

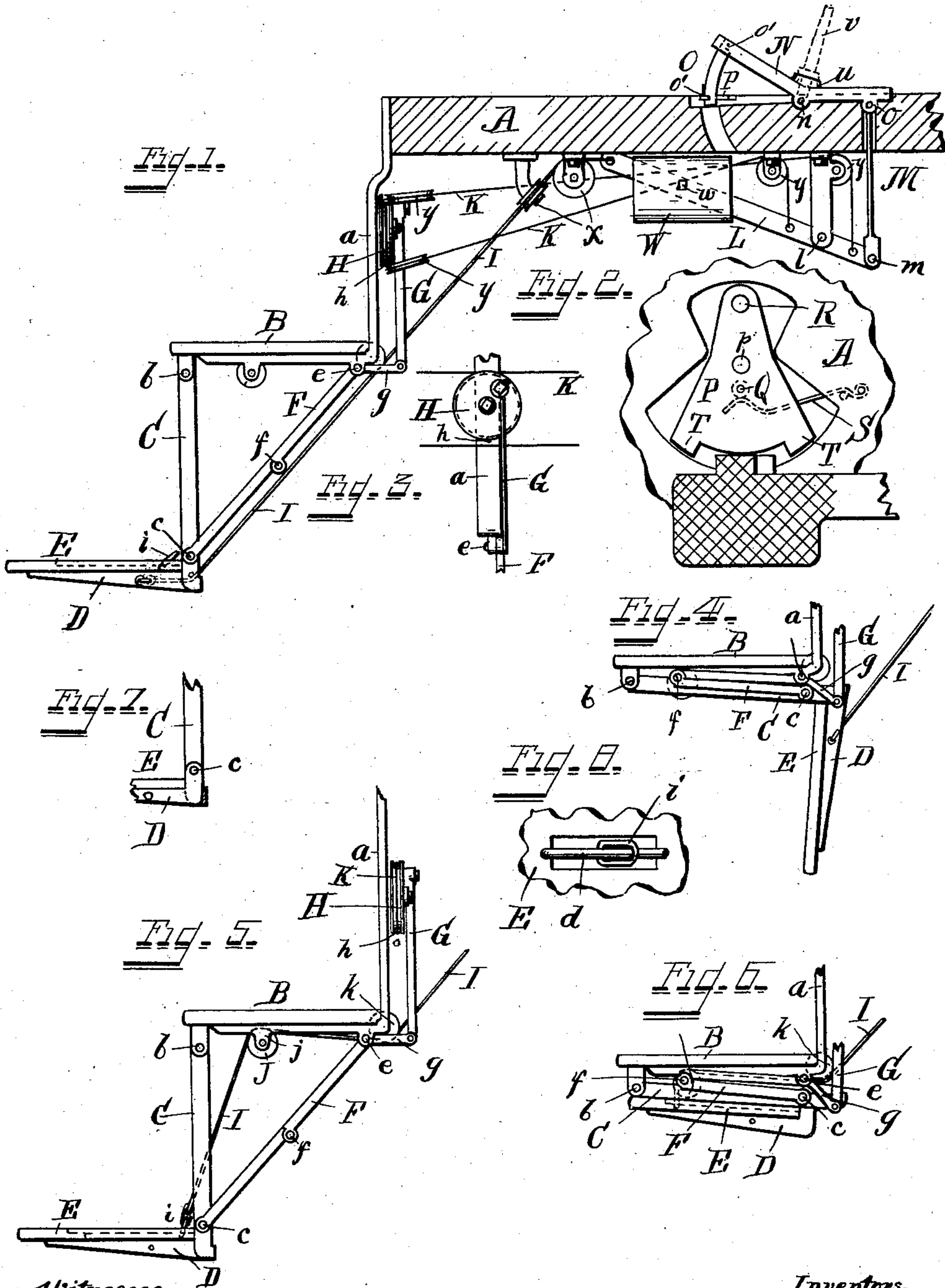
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C. W. KEYLER & A. MATZ.
STEP FOR STREET CARS OR OTHER VEHICLES.

(Application filed Apr. 1, 1901.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

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STEP FOR STREET-CARS OR OTHER VEHICLES.

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To all whom it may concern:

Be it known that we, CHARLES W. KEYLER and ADAM MATZ, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Steps for Street-Cars or other Vehicles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention relates to such improvements in said steps that the same may be lowered within easy stepping distance of the ground when a car provided with our device has stopped to receive or discharge passengers and when not in use may be turned back or raised and folded underneath the fixed step out of the way, it being well known that usually the fixed step of ordinary open or summer cars is too high to be stepped upon conveniently, especially by the aged, ladies, and children, and that fixed steps built so as to occupy the position that ours would occupy when lowered would be impracticable because of the increased fixed width of the car and because such a fixed step would, owing to the rocking motion of a car moving rapidly over a rough track, be likely to strike the ground or other irregular projections from the surface of the street.

The novelty of our invention will be hereinafter fully set forth, and specifically pointed out in the claims.

Referring to the drawings, Figure 1 is a front end view, partly in section, of our step in a lowered position and adjusted to simply be turned back underneath the fixed step and the operating mechanism thereof. Fig. 2 is a detail plan view of the latch and part of the treadle to be hereinafter described. Fig. 3 is a detail side view of one of the pulleys, pitman-rods, and their connections used in making and breaking the joints in the braces to be more fully described hereinafter. Fig. 4 is an end view of our step turned back under the fixed step. Fig. 5 is an end view of our step adjusted to turn back and fold up under the fixed step. Fig. 6 is an end view of the same when turned back and folded up under the fixed step. Fig. 7 is a detail view, partly in section, showing the means for preventing the movable step from falling below

a horizontal position when the hangers are vertical. Fig. 8 is a detail plan view of the rod and link in the movable step.

The same letters of reference indicate identical parts in all the figures.

To the bottom A of the car is hung in a usual manner by means of a series of brackets *a* the fixed step or running-board B, near and below the outer edge of which is suitably hinged, as at *b*, a series of hangers C, to which are pivoted, as at *c*, the nearly right angular brackets D, upon the lower arms of which is suitably secured the step E of any desired length. The elbows of the brackets D are suitably shouldered against the lower ends of the hangers C, as shown in Fig. 7, so that while said brackets carrying the step E may be freely turned up until said step is against the hangers C said shoulders will prevent the same turning in the opposite direction farther than to bring the step E into a horizontal position when said hangers are in a vertical position.

Suitably hinged to the two hangers C nearest the opposite ends of the step E, as at *c*, are braces F, which are provided with knuckle-joints *f*, which admit of said braces breaking at said joints and rising in the middle, but do not admit of said braces lowering in the middle farther than to bring the axis of the joints *f* slightly below a straight line drawn between the axes *c* and *e* of said braces. Said braces may be made to break in the opposite direction; but we prefer them as above described. Near their upper ends, as at *e*, said braces are pivoted, preferably, to the lower and rear edge of the fixed step and are provided with arms or extensions *g*. To the ends of said arms *g* are pivoted pitman-rods G, the upper ends of which are journaled eccentrically upon the pulleys H, suitably journaled and secured to the brackets *a*.

If it be desired to use our device so as merely to turn the step E back under the fixed step, as shown in Fig. 4, the ends of cables I are secured to the under side of, preferably, the step E, one near each end, or to the lower arms of the end brackets D, as shown in Fig. 1, then passed back underneath the step E, and carried by suitable guide-pulleys *x* to the operating mechanism, to be hereinafter described.

From the foregoing it will be apparent that

if the cables I be pulled upward after the braces F are broken at their knuckle-joints the step E will remain substantially in a position at right angles to the hangers C and both
 5 will be carried in that position until the hangers C rise against the under side of the fixed step, as shown in Fig. 4, bringing the step E into a nearly-vertical position. If it be desired to use our device so as to turn the step
 10 E back and fold it up under the fixed step, as shown in Fig. 6, the cables I are attached to the top and one near each end of the step E, preferably by means of links *i*, sliding on rods or staples *d*, set in the step E, as shown
 15 in Fig. 8. Said cables I are then passed over pulleys J, suitably journaled and preferably secured to the under side of the fixed step B, as at *j*, thence over the pulleys *k*, suitably journaled and secured, preferably, to the rear
 20 edge of the fixed step B, and thence passed by suitable guide-pulleys *x* to the operating mechanism. As so adjusted if the cables I be pulled upward after the braces F are broken at their knuckle-joints the step E will be raised
 25 against the hangers C and both step and hangers will be raised and folded nearly horizontally under the fixed step, as shown in Fig. 6. The links *i*, sliding upon the rods *d*, admit of the pull being exerted to advantage,
 30 but is not an essential. The cables I in either case are so adjusted that the operating mechanism will cause the same to pull simultaneously and to the same extent at each end of the step E, so that both ends of the step
 35 will move together simultaneously. Whether the step E is to be turned back, as in Fig. 4, or folded, as in Fig. 6, the cables I may be so attached to the step E that in either case the pull of the cables I may be practically for the
 40 same distance, rendering unnecessary any other adjustment of other parts. When the step E is in its lowest horizontal position, the braces F will hold it there, no matter if it be stepped upon, until the braces at their
 45 knuckle-joints *f* are broken. Pulling upon the cables I will not raise the step until said braces F are broken at their knuckle-joints.

It is obvious that if the pulleys H be partially rotated the pitman-rods G will be made
 50 to move up or down. If they move up, they will pull with them the arms *g*, which will cause the braces F to straighten until the shoulders of the knuckle-joints come together, forming a complete brace for the purpose intended until it is to be broken again, which is
 55 accomplished by partially rotating the pulleys H in the opposite direction, causing the pitman-rods G to press down the arms *g*. The pulleys H are placed about opposite each end
 60 of the step E and are made to partially rotate simultaneously and to the same extent by means of cables K, preferably of steel wire, attached thereto at one point *h*, (see Fig. 3,) and passing around said pulleys, and passing
 65 over suitable guide-pulleys *y* the other ends are suitably attached to the operating mechanism, hereinafter described. The ca-

bles I after passing over suitable guide-pulleys *x* have their other ends fastened to the end of the long arm of an operating-lever L, 70 pivoted, as at *l*, to an arm rigidly secured to the floor A of the car. The cables K pass over suitable guide-pulleys *y* and have their ends secured to opposite arms of the lever L, 75 equally distant from the pivot thereof. The cables K are so adjusted as to cause the braces F to break before the cables I pull upon the step. It will readily appear that when the lever L is operated, as hereinafter described, said cables being suitably adjusted, it will exert equal and simultaneous pulls upon the cables I in the same direction and equal pulls upon the cables K in opposite directions and at different times. 80

To the short arm of the lever L is suitably 85 pivoted, as at *m*, a pitman-rod M, which has its upper end pivoted, as at *o*, to one end of a lever footpiece or treadle N, suitably pivoted, as at *n*, to the upper side of the car-floor. The other end of the treadle carries a segment 90 O, preferably extending downward into an opening in the car-floor, said segment serving to hold the lever L at either of its extreme positions by means of a catch or a latch P, pivoted, as at *p*, and set in a recess in the 95 car-floor and having lugs T (see Fig. 2) engaging notches *o'* (see Fig. 1) in the sides of said segment, one of which is near the top in one side of the segment and the other near the bottom in the other side thereof, as shown 100 in Fig. 1. The latch P may be of any desirable shape; but we prefer that shown in Fig. 2. A pin Q is set in the under side of said latch, preferably between the pivot and the segment. On the opposite side of said latch 105 and of the pivot of said latch is set a pin R, which pin may be pushed either way by the foot of the motorman of the car, and thus operate said latch. A spring S is suitably secured at one end beneath the latch P to 110 the car-floor and is curved near its other free end, with the convex side of said curve bearing against the pin Q in such manner that when the latch is shifted in either direction past its middle position the spring 115 S by bearing against the pin Q causes the latch to travel onward in that direction until the lugs T of the latch come into contact with the segment O, and when the segment has been moved far enough to operate the lever L 120 into either of its extreme positions (the step being then clear up or clear down) one of the notches in the segment will come opposite one of the lugs of the latch and the spring S will force said lug into engagement with said 125 notch, thereby locking the parts. The same may be unlocked by pressing against the pin R in the opposite direction. The lever L is provided with a weight W, adjustable thereon and secured thereto in any desired position by means of a set-screw *w*, the object of said weight being to nearly counterbalance 130 the weight of the step E and the parts to be raised along with it. By simply operating

the treadle up or down the operator may raise or lower the step E and hold same in either position by means of the latch. When the step E is released from its raised position, it will fall by force of gravity nearly or quite to its lowered position, and the pull upon the cables K, raising the arm *g*, will force the braces F into position to lock at their knuckle-joints. A socket *u* in the treadle N admits of the insertion therein of a handle *v*, so that said treadle may be also operated by hand, if desired, or removed and operated exclusively by foot.

Having fully described our invention, we claim—

1. In a vehicle, the combination of a fixed step, a second step movably hung thereto, and projecting below and horizontally outward therefrom; means for rigidly holding and locking said lower suspended step in said horizontal position; means for unlocking the same; means for pulling it back and folding it up horizontally under the fixed step; means for holding said movable step locked in said last-named position; means for unlocking the same therefrom, and means for lowering said adjustable step into its former lower horizontally-extended position, substantially as shown and described.

2. In a vehicle, the combination of a fixed step, a second step movably hung thereto, and projecting below and horizontally outward therefrom, knuckle-jointed braces for rigidly holding and locking the said lower suspended step in said horizontal position; means for making and breaking said braces at their knuckle-joints; means for pulling said movable step back and folding it up horizontally under said fixed step; means for holding said movable step locked in said last-named position; means for unlocking the same therefrom, and means for lowering said adjustable step into its former lower horizontally-extended position, substantially as shown and described.

3. In a vehicle, the combination of the fixed step B, a second step E, movably hung thereto and projecting below and horizontally outward therefrom, knuckle-jointed braces F, (for rigidly holding and locking said lower suspended step in said horizontal position) provided with arms *g*, means for raising or lowering said arms *g* as desired, thereby making or breaking said braces at their knuckle-joints; means for pulling said movable step back into a vertical position under said fixed step; means for holding the same locked in said vertical position; means for unlocking the same therefrom, and means for lowering said adjustable step into its former lower horizontally-extended position, substantially as shown and described.

4. In a vehicle, the combination of the fixed step B, a second step E, movably hung thereto and projecting below and horizontally outward therefrom, knuckle-jointed braces F, (for rigidly holding and locking said lower

suspended step in said horizontal position) provided with arms *g*; means for raising or lowering said arms *g*, as desired, thereby breaking said braces at their knuckle-joints; means for pulling said movable step back and folding it up horizontally under said fixed step; means for holding the same locked in said vertical position; means for unlocking the same therefrom, and means for lowering said adjustable step into its former lower horizontally-extended position, substantially as shown and described.

5. In a vehicle, the combination of the fixed step B, a second step E, movably hung thereto, and projecting below and horizontally outward therefrom, knuckle-jointed braces F, (for rigidly holding and locking said lower suspended step in said horizontal position) provided with arms *g*, pulleys H, suitably journaled to the brackets *a*, to which pulleys are eccentrically journaled the ends of pitman-rods G, the other ends of which are pivoted to the ends of the arms *g*, means for rotating said pulleys H, means for pulling said movable step back into a vertical position under said fixed step; means for holding the same locked in said vertical position; means for unlocking the same therefrom, and means for lowering said adjustable step into its former lower horizontally-extended position, substantially as shown and described.

6. In a vehicle, the combination of the fixed step B, a second step E, movably hung thereto and projecting below and horizontally outward therefrom, knuckle-jointed braces F, (for rigidly holding and locking said lower suspended step in said horizontal position) provided with arms *g*, pulleys H, suitably journaled to the brackets *a*, to which pulleys are eccentrically journaled the ends of pitman-rods G, the other ends of which are pivoted to the ends of the arms *g*, means for rotating said pulleys H, means for pulling said movable step back and folding it up horizontally under said fixed step, means for holding the same locked in said vertical position, means for unlocking the same therefrom, and means for lowering said adjustable step into its former lower horizontally-extended position, substantially as shown and described.

7. In a vehicle, the combination of the fixed step B, a second step E, movably hung thereto, and projecting below and horizontally outward therefrom, knuckle-jointed braces F, (for rigidly holding and locking said lower suspended step in said horizontal position) provided with arms *g*, pulleys H, pitman-rods G, cables I, cables K, hangers C, brackets D, pulleys *x*, pulleys *y*, lever L, pitman-rod M, treadle N, segment O, latch P, spring S, and adjustable weight W, substantially as shown and described.

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