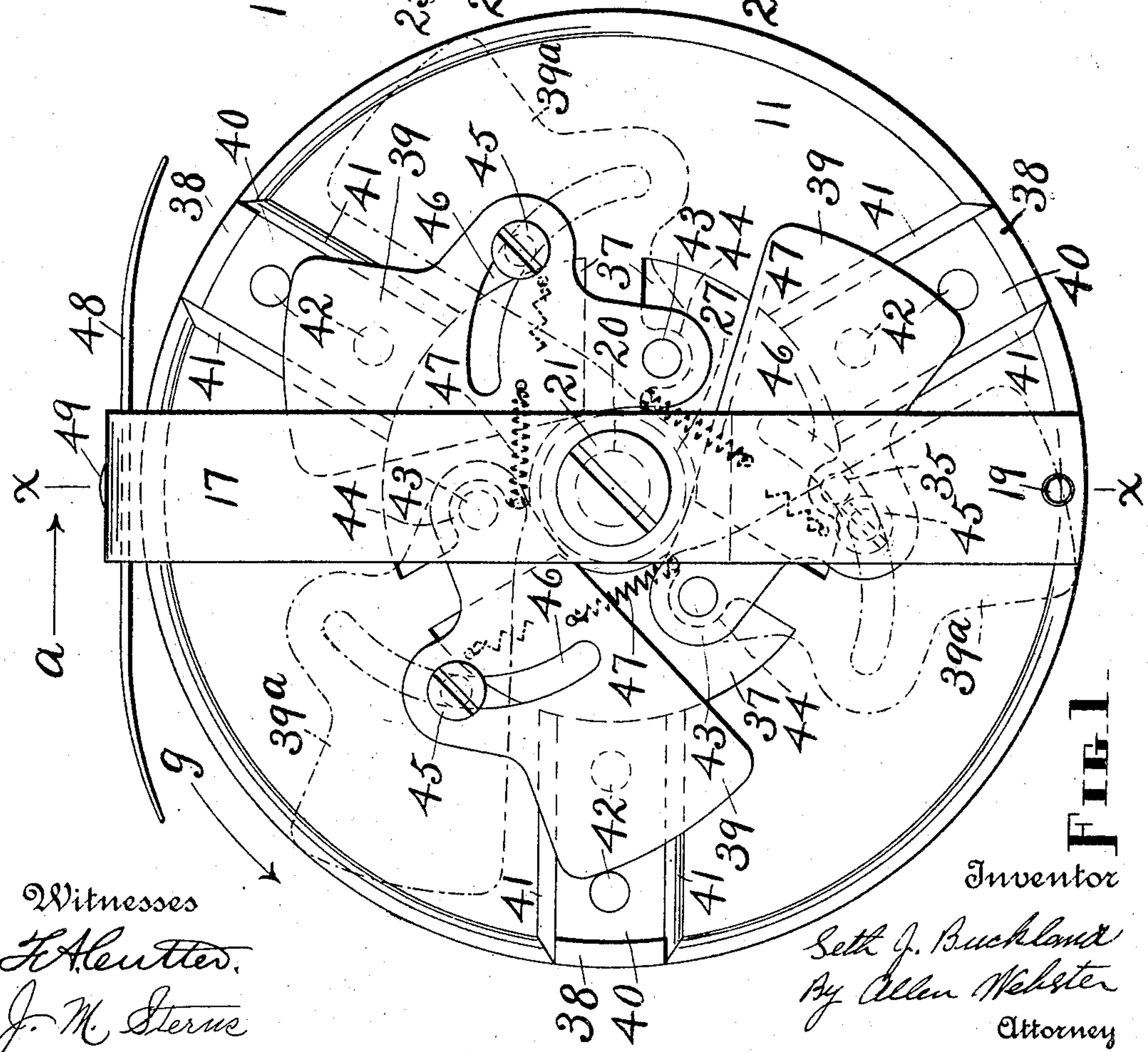
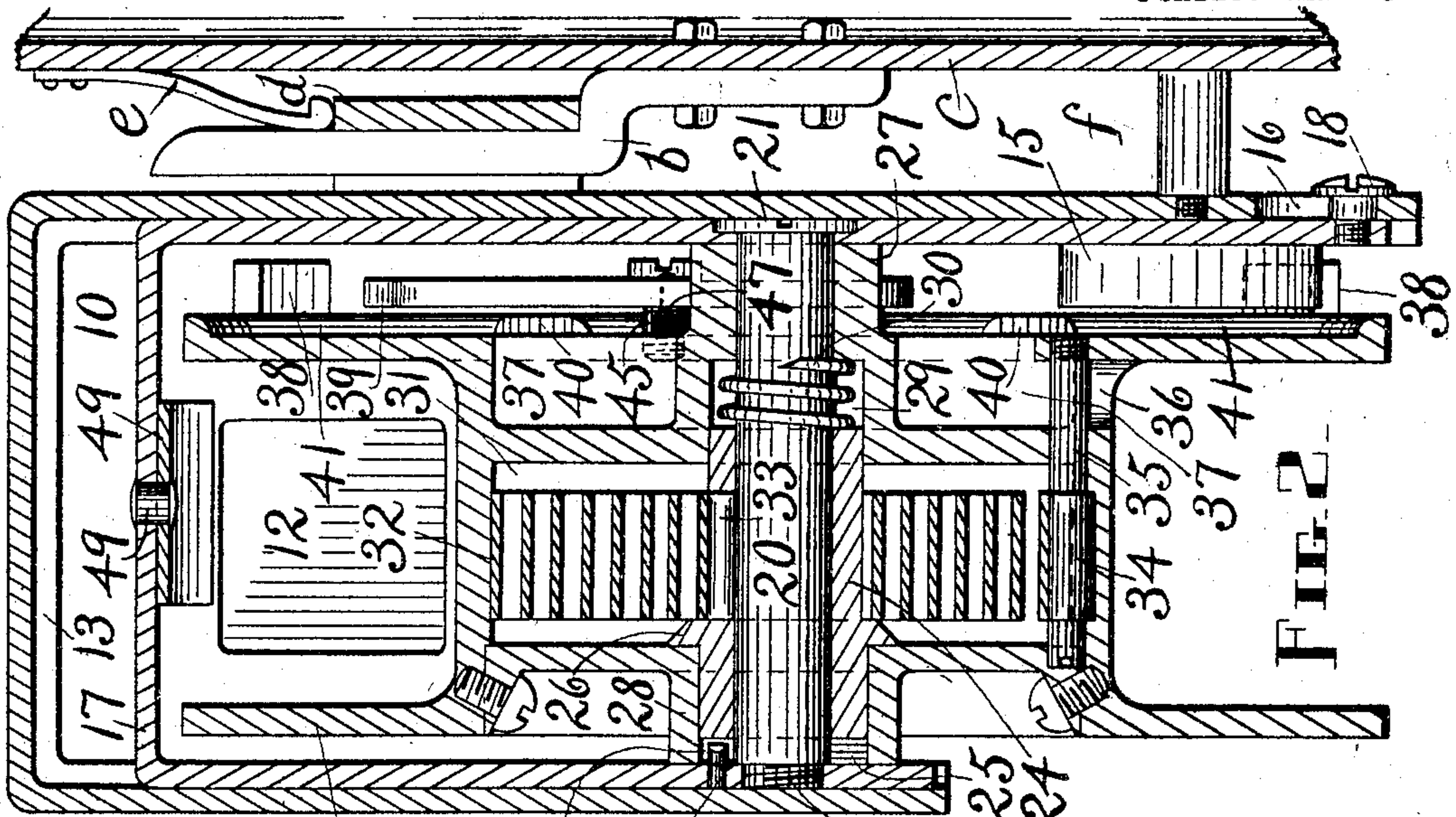


No. 796,697.

PATENTED AUG. 8, 1905.

S. J. BUCKLAND.
TROLLEY CATCHER.
APPLICATION FILED JAN. 30, 1905.

2 SHEETS—SHEET 1.



Witnesses
H. A. Lutter.
J. M. Sterne

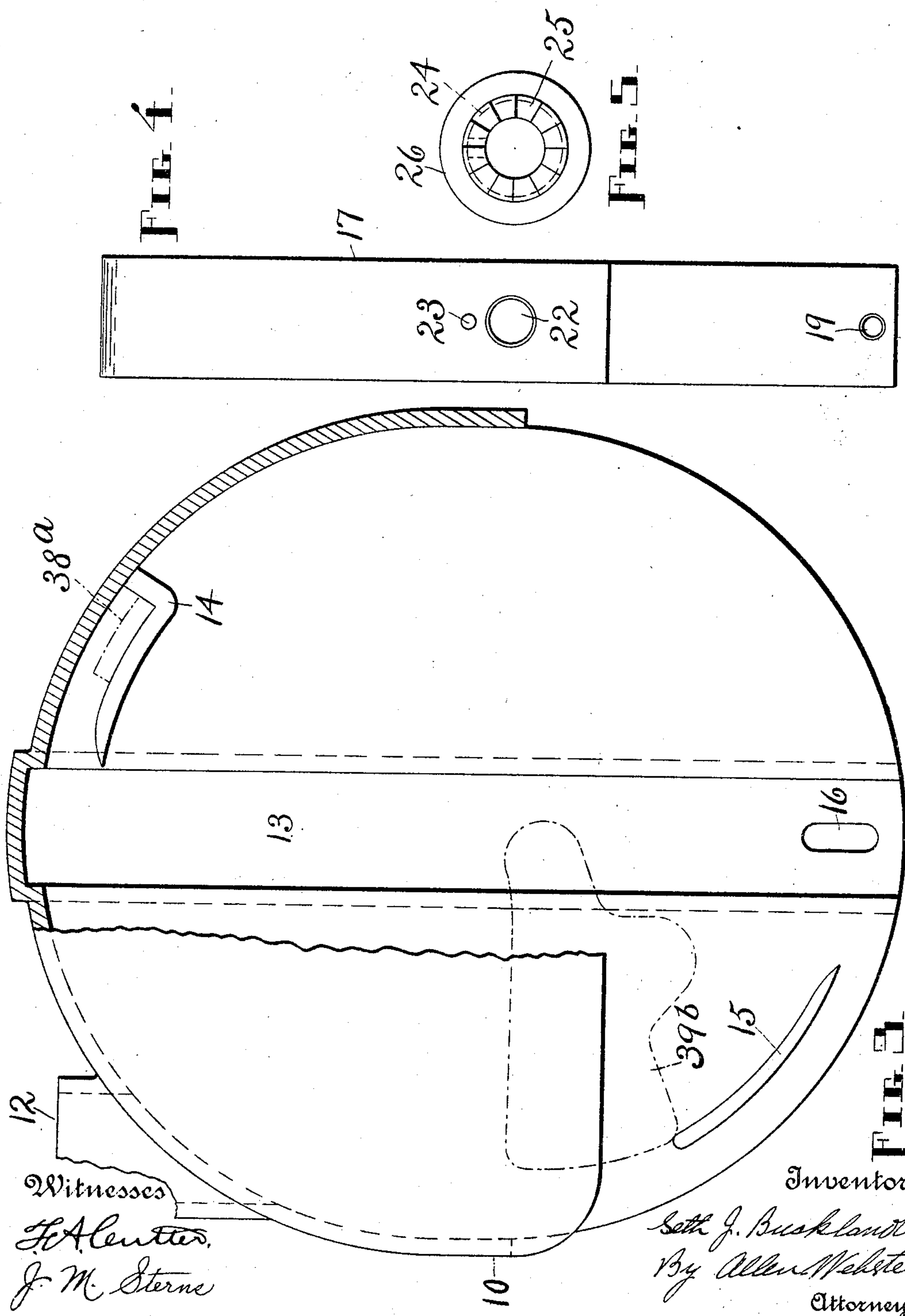
Inventor
Seth J. Buckland
By *Allen Webster*
Attorney

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UNITED STATES PATENT OFFICE.

SETH J. BUCKLAND, OF SPRINGFIELD, MASSACHUSETTS.

TROLLEY-CATCHER.

No. 796,697.

Specification of Letters Patent.

Patented Aug. 8, 1905.

Application filed January 30, 1905. Serial No. 243,174.

To all whom it may concern:

Be it known that I, SETH J. BUCKLAND, a citizen of the United States of America, residing at Springfield, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Trolley-Catcher, of which the following is a specification.

My invention relates more particularly to improvements in devices for controlling the trolley-rope connected with the trolley-pole of an electric car, and comprises certain novel and peculiar features of construction, as hereinafter set forth; and the object of my invention is to provide mechanism for automatically taking up the ordinary slack in a trolley-rope and maintaining it taut while permitting the trolley-pole to swing up and down as the trolley-wheel follows the undulations in the conductor-wire—in other words, for paying out and taking in the trolley-rope under normal conditions and for checking almost instantly the upward flight of the trolley-rope whenever the trolley-wheel accidentally slips from the wire, thereby preventing the trolley-pole from shooting violently upwardly or away from the desired position any great distance and coming in contact with cross or other wires and doing more or less damage.

A further object is to prevent the release of the trolley-rope in case the trolley-pole rebounds when the rope is first caught, as generally occurs. This last provision enables me to avoid the tendency, present in many other trolley-catchers, to relax or release the trolley-rope upon the rebound of the trolley-pole, and thus defeat the very purpose for which such a device is primarily intended.

I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of the back side of the reel and its appurtenances, showing the lifters drawn in or normally disposed in full lines and outwardly or abnormally disposed in dot-and-dash lines, the first being the inactive or inoperative position and the second the active or operative position; Fig. 2, a cross-section on lines *x x*, looking in the direction of the arrow *a* in Fig. 1, the case, which is omitted from Fig. 1, being here included and the whole device suspended from a portion of a dasher of a car; Fig. 3, a front view and partial section of the case; Fig. 4, a front elevation of the guide, and Fig. 5 a front end view of the sleeve.

Similar letters and figures refer to similar parts throughout the several views.

Since the general application of trolley-catchers is so well known to those familiar with the art, I have not shown a trolley-pole and trolley-wheel or the trolley-rope, but have confined the illustrations to the catcher alone.

Generally speaking, my trolley-catcher consists of a suitable case adapted to be attached to the back of the rear dasher of a car, a revoluble spool or reel so arranged in said case as to be moved with its mechanism bodily therein, means for automatically so moving such reel and mechanism, means to permit said reel to revolve in either direction under ordinary circumstances, and means to cause the reel to become locked against rotation in one direction when the position thereof is changed in a certain manner. The mainspring in this catcher acts upon the reel to wind up the slack in the trolley-rope and yields to allow said trolley-rope to be paid out—that is to say, when the trolley-rope is carried upward the mainspring is itself wound up. Provision is also made to release the mainspring after it has expended its force, so as to avoid winding it in the wrong direction. Particular novelty resides in the locking feature hereinbefore referred to, and its value and efficiency are enhanced by reason of the fact that a positive check can be automatically put upon the reel, which when locked cannot be released until the trolley-rope is drawn down some little distance by hand or otherwise, the mere rebound of the trolley-pole failing to relax the trolley-rope sufficiently to unlock the reel, which latter still holds the former fast at the time the final upward spring thereof takes place. The trolley-pole rebounds only a few inches and but once before its energy is exhausted.

Referring to the drawings, it will be observed that I provide an outer case 10, in which a spool or reel 11 is located and arranged to move bodily in the manner hereinafter fully explained. This case may be attached to the dasher of a car in any convenient manner, the means here employed consisting of a lug *b* on the outside of the dasher *c* and a strap *d* on the back of the case, a spring-snap *e* being employed to hold said strap in place on the lug and to release the same when it is desired to remove the catcher from the car. A post *f*, screwed into the back of the case 10 below the strap *d*, bears against the dasher *c*

and assists in maintaining the catcher in a substantially vertical position. The upper and lower portions of the back of the case are semicircular; but the length of such back is greater than its width—that is, the back is vertically elongated, as shown in Fig. 3, where the complete outline of the back is plainly indicated, the front being here partially broken away and so much of the sides as is thus left exposed being in section. The front and sides of the case are shorter than the back, and a passage for the trolley-rope is formed at 12 in one of the sides. The case has a groove 13 therein commencing at the bottom of the back, extending upward to the top, then forward, and finally downward to the bottom of the front. On the back of the case at the top and one side of the groove 13 therein (the right side) an angular lug 14 is provided, and a cam 15 stands out from said back on the other side of such groove (the left) near the bottom. The lug 14 and the cam 15 are of substantially the same thickness. A slot 16 is cut in the grooved portion of the back of the case near the base.

An inverted-U-shaped guide 17, having its front arm shorter than the back one, fits into the groove 13 and can reciprocate therein, the amount of reciprocal motion permitted such guide being limited by a screw 18, passing through the slot 16 in the back of the case into threaded engagement at 19 with the rear arm of the guide, and, furthermore, of course limited by the top of the case. When in normal position, the guide 17 rests on the screw 18 in the bottom of the slot 16, from which position said guide may be moved upward. A shaft 20, upon which the reel 11 is loosely mounted, is carried by the guide 17, the head 21 of said shaft being countersunk in the rear arm of the guide and the threaded front terminal thereof being screwed into the front arm of the guide at 22. A tooth or pin 23 extends inward from the front arm of the guide above the threaded opening 22. A sleeve 24, having ratchet-teeth 25 on the front end and a flange 26 some distance behind such teeth, is mounted on the shaft 20. The rear hub 27 of the reel 11 is mounted directly on the shaft 20, while the front hub 28 of said reel is mounted on the sleeve 24 in front of the flange 26. A small annular chamber 29 is formed in the reel to receive the back end of the sleeve 24 and a spiral spring 30 interposed between the rear wall of such chamber and said sleeve end. The spring 30 tends constantly to force the sleeve 20 forward and its teeth 25 into engaging position with the pin 23, such forward movement being limited by the contact of the flange 26 with the adjacent face of the reel. In addition to the small chamber 29 a large annular chamber 31 is formed in the reel to accommodate the flange 26 and the mainspring 32 of the device. The inner end 33 of the mainspring 32 is fas-

tened to the sleeve 24 in the usual manner, and the outer end 34 of such spring is held to the reel 11 by means of a pin 35. The pin 35 is introduced into the reel inside of the rope-surface and lies parallel with the axis thereof, and a hole 36, cut through the bottom of the rope-groove to said pin, enables the latter to be used as an anchor for the trolley-rope, which can be securely fastened to the reel at this point. When the reel 11 is revolved in the direction of the arrow *g*, Fig. 1, the mainspring 32 will be wound up, because the sleeve 24, to which the inner end of said mainspring is fastened, is prevented from rotating by the pin 23 and the engaging teeth 25; but when said wheel revolves or is revolved in the opposite direction after the mainspring has run down it will not be forced out of proper shape or wound the wrong way by the continued rotation of the reel, owing to the fact that the teeth 25 now slip past said pin, the spiral spring 30 yielding for this purpose. This arrangement not only takes care of any momentum that might be imparted to the reel by the unwinding of the mainspring, but helps to quickly overcome the same. The main office, however, of the ratchet mechanism is to enable the surplus rope to be wound on the reel after the associated end of the rope has been fastened to the pin 35 by rotating the reel in the opposite direction to that indicated by the arrow *g*. It will now be seen that any pull on a rope wound on the reel in the manner described will cause the mainspring to be wound up, more or less, accordingly, and when the rope is slackened said mainspring will in turn cause the slack to be again wound on the reel. Thus is the rope kept taut under all ordinary circumstances.

The back of the reel 11 has a plurality of recesses 37 therein adjacent the center thereof, and said reel is equipped on the back with a plurality of dogs 38 and lifters 39, there being three of each in the present instance, although this number may be varied. Each dog 38 projects rearwardly from a plate 40, held in place on the rear face of the reel by ribs 41 41 and rivets 42 42, the parts being so arranged as to bring the peripheral face of the dog flush with the periphery of the reel-back, although this relationship may be varied more or less. When the reel is in its normal position, the rotation of the same carries the dogs 38 below or outside of the cam 15 and entirely below the lug 14. Each lifter 39 has its inner end pivoted at 43 to a projection extending into one of the recesses 37, and the oscillating movement of said lifter is governed by a screw or stop 45 passing through a slot 46 in the lifter into the reel-back. The lifters 39 are normally drawn inward and retained with the outer ends of their slots 46 against the stops 45 by means of light springs 47 located in the recesses 37. Each spring 47 has one end fastened to one of the walls within

the recess where located and the other end attached to the adjacent lifter 39. When in the position just noted, the lifters clear the cam 15 as the reel revolves, provided the revolution thereof be regular and even and insufficient to overcome by centrifugal force the power of the springs 47; but under a sudden acceleration of speed imparted to the reel in the direction of the arrow *g*, as when the trolley-wheel slips from the wire and suddenly jerks up the rope attached to the trolley-pole, the power of said springs is overcome and the lifters swing outward as far as the inner ends of the slots 46 will permit, so that the cam 15 now lies in their path, the dot-and-dash lines 39^a in Fig. 1 illustrating the position of the lifters when thus disposed. Immediately one of the lifters 39 encounters the cam 15, rides onto the same, and elevates the reel 11 and guide 17, when the dog 39, which is nearest what may be termed the "open" end of the lug 14, rides into or onto said lug, contacts with the short side or arm thereof, and stops further movement of the reel, thus checking the rope and trolley-pole. The positions of the dog and lifter which have performed the work just described are indicated by dot-and-dash lines 38^a and 39^b, respectively, in Fig. 3. In case the trolley-pole rebounds when first checked in its upward flight, as above explained, and by the consequent slackening of the rope releases the reel for an instant the mainspring immediately acts to rotate said reel and carry the active dog 38 away from the short arm of the lug 14; but owing to the fact that the amount of such rotation is necessarily slight, because the force of the rebound is quickly expended, and to the further fact that the length of the long arm of said lug is sufficient to prevent complete disengagement of the locking parts no such disengagement takes place. On the contrary, said rope is again drawn up by the trolley-pole, which action rotates the reel in the opposite direction or against the mainspring until said dog again strikes said short arm of the lug, when further motion ceases. From the foregoing it will be seen that all danger of unlocking the reel and releasing the trolley-pole before the proper time is obviated. When the reel is released, upon the drawing down of the rope to replace the trolley-wheel on the wire by the operator the mainspring unwinds and rotates the reel in the proper direction to remove the dog 38 from all engagement with the lug 14, when the parts drop into their normal position, the device being now unlocked and ready for a repetition of the action hereinbefore described. At or before this time it will be understood that the springs 47 return or have returned all of the lifters 39 to normal position. In other words, said springs have drawn said lifters inward, so that they will clear the cam 15.

The combined weight of the reel and at-

tached movable parts may be sufficient to overcome the lifting power of the spring which supports the trolley-pole; but whether this be so or not I may use a spring to augment the force of gravity of such reel and attached parts. As an illustration of this point, I show a flat spring 48, riveted at 49 to the under side of the top part of the guide 17 and having its arms long enough to bear against the upper side portions of the case. With this spring in position the active lifter must of course overcome the resiliency of the same, as well as the inertia of the vertically-movable parts, in order to raise such parts into place for locking the reel. A further advantage of a spring adapted to normally retain the reel in some certain location in the case resides in the fact that its presence enables the whole device to be placed in any desired position instead of being compelled to occupy the vertical position shown.

It is obvious that the successful operation of this catcher is not dependent upon any particular drawing-point for the rope, provided the latter is wound on the reel in the proper manner, the direction which the rope takes in leaving the reel being immaterial.

By my peculiar arrangement, wherein the reel moves bodily by a sliding movement instead of by a tilting movement, I am enabled to get a more positive action and avoid wedging of the parts, which often results from the tilting of a piece of mechanism.

By the employment of the term "sliding" or other analogous term I mean that the sliding part or parts moves or move wholly in the same direction forwardly and backwardly in substantially parallel lines as contradistinguished from a tilting movement.

I do not wish to be confined to the exact construction and arrangement of parts as herein shown and described, but reserve the right to make such changes therein as properly fall within the scope of my claims.

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

1. The combination, in a trolley-catcher, of a case, a member mounted to reciprocate therein, a reel carried by said member, a mainspring adapted to rotate said reel in one direction, and a stop to prevent rotation in the opposite direction when the reciprocating member is moved out of normal position.

2. The combination, in a trolley-catcher, of a suitable supporting-frame, a reel mounted and having sliding movement therein, stops on the frame and reel, and means to cause the reel to slide bodily from its normal position, by reason of a sudden pull on the trolley-line, and cause the stops to be brought into engagement and further rotation of the reel prevented.

3. The combination, in a trolley-catcher, of a suitable frame, a reel mounted and having sliding movement therein, a recessed stop on

the frame, a lug on the reel adapted to enter said recess, and means to cause the reel to slide bodily in the frame, by reason of a sudden pull on the line, and cause the lug to enter said recess whereby further revolution of the reel is prevented.

4. The combination, in a trolley-catcher, with a case, and a member mounted to reciprocate therein, of a reel carried by said member, means to cause said reel to revolve in one direction, and means to cause the reel to be moved bodily and radially when a sudden acceleration of rotary motion is imparted thereto and locked against further rotary motion in one direction.

5. The combination, in a trolley-catcher, with a case, a member mounted to reciprocate therein, and a reel carried by said member, of a mainspring arranged to rotate said reel in one direction, and means to cause said reel to be moved bodily and radially when a sudden acceleration of rotary motion is imparted thereto and locked against further rotary motion in one direction.

6. The combination, in a trolley-catcher, with a case, a member mounted to reciprocate therein, and a reel carried by said member, of means to cause said reel to be moved bodily when a sudden acceleration of rotary motion is imparted thereto and locked against further rotary motion in one direction, and means to prevent the complete unlocking of the same when rotated in the opposite direction within a predetermined range.

7. The combination, in a trolley-catcher, with a supporting member, of a shaft journaled in said member, a sleeve on said shaft, a reel mounted on said shaft and sleeve, a mainspring attached at one end to the sleeve and at the other end to the reel, and means to lock the sleeve to the supporting member when the reel is revolved in one direction and to permit the sleeve to revolve with the reel when the latter is revolved in the opposite direction.

8. The combination, in a trolley-catcher, with a supporting member provided with a pin, of a shaft journaled in said member, a sleeve on said shaft provided with ratchet-teeth adapted to engage said pin, tension means to maintain the ratchet-teeth and pin in engagement, a reel mounted on the sleeve and shaft, and a mainspring having one end attached to the sleeve and the other end attached to the reel.

9. The combination, in a trolley-catcher, with a case provided with a lug and a cam, of a guide mounted to reciprocate in said case, and a reel supported by said guide and provided with members adapted to sequentially engage said cam and lug under the impulse of a sudden acceleration of rotary motion imparted to said reel.

10. The combination, in a trolley-catcher, with a grooved case provided with a lug and

a cam, of a reciprocating guide in the groove in said case, and a reel carried by said guide and provided with members adapted to sequentially engage said cam and lug under the impulse of a sudden acceleration of rotary motion imparted to said reel.

11. The combination, in a trolley-catcher, with a case provided with a cam, of a guide mounted to reciprocate in said case, a reel carried by said guide, a lifter pivotally attached to said reel, and a spring adapted to normally retain said lifter out of engagement with said cam, the lifter being adapted to fly outward and engage the cam under the impulse of a sudden acceleration of rotary motion imparted to said reel and to move the reel bodily in the case through the medium of the cam.

12. The combination, in a trolley-catcher, with a case provided with a cam, of a guide mounted to reciprocate in said case, a reel carried by said guide, a lifter pivotally attached to said reel, a spring adapted to normally retain said lifter out of engagement with said cam, and means to limit the movement of the lifter, the latter being adapted to fly outward and engage the cam under the impulse of a sudden acceleration of rotary motion imparted to said reel and to move the reel bodily in the case through the medium of the cam.

13. The combination, in a trolley-catcher, with a case provided with an engaging member, of a reel also provided with an engaging member and mounted in said case, said reel being adapted to revolve with its engaging member normally out of range of the engaging member in the case, and means to move said reel bodily to bring the two engaging members into contact.

14. The combination, in a trolley-catcher, with a case provided with a cam and a lug, of a guide mounted to reciprocate in said case, a reel carried by said guide, a lifter pivotally attached to said reel, a spring adapted to normally retain said lifter out of engagement with said cam, the lifter being adapted to fly outward and engage the cam under the impulse of a sudden acceleration of rotary motion imparted to said reel and to move the reel bodily in the case through the medium of the cam, and a dog on the reel arranged to engage said lug when the reel is so moved and lock the latter against further rotary motion in one direction.

15. The combination, in a trolley-catcher, with a case provided with a lug, of a reel provided with a dog and mounted in said case, and means to move said reel bodily and cause its dog to ride onto said lug.

16. The combination, in a trolley-catcher, of a case provided with an engaging member, a reel also provided with an engaging member and mounted in said case, one of such engaging members being angular, and means to move said reel bodily while rotating and bring said members into engagement with one mem-

ber contacting with both arms of the other member.

17. The combination, in a trolley-catcher, with a case provided with a cam and a lug, of a guide mounted to reciprocate in said case, a reel carried by said guide, a lifter pivotally attached to said reel, a spring adapted to normally retain said lifter out of engagement with said cam, the lifter being adapted to fly outward and engage the cam under the impulse of a sudden acceleration of rotary motion imparted to said reel and to move the reel bodily in the case through the medium of the cam, and a dog on the reel arranged to engage said lug when the reel is so moved and lock the latter against further rotary motion in one direction, the interlocking members being so constructed as to permit a certain amount of movement between the two without complete disengagement.

18. The combination, in a trolley-catcher, with a case, of a reel mounted therein, resilient means adapted to retain said reel in one location, and means to move said reel bodily and radially against said resilient means.

19. The combination, in a trolley-catcher, with a case, of a member mounted to reciprocate therein and provided with a spring adapted to bear against said case, a reel carried by said member, and means to move said reel and member bodily against the resiliency of said spring, such movement being in the direction of a radius of the reel.

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

SETH J. BUCKLAND.

Witnesses:

F. A. CUTTER,
J. M. STERNS.