

(No Model.)

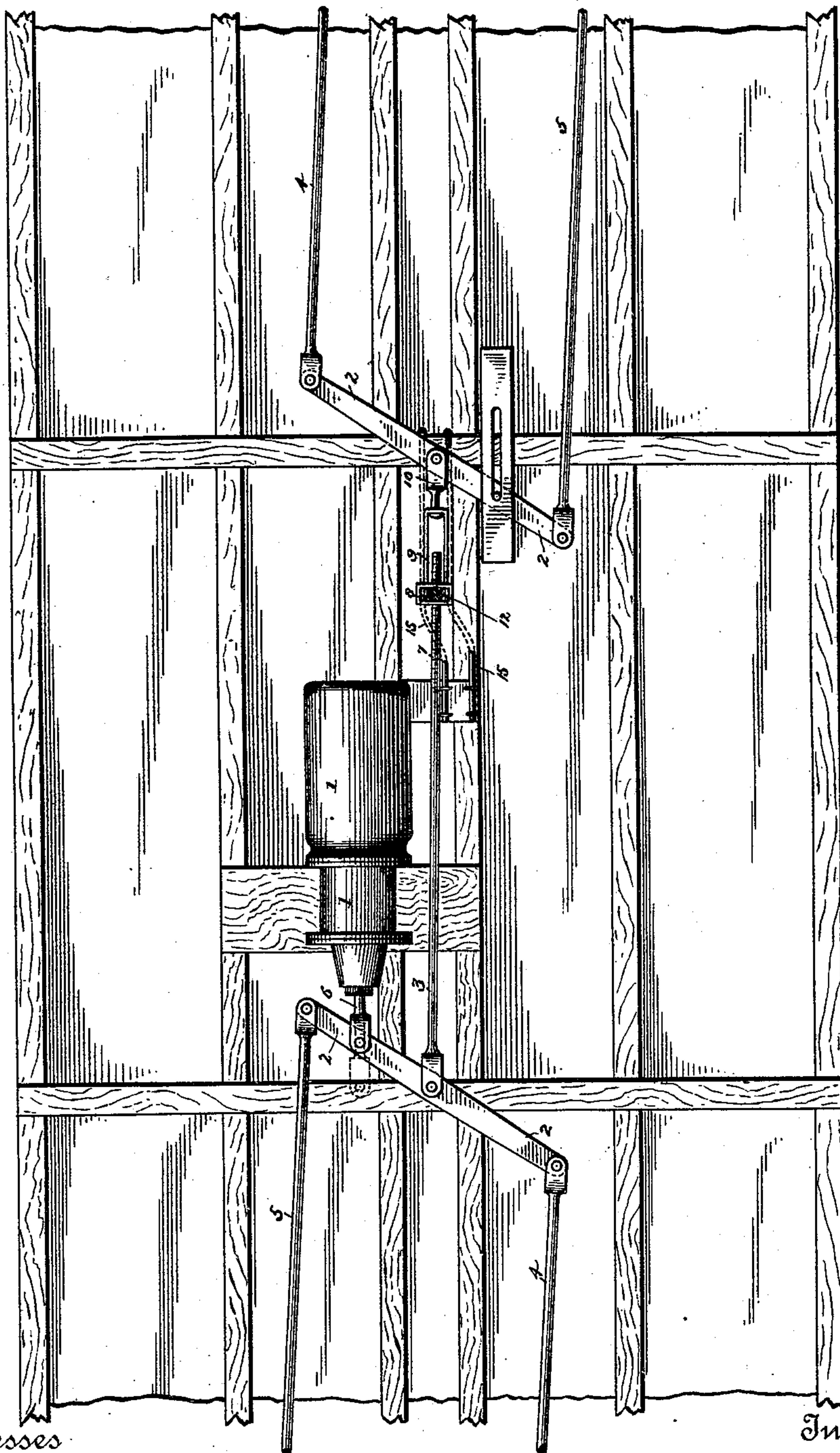
2 Sheets—Sheet 1.

H. HINCKLEY.

AUTOMATIC CAR BRAKE ATTACHMENT.

No. 475,015.

Patented May 17, 1892.



Witnesses

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Inventor

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Fig. 2.

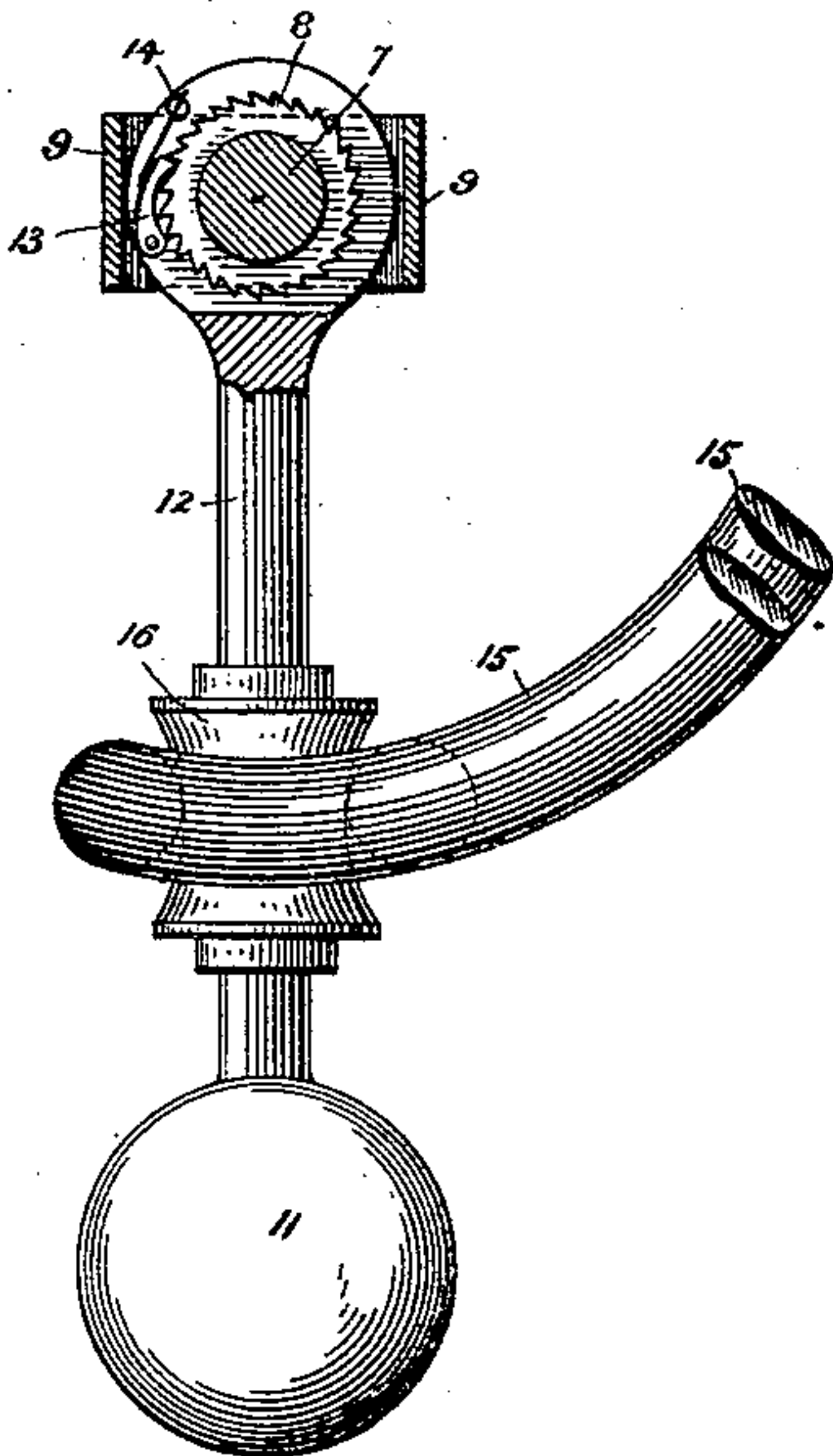


Fig. 3.

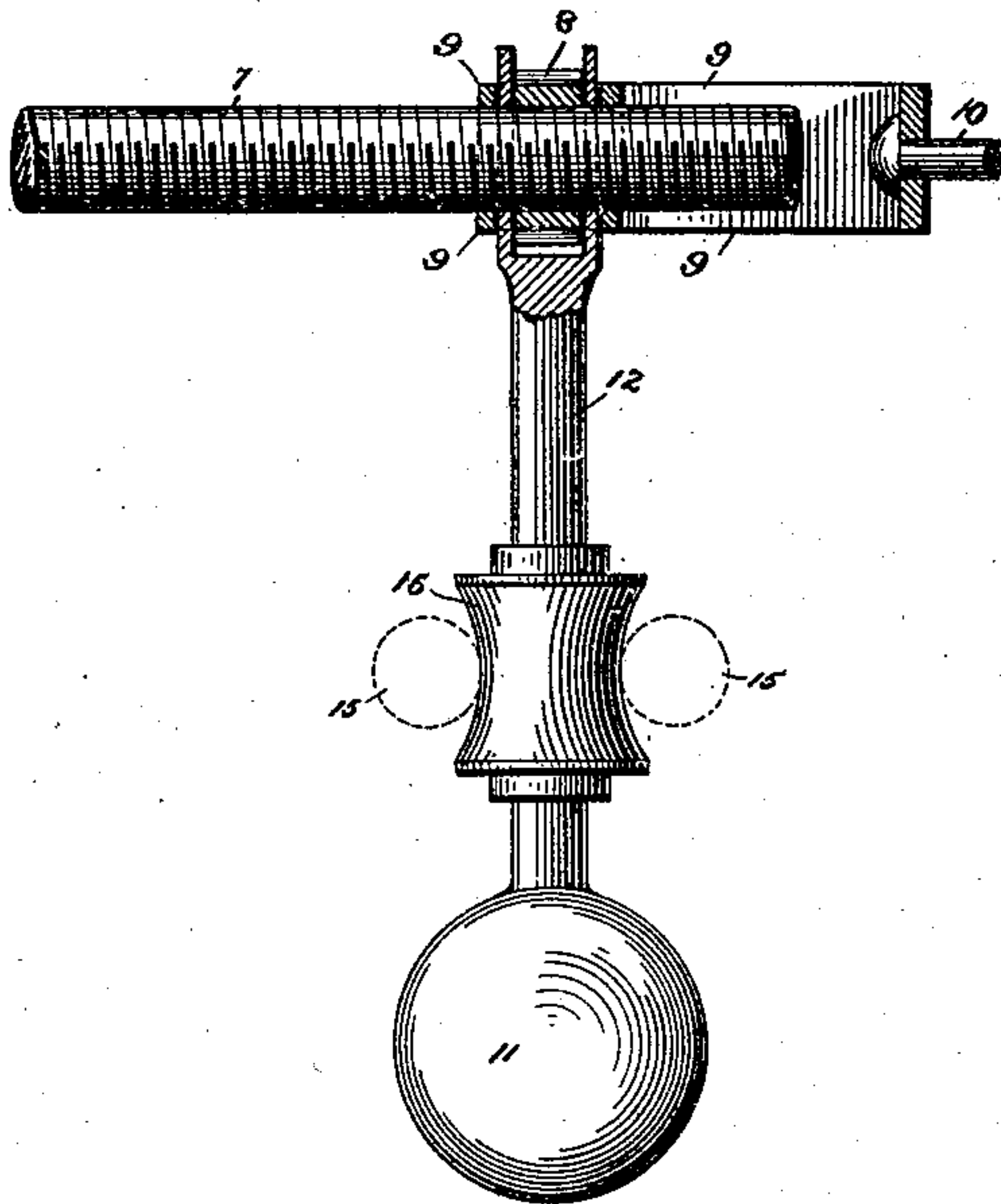
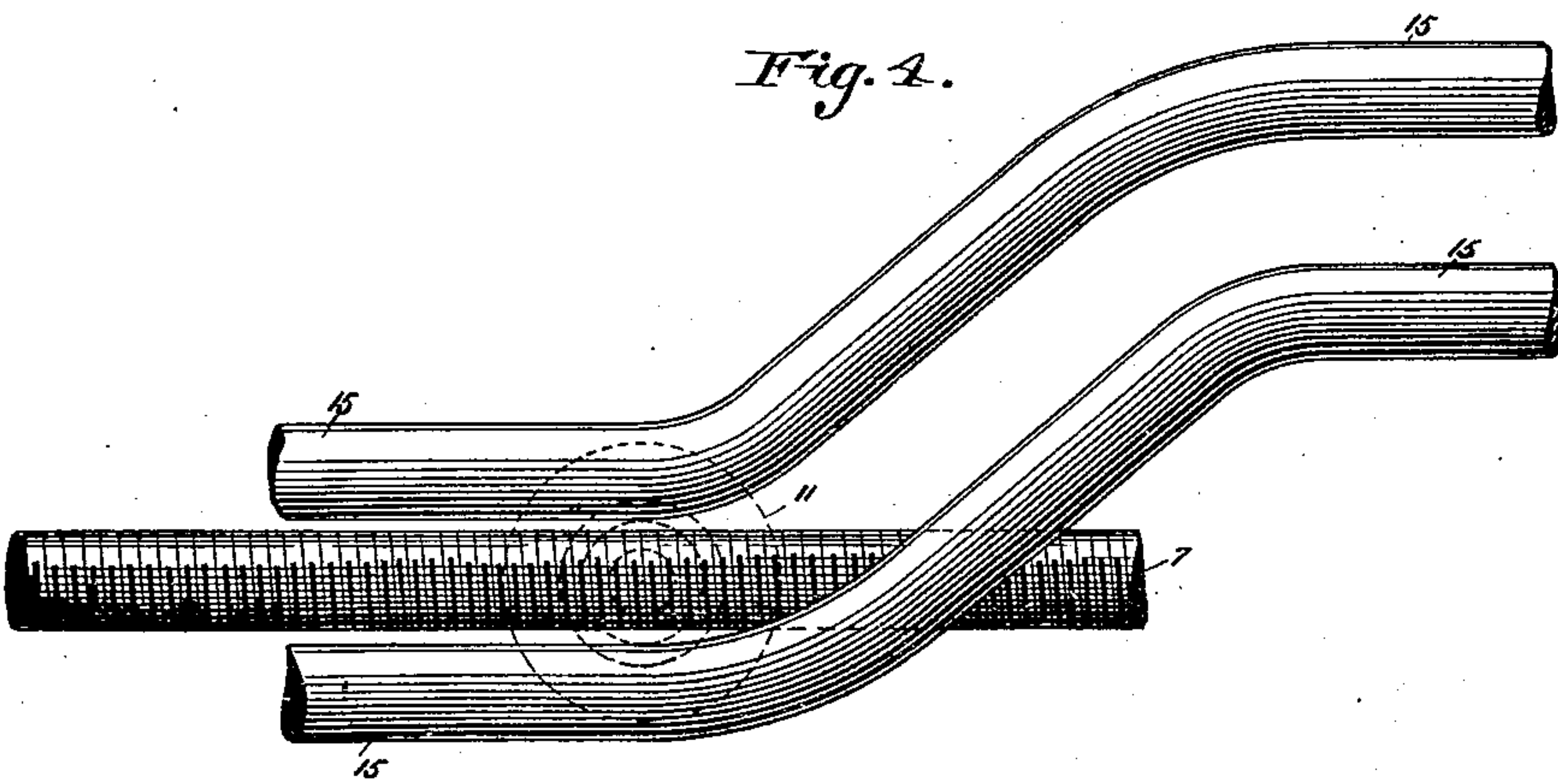


Fig. 4.



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UNITED STATES PATENT OFFICE.

HOWARD HINCKLEY, OF TRENTON, NEW JERSEY.

AUTOMATIC CAR-BRAKE ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 475,015, dated May 17, 1892.

Application filed October 17, 1889. Renewed February 23, 1892. Serial No. 422,511. (No model.)

To all whom it may concern:

Be it known that I, HOWARD HINCKLEY, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Automatic Car-Brake Attachments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the practical operation of car-brakes, whether automatic or hand-actuated, a difficulty has heretofore been encountered in that the wearing away of the brake-shoes by frictional contact with the wheels, the loosening or wearing of the connections between the shoes and their actuating mechanism, the bending or warping of some of the rods or levers, &c., necessitates an increased movement of the brake-lever in order to bring the brake-shoes into contact with the wheels; and this additional movement is what is known as the "slack motion." Unless some compensation is made for this lost motion, the amount of movement of the brake-lever necessary to set the brakes increases until it gets beyond the limit of its effective range, thereby impairing the efficiency of the brakes to that extent; or, it may even extend until it reaches the actual limit of the brake-lever's movement, thereby rendering the brake entirely inoperative. As the efficiency of all brakes depends largely upon the ease and celerity with which they can be applied and released, it is necessary to make readjustment from time to time of the connections in order to compensate for the additional travel on the brake-lever required to bring the shoes into contact with the wheels.

The object of my present invention is to do away with this necessary readjustment of the parts by providing means for automatically taking up the slack motion by what is in effect altering the length of the connections between the brake-shoe and its actuating mechanism so as to confine the movement of the brake-lever within its most effective range; and to this end the invention consists in the construction shown in the drawings, and hereinafter described, and pointed out in the claims.

Though the invention is herein shown and described in connection with the well-known Westinghouse automatic air-brake it is equally well adapted for use in connection with any power-brake, or it may be conveniently used in connection with brakes which are operated by hand.

In the accompanying drawings, forming part of this specification, Figure 1 is the bottom plan view of a car, showing the Westinghouse brake-cylinder and usual system of levers with my invention applied thereto. Figs. 2 and 3 are detail views showing the pendent weighted arm from two points of view; and Fig. 4 is a detail showing the relation of the connecting-rod between the brake-levers to the guide-rods which control the action of the take-up device.

In the drawings, 1 denotes the brake-cylinder and air-reservoir; 2, the brake-levers; 3, the rod forming a connection between the two levers; 4, the rods connecting these brake-levers with the brake-beam levers; 5, the rods or links leading to the hand-actuating mechanism at either end of the car by means of which the brakes may be operated by the brakeman, and 6 the piston of the brake-cylinder. These parts are all common to the well-known Westinghouse automatic air-brake system, and need no particular description here, except to say that they are arranged and connected together in the usual way.

Though my improved slack-take-up may be introduced at any preferred point in the system of rods, levers, &c., by which the movement of the brake-cylinder piston is communicated to the brake-shoes, I have here shown it as introduced into the connection between the two brake-levers. The rod 3 connecting these levers, instead of being, as is generally the case, one continuous rod of fixed and predetermined length, comprises a turnbuckle, and is made automatically adjustable in length as the range of movement of the levers increases by the wearing away of the brake-shoes, or from any of the other causes likely to produce that result. The end of the rod proper, opposite its connection with one of the levers, is screw-threaded, as shown at 7 in the drawings. This screw-threaded end takes into a nut 8, having a ratchet-like periphery. This nut is seated within a rectangular seat

or housing provided therefor in the turnbuckle by shaping the end of the metal frame 9, constituting the turnbuckle proper, to fit it snugly, yet allow of its free-turning movement. The opposite end of the turnbuckle is connected by the usual headed bolt and clip 10 to the opposite brake-lever.

12 is a pendulous arm having a weight 11 at its lower end and provided with a yoke at its upper end to straddle the nut 8. A pawl 13, controlled by a spring 14, is pivoted to the upper yoked end of this arm, and takes into the ratchet-like periphery of the nut, so that upon turning the arm 12 the nut is turned very much after the manner of the ordinary ratchet-drill, and thereby caused to run up on the thread of the rod.

Arranged upon suitable brackets attached to the bottom of the car-body are two parallel guide-rods 15, which underlie the connecting-rod 3 and run parallel therewith in straight lines for a distance about equal to the ordinary movement of that part of the brake-lever to which the rod 3 is attached. Thence these guide-rods are abruptly deflected laterally with respect to said rod, as shown in Fig. 1.

The pendulous weighted arm 12 is placed over the end of the rod 7, with its yoked end astride the ratcheted nut, and hangs down between the two guide-rods 15, as shown on Sheet 2 of the drawings, being provided midway of its length with an anti-friction spool or sheave 16 to run upon the guide-rods. These rods are bent upward in a vertical plane where they are deflected laterally, as shown in Fig. 2, upon an arc struck from the connecting-rod 3, so that as the weighted arm is swung to and fro on the rod its spool 16 may travel smoothly thereon. The weight 11 at the lower end of the arm is to aid in restoring it to and maintaining it in a vertical position.

The construction and arrangement of parts being as thus described, the operation is as follows: The movement of the cylinder-piston is of course limited by the length of the cylinder; but it is desirable that the maximum pressure of the brakes should be exerted before the piston has traversed the length of the cylinder, so that the full application of the brakes shall be had with a minimum amount of air and a uniform range of movement of the piston. In new cars it is customary to so adjust the system of levers, rods, &c., that the piston will move about four and one-half inches to apply the maximum pressure. As the shoes wear away, or as slack motion occurs from any other cause, this movement of the piston increases rapidly, requiring excessive expenditure of air to give it this increased throw, as well as consuming more time in applying the maximum pressure of the brakes. This throw of the piston increases in rapid ratio to the amount of slack motion, it being estimated that a wear of three-eighths of an inch on the shoes requires a throw of from eight to ten inches,

while for one-half an inch wear it ranges from nine to eleven inches. This results in greatly impairing the efficiency of the system, and if allowed to go on without being taken up somewhere the piston-head in its stroke finally reaches the limit of its movement and exerts its pressure against the end of the cylinder and the brakes become entirely inoperative.

As above stated, the rods 15 are arranged so that the guide formed thereby for the pendent arm shall have a straight reach about equal to the range of movement given to the piston when the system is first applied. They are then turned off to one side, as shown in Fig. 1. The pendent arm hangs down, as already explained, between these rods, and as it travels with the rod to and fro so long as it remains in the straight reach will not be turned to the right or the left; but as the movement of the piston increases with the slack motion this arm passes into the curved reach of the guide formed by the lateral deflection of the rods. The effect of this is to turn the arm upon the rod 3, first to one side and then the other, as it travels to and fro with the rod 3. In this turning movement the spring-pawl 13 takes into the ratcheted periphery of the nut and screws it upon the rod as the arm moves in one direction with the rod and slips over the ratchets in its return movement without effecting the position of the nut, similar to the action of the handles of the ordinary ratchet-drills. This causes a gradual shortening up of the rod 3, and secures the application of the brakes without any necessary increase in the throw of the piston.

The threads on the rod 3 and the nut 8 are arranged in relation to the sidewise deflection of the guide-rods 15, so that the pawl 13 shall act to turn the nut on the return stroke of the piston. This is an important feature, for it will be apparent that the nut can be turned on the rod much more easily when there is practically no tension on the rod 3 than when it is strained in the application of the brakes. I have shown the guide-rods arranged beneath the rod 3 and the arm 12 hanging in a vertical position. This arrangement, however, is not essential, for the guide may be arranged so that the arm 12 may be horizontal or inclined. The weight 11 on the end of the rod is not essential, but its use is desirable to assist in restoring it to its normal position and prevent rattling. The curved reach in the guide may be arranged at any desired angle to the straight portion. The more abrupt the deflection is for a given length of reach the more the nut will be turned. As the wear is gradual and it takes many applications of the brakes to cause any perceptible increase in the throw of the piston, the ratchet will by very slight movements keep shortening up the connecting-rod and thereby compensate gradually for the slack developed in the levers and brake-shoes. It is sufficient to turn

the nut through a short arc at each stroke of the arm 12.

5 This device forms a perfect automatic take-up, requiring no attention whatever after being first set up and operating under conditions where other take-ups would fail. It may be applied at any other point in the system, or more than one may be used in different parts.

10 The invention is susceptible of wide range of modifications; and I do not therefore wish to be understood as limiting it to the details of the construction and arrangement herein shown.

15 What I claim, and desire to secure by Letters Patent, is—

1. In a car-brake system, the combination of the actuating mechanism, a rod or link through which power is communicated from 20 said mechanism to the brake-shoes, a turnbuckle connected with said rod, an arm or lever pivoted to turn on the rod and connected with the turnbuckle, and a fixed guide acting on the arm to cause the latter to oscillate 25 on the rod transversely of its length, so as to turn the buckle and shorten the rod as the latter moves, substantially as described.

2. In a car-brake system, the combination of the actuating mechanism, a rod or link through which power is communicated from 30 said mechanism to the brake-shoe, said rod having a threaded end, a turnbuckle connected with the rod and comprising a screw-nut having a ratcheted periphery, an arm or lever swinging on the rod and carrying a 35 spring-pawl in engagement with the ratchet, and a fixed guide through which the arm travels as the rod moves, said guide having a straight reach and a deflection, whereby so long as the movement of the rod does not ex- 40 ceed the length of the straight reach the arm will be maintained in one position, but when the movement of the rod exceeds the length of this reach the arm will be carried into the deflection and swung so that the pawl will 45 turn the nut and shorten the rod, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD HINCKLEY.

Witnesses:

F. W. GNICHTEL,
M. M. HEIDWEILER.