOD.

SUSPENSION ARM FOR ELECTRIC LAMPS.

No. 385,493. Patented July 3, 1888.

Fig. 1.

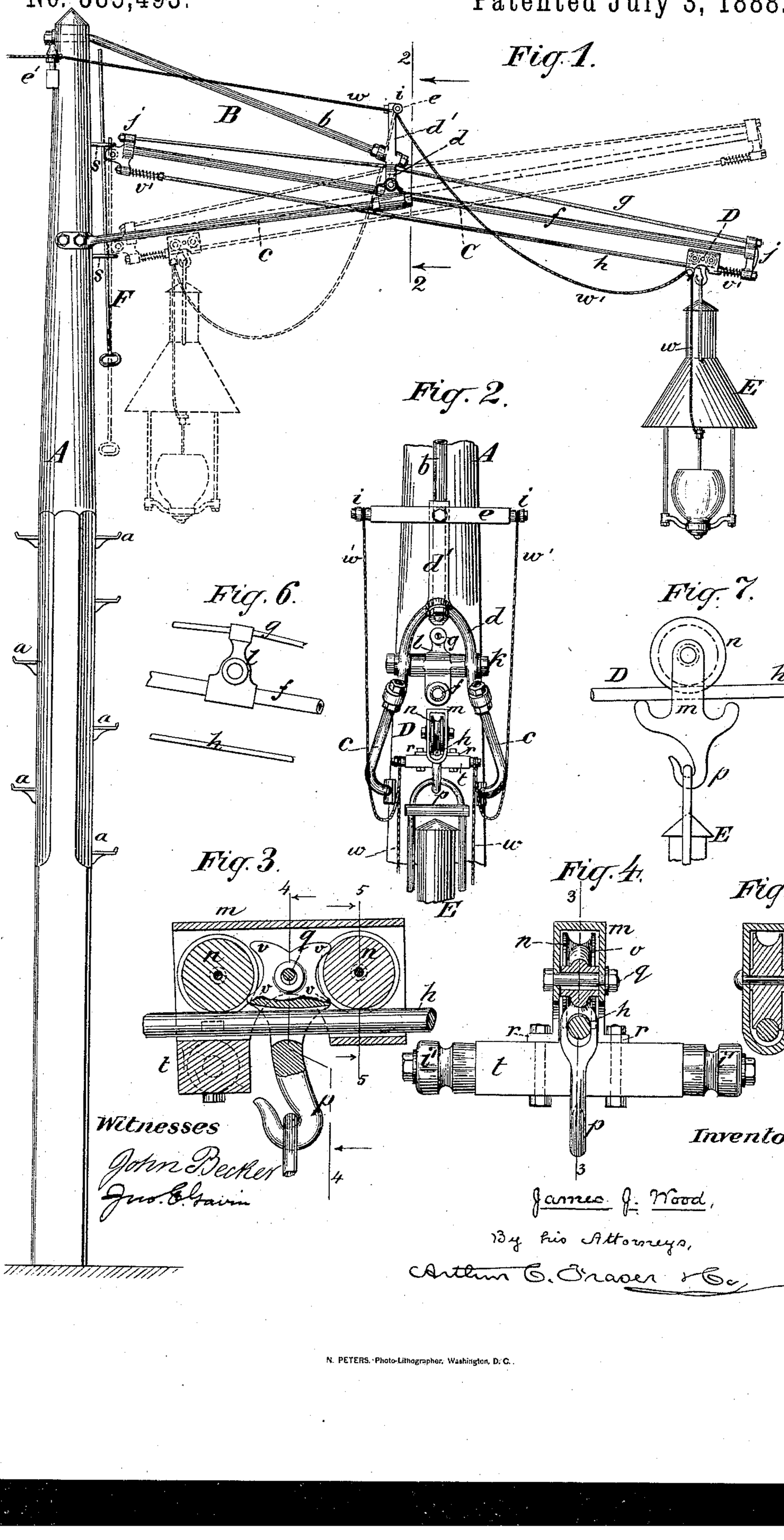

Fig. 2.

Fig. 6.

Fig. 7.

Fig. 3.

Fig. 4.

Fig. 5.

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SUSPENSION-ARM FOR ELECTRIC LAMPS.

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To all whom it may concern:

Be it known that I, JAMES J. WOOD, of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Suspension-Arms for Electric Lamps, of which the following is a specification.

This invention relates to suspension devices for electric lamps, whereby the lamp is hung at a considerable distance laterally of its support at the end of an intervening arm or boom. Such suspension devices are used for street-lighting, in connection with supporting-poles at the sides of the street, in order that the lamps may be swung over the middle of the street. They are also used when it is desired to support the lamp from the wall of a building and at some distance outwardly therefrom.

Prior to my invention "mast-arms," so called, for supporting street-lamps have been made with a lever or boom pivoted near one end to the top or upper part of a mast or pole with the electric lamp swung from its other or free end, and with a windlass device, by means of which the short arm of the lever may be drawn down, in order to lift the lever to an approximately horizontal position, which it maintains during ordinary use. When it is desired to lower the lamp, in order to insert new carbons or otherwise to gain access to it, the windlass is operated to release the shorter arm of the boom or lever, whereby its longer arm is swung downwardly, thereby bringing the lamp within reach. Mast-arms of this character are subject to the disadvantage that too much strength is required to operate them, it being impossible to counterbalance properly the boom, which is necessarily fulcrumed quite close to the supporting-pole. The operation of the windlass is hence laborious and tedious.

According to my present invention I substitute for the swinging boom heretofore employed a rocking arm or lever, which is mounted in such manner that it may vibrate to some extent to either side of a horizontal line, and I hang the electric lamp from a traveling carriage, which is mounted on the rocking arm and adapted to roll on the latter from end to end. The rocking arm is fulcrumed on a bracket projecting outwardly from the pole or other support—such as the wall of a building—one end of the rocking arm being arranged adjacent to the supporting structure, and the other end, from which the lamp normally hangs when in use, is remote therefrom. When it is desired to gain access to the lamp, the inner end of the rocking arm is pulled down until the arm slopes toward the support, whereupon the carriage from which the lamp is hung rolls toward the inner end of the arm. On pushing up the inner end of the rocking arm the carriage rolls outwardly, again bringing the lamp back to its normal position.

In the accompanying drawings, Figure 1 is a side elevation of an electric-light pole and suspension-arm constructed according to my invention. Fig. 2 is an elevation, on a larger scale, partly in section, cut on the line 2 2 in Fig. 1, and looking toward the pole. Fig. 3 is a longitudinal vertical mid-section of the traveling carriage cut on the line 3 3 in Fig. 4. Fig. 4 is a transverse section of the carriage cut on the line 4 4 in Fig. 3. Fig. 5 is a transverse section thereof cut on the line 5 5 in Fig. 3, and looking in the opposite direction. Fig. 6 is an enlarged fragmentary side elevation of the middle portion of the rocking arm. Fig. 7 is a side elevation of a modified construction of carriage.

Referring to Fig. 1 of the drawings, let A designate an ordinary mast or electric-light pole, which may be provided with projecting steps *a a*, as usual. The wall of a building or any other supporting structure may take the place of the pole A.

B designates a bracket projecting laterally from the support A.

C designates the rocking arm pivoted to the bracket B.

D is the carriage, which runs upon the arm C, and E is the electric lamp, which will ordinarily be an arc lamp.

The bracket B consists in the construction shown of a tie-rod, *b*, two strut-rods, *c c*, and a vertical fork, *d*. The struts *c c* are spread apart wide enough to admit the rocking arm C, the carriage D, and the upper part of the lamp between them, and are fastened at their inner ends to opposite sides of the pole A and at their outer ends to the lower extremities of the fork *d*, the latter connection being best shown in Fig. 2. The tie-rod *b* is fastened at its inner end to the top of the pole A, and ex-

tends thence diagonally outward and downward, and is fastened at its outer end to the crotch of the fork *d*. This fork is in the form of an inverted Y, its bisected portion projecting upwardly in the form of a boss, *d'*, and bearing at its upper end a cross-bar, *e*, to the ends of which are fixed insulators *i i*, to which the conducting-wires *w w* of the lamp-circuit are fastened. These wires are led from insulators carried by a cross-bar, *e'*, at the top of the pole A, as shown.

The rocking arm C is constructed of three longitudinal members, a tubular stiffening bar or strut, *f*, preferably made of gas-pipe, and two tie or truss rods, *g h*, arranged, respectively, above and below the bar *f*. At the opposite ends are upright cross heads *j j*, into which the ends of the bar *f* are socketed, and through the ends of which the threaded extremities of the rods *g* and *h* pass and are drawn taut by nuts screwing on them.

The arm C is fulcrumed on an axial bolt, *k*, Figs. 2 and 6, which passes through the fork *d* and through a standard, *l*, which is fixed on the bar *f*, extending upwardly therefrom (see Fig. 6) and engaging the rod *g*, so that the latter is lifted away from the bar *f* at this point, and thereby is constituted a truss to stiffen the ends of the arm C. The standard *l* does not extend down to the rod *h*, but the latter is left clear from end to end in order to constitute a rail or track on which the carriage D may run.

The carriage (best shown in Figs. 3, 4, and 5) is constructed with an outer shell or casing, *m*, which extends beneath and incloses the rod *h*, and in which are pivoted two grooved wheels or rollers, *n n*, which roll upon the rod *h*. The hook *p*, from which the lamp is suspended, is pivoted freely to the casing *m*, between the wheels *n n* on a cross-bolt, *q*, and is formed beneath with an eye, through which the rod *h* freely passes, as shown in Fig. 4. To the carriage beneath the rod *h* is fastened a cross-bar, *t*, by means of ears *r r*, turned outwardly from the casing *m*, and through which bolts are passed, and on the opposite ends of the cross-bar *t* are fastened insulators *i' i'*, to which the circuit-wires *w w* are attached. These wires are looped between the insulators *i* on the cross-bar *e* and the insulators *i'* on the cross-bar *t*, as shown at *w'* in Fig. 1, being given sufficient slack to accommodate the extreme traveling movement of the carriage, as will be seen by a comparison of the full and dotted lines in Fig. 1. The loops *w'* hang on opposite sides of the rocking arm and bracket and outside of the latter, so that they cannot foul therewith.

The arm C is rocked or tilted by means of a vertical rod, F, (shown in Fig. 1,) which is jointed to the inner end of the arm C, and is guided by passing through eyes *s s*, fixed to the pole A. These eyes form stops to limit the rocking movement of the arm C; or, if preferred, other stops may be provided for this purpose. The rod F is formed with a handle at its lower end, so that it may be readily grasped and pulled down.

During ordinary use the parts are in the position shown in full lines in Fig. 1, the lamp E hanging from the outer end of the rocking arm C. When it is necessary to renew the carbons, the operator climbs the pole A and pulls down on the rod F with sufficient force to tilt the arm C into the position shown in dotted lines, whereupon carriage D rolls, by its own weight and that of the lamp suspended from it, down the incline of the rod *h* to the position shown in dotted lines. It is thus brought close to the operator, where he can readily manipulate it. When he is through with it, he will push upon the rod F, and thereby lift the inner end of the arm C and the lamp until the arm stands again in the position shown in full lines, whereupon the carriage will roll down the inclined rod *h* to the outer end of the arm. The weight of the lamp and carriage is sufficient to retain the arm C in either position to which it is tilted.

Inasmuch as one can exercise much greater strength in pulling down than in pushing up, I have so constructed and proportioned the parts that much less exertion is required to lift the rod *f* in order to throw the lamp outwardly than to pull down the rod in order to bring the lamp in toward the operator. This I have done by arranging the fulcrum on which the arm C is pivoted nearer to the inner end thereof than the middle, in order that the outer portion of the arm beyond the fulcrum shall constitute the longer arm of the lever and the inner portion the shorter arm, and also in order that the outer portion shall overweight the inner portion. This also has the advantage that the bracket B need not extend as far out from the supporting structure A as would otherwise be necessary. The result of this arrangement is that the force required to pull down the inner end of the arm C when the lamp is at the outer end is approximately twice as great as the force required to lift the inner end when the lamp is run in.

In practice, with a lamp and its suspending parts weighing about thirty-five pounds, the proportions are such that the downward pull necessary to run the lamp in is fifty pounds, while the upward pressure necessary to run the lamp out is only twenty-five pounds. These proportions, however, are subject to change, as circumstances or the judgment of the constructor shall dictate.

In order to check the carriage D when it reaches the end of its run and prevent its striking too violently against the cross-heads *j* at the ends of the arm C, I provide spring-buffers V' V', consisting of spiral springs inclosing the opposite ends of the rod *h*, and preferably terminating in a sliding ring or sleeve against which the carriage may strike.

In order to prevent the running down of the carriage too rapidly and to enable the oper-

ator to control its speed, I provide it with an automatic brake, the construction of which is best shown in Fig. 3. The hook *p*, from which the lamp is suspended, is, as has been stated, freely or loosely hung upon the cross-bolt *q*, and it is formed with four arms or projections, *v v*, two on each side, which extend toward the peripheries of the wheels *n n*, being respectively above and below a line drawn between the axes of the two wheels. If the rod *h* and the carriage were in a horizontal position, or were tilted but slightly beyond the horizontal, the weight of the lamp drawing the hook *p* into vertical position would hold the projections *v* out of contact with the wheels *n n;* but when they are tilted as much as the extreme inclination in either direction to which the arm C is subject the weight of the lamp brings the diagonally-opposite projections *v v* against the peripheries of the wheels *n n* with sufficient pressure to act as brakes thereagainst, and thereby to check or retard, if not entirely to stop, their rotation. When the carriage is inclined in one direction, one of the diagonally-opposite pairs of projections takes effect, and when inclined in the opposite direction the other diagonally-opposite pair acts upon the wheels. The proportions may be such that when the arm C is inclined to its greatest extent this brake will stop the carriage wherever it may be, and the carriage will remain there until the arm is tilted toward the horizontal. Thus the operator has it in his power to control the speed at which the carriage shall run down the incline by increasing the inclination of the arm C in case the carriage is running too fast, or decreasing its inclination in case he wishes the carriage to travel faster. This he will do by slightly raising or lowering the rod F.

In Figs. 3 and 4 the hook *p* is shown as formed with its eye engaging the bolt *q* of larger diameter than the bolt, so that the hook has considerable freedom of motion. This enables the projections *v v* to bear equally against both wheels *n n* without necessitating any fine adjustment of the parts, as will be obvious.

In Fig. 6 is shown a modified construction of the carriage and its brake, wherein only one wheel *n* is employed, and the frame *m* and hook *p*, with its brake projections *v v*, are made all in one piece. In this case the brake projections engage, not the wheel *n*, but the under surface of the rod *h*, pressing upwardly against the latter whenever it is tilted to so great an angle that the weight of the lamp, tending to maintain the carriage plumb, brings one or the other of them into contact with the rod.

In the drawings the inclination of the arm C is shown as exaggerated in order to make the operation clear. In practice a slope of about one in fifty is found sufficient.

My invention may be modified constructively in various ways, as will be obvious to any conversant with the principles of mechanical construction or with mechanisms of this character. For example, the carriage D may slide instead of roll; but this would necessitate a steeper inclination of the arm C.

I claim as my invention the following defined novel features and combinations, substantially as hereinbefore specified, viz:

1. The combination, with an electric lamp, of a carriage from which it is suspended, and a rocking arm bearing said carriage and along which it may travel, constructed to vibrate to opposite sides of the horizontal, the support to which said arm is pivoted, and the circuit-wires of said lamp fastened to said support and looped with sufficient slack to permit the movement of the lamp to either end of said arm.

2. The combination, with a supporting structure, of a rocking arm arranged with its inner end approaching said structure and its outer end extending away therefrom and constructed to vibrate to opposite sides of the horizontal, and a carriage adapted to travel along said arm and to carry an electric lamp hung beneath it, whereby on lowering the inner end of the arm said carriage will run inwardly toward said structure, and on raising it the carriage will run outwardly therefrom.

3. The combination, with a supporting structure, of a bracket projecting outwardly therefrom, a rocking arm arranged with its inner end approaching said structure and its outer end extending away therefrom, fulcrumed to said bracket and constructed to vibrate to opposite sides of the horizontal, a carriage adapted to travel along said arm and to carry an electric lamp hung beneath it, and the circuit-wires attached to said bracket and to said carriage and looped between them with sufficient slack to permit the endwise movement of the carriage along said arm.

4. The combination, with a supporting structure, of a rocking arm arranged with its inner end approaching said structure and its outer end extending away therefrom and constructed to vibrate to opposite sides of the horizontal, a carriage adapted to roll along said arm and to carry an electric lamp hung beneath it, and a vertically-moving operating-rod jointed to the inner end of said rocking arm.

5. The combination, with a supporting structure, of a rocking arm arranged with its inner end approaching said structure and its outer end extending away therefrom, fulcrumed to vibrate to opposite sides of the horizontal, with its fulcrum nearer its inner end than its center of gravity, whereby its outer portion overweights its inner portion, and a carriage adapted to roll along said arm and to carry an electric lamp hung beneath it.

6. The combination, with a supporting structure, of a rocking arm arranged with its inner end approaching said structure, constructed to vibrate to opposite sides of the

horizontal and fulcrumed on an axis between its middle and its inner end, whereby its outer portion beyond said fulcrum is longer than its inner portion, and a carriage adapted to roll along said arm and to carry an electric lamp hung beneath it.

7. The combination, with an electric lamp, of a carriage from which it is suspended, a rocking arm constructed to vibrate to opposite sides of the horizontal, bearing said carriage and along which the latter may roll, and elastic buffers at the opposite ends of said arm in position to receive the impact of the carriage.

8. The combination, with an electric lamp, of a rocking arm constructed to vibrate to opposite sides of the horizontal, a carriage adapted to roll along said arm and from which said lamp is suspended, and an automatic brake applied to said carriage and constructed to check the movement thereof when the said arm is tilted to its extreme inclination.

9. The combination, with a rocking arm constructed to vibrate to opposite sides of the horizontal, of a carriage adapted to roll along said arm and constructed with two wheels, and a suspension-hook pivoted to said carriage between said wheels and formed with opposite projections, adapted, when the hook is tilted relatively to the carriage, to come against the peripheries of said wheels and act as a brake therefor.

10. The combination, with an electric lamp and a traveling carriage from which it is suspended, of a rocking arm adapted to vibrate to opposite sides of the horizontal and constructed with a rigid longitudinal bar or strut, a trussed tie-rod above said strut, and a tie-rod below said strut strained taut and on which said carriage travels.

11. The combination, with a supporting structure and a rocking arm adapted to vibrate to opposite sides of the horizontal, of a bracket to which said arm is fulcrumed, consisting of an upper tie-rod, two lower struts arranged side by side and spread to admit the rocking arm between them, and a fork to which the outer ends of said tie-rod and truss are fastened, and between the legs of which the fulcrum-pivot passes.

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