

C. E. LORD.  
 CONTROLLER REGULATOR.  
 APPLICATION FILED NOV. 30, 1906.

Patented May 18, 1909.

922,172.

Fig. 1

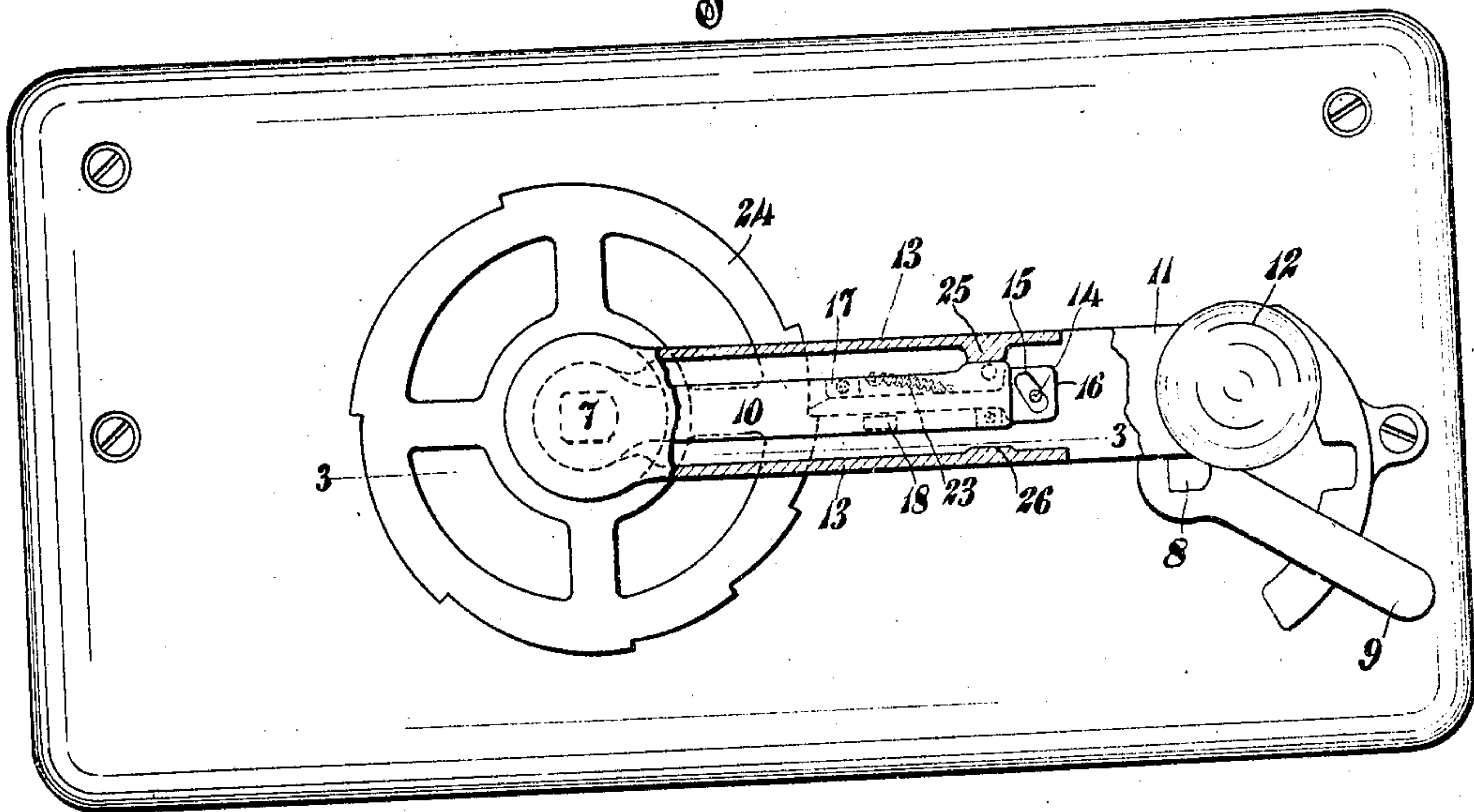


Fig. 2

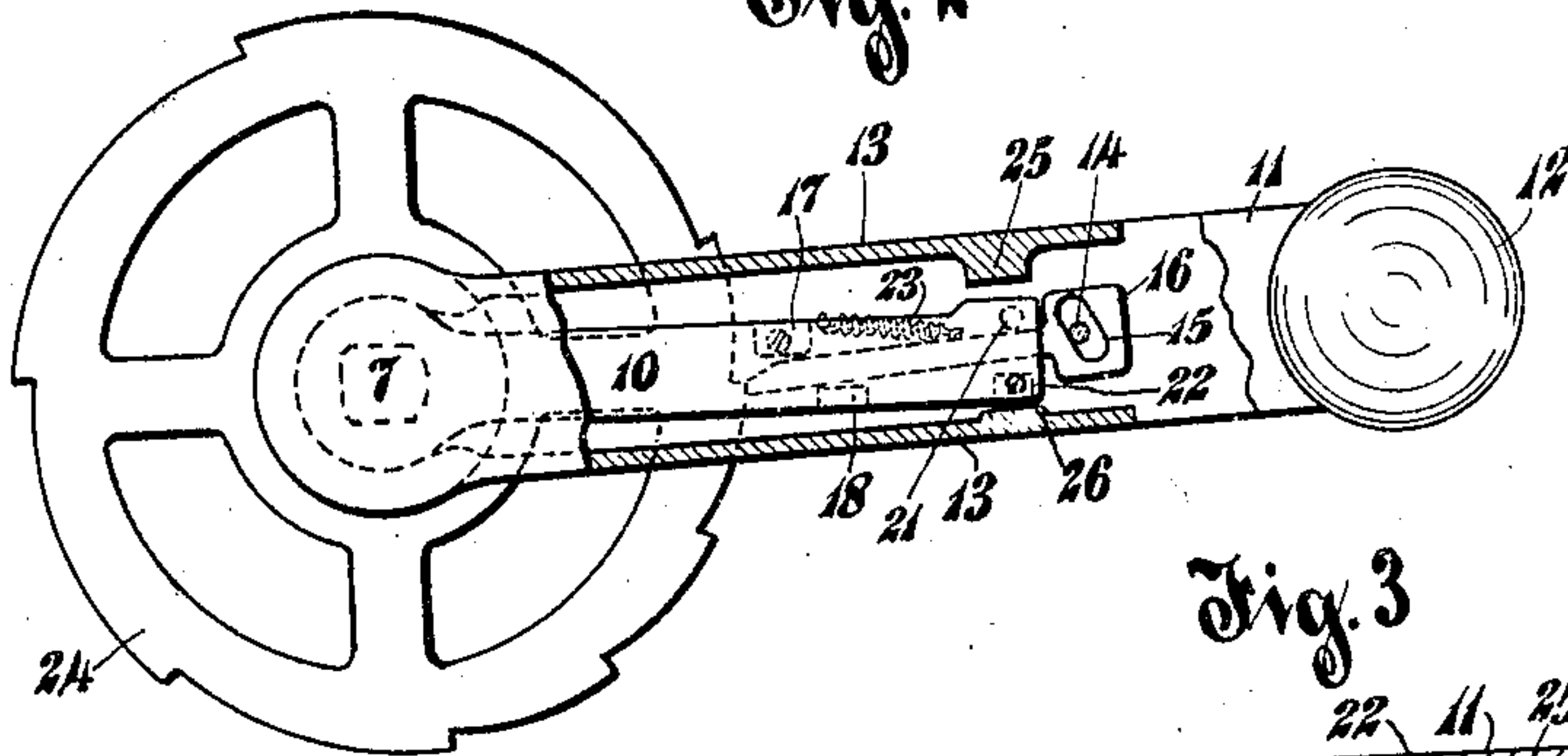


Fig. 3

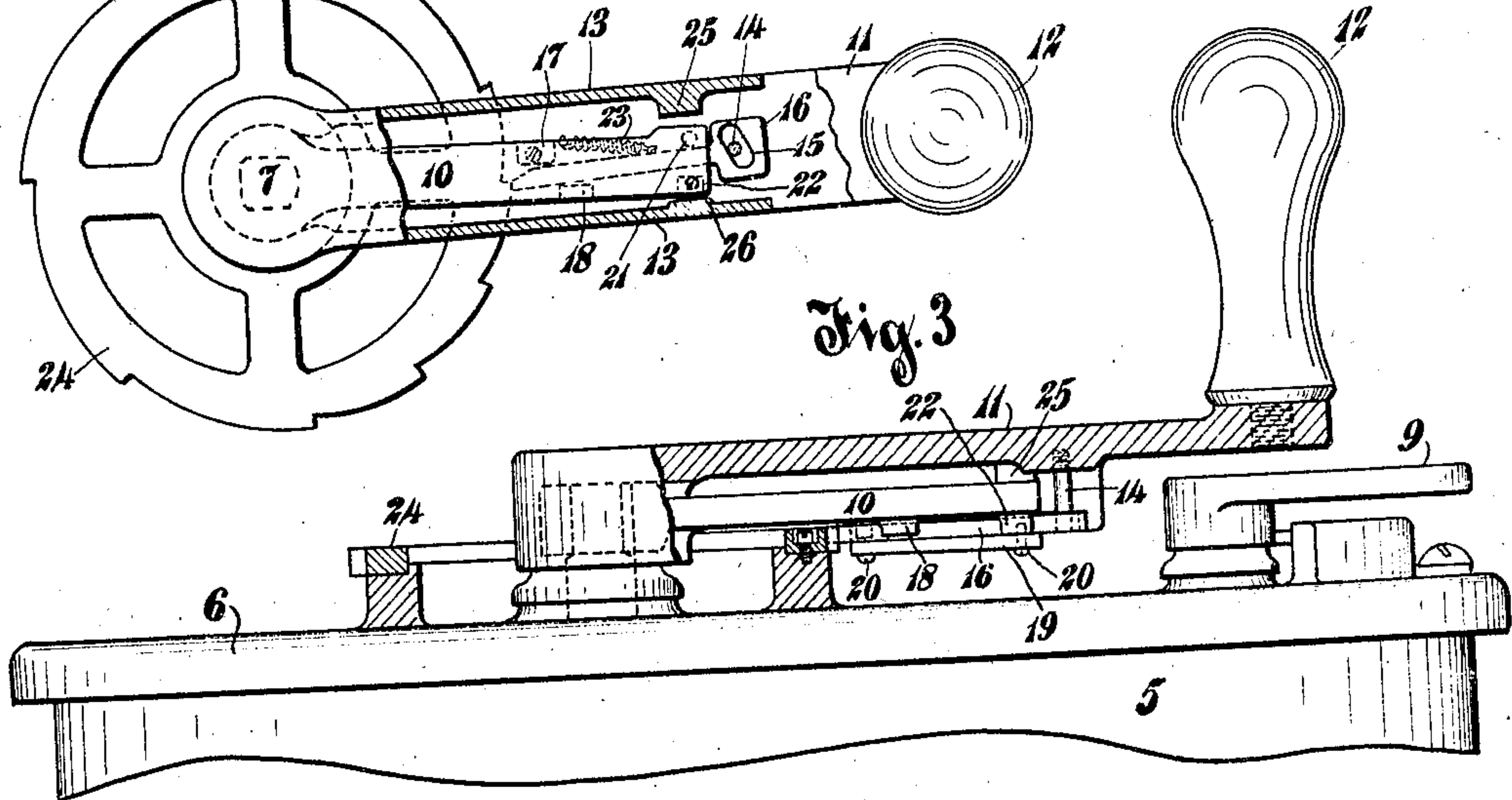
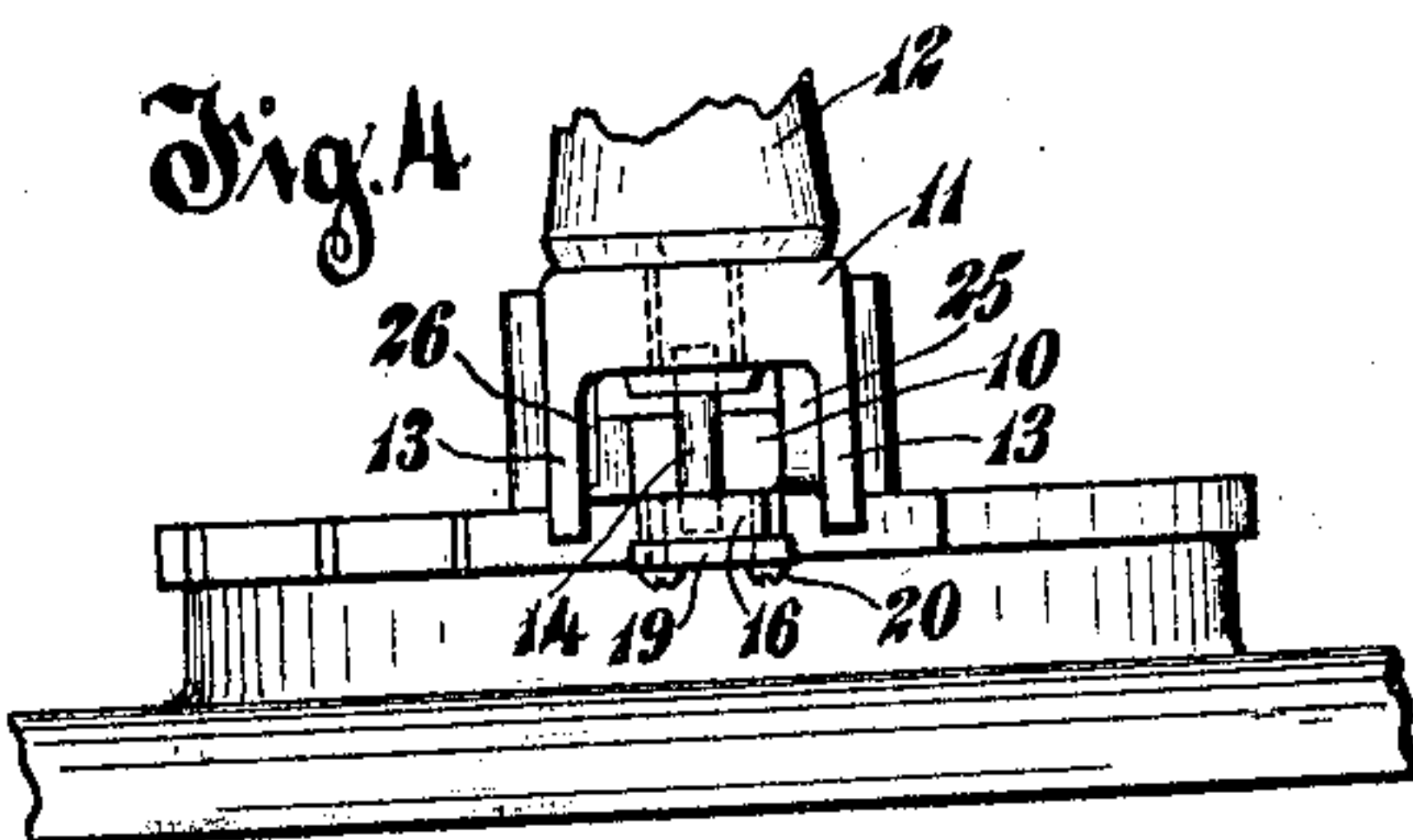


Fig. 4



Witnesses  
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# UNITED STATES PATENT OFFICE.

CHARLES E. LORD, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, A CORPORATION OF NEW JERSEY.

## CONTROLLER-REGULATOR.

No. 922,172.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed November 30, 1906. Serial No. 345,582.

*To all whom it may concern:*

Be it known that I, CHARLES E. LORD, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Controller-Regulators, of which the following is a full, clear, and exact specification.

My invention relates to improvements in motor controllers and particularly to means for regulating the operation of electric railway controllers.

Great difficulty has been experienced with ordinary controllers because of the tendency of inexperienced or careless operators to move them rapidly from the "off" to the "full on" positions without pausing properly at other predetermined operative positions. This rapid movement is apt to cause considerable damage to the motors and to the controller itself.

It is the object of my present invention to produce a positive step-by-step movement of the controller so as to prevent a too rapid supply of current to the motor or motors controlled thereby; and to provide means for doing this which shall be both simple in operation and manufacture, and not clumsy or unsightly in appearance.

The invention therefore consists of a controller handle, a pawl cooperating with a notched member to stop the handle at predetermined points in its forward movement, and means for disengaging the pawl and notched member by a cam action during a slight backward movement of the handle.

More specifically my invention consists of the combination of a handle comprising two parts slightly movable relatively to each other, a fixed notched member, a latch carried by one part of the handle and biased toward the notched member, and a pin and slot connection between the second part of the handle and the latch so arranged that upon a backward movement of the second part of the handle alone, the latch is withdrawn from the notched member.

The invention further consists in improved details of construction and novel combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings, which illustrate the preferred embodiment of my invention, Figure 1 is a partly sectional plan view of my improved controller regulator as

applied to a controller; Fig. 2 is a similar view of the regulator showing parts of same in a different operative position; Fig. 3 is a front elevation of the regulator and part of the controller casing, partly in section along the line 3—3 of Fig. 1; and Fig. 4 is an end elevation of said regulator.

Referring now to the figures of the drawing, the controller casing 5 is provided with a cap plate 6, through which projects the upper ends of the main drum shaft 7 and the reversing switch shaft 8. The latter shaft is provided with the customary operating handle 9. The shaft 7 however is provided with my improved regulating device for producing a positive step-by-step or notching-up movement of the main drum. This regulating device is so constructed and arranged that it insures the gradual operation of the controller so as to permit the motors to gain speed to such an extent that proper counter electromotive force is generated thereby before the next step of the controller can be taken. This arrangement protects the motors and the controller against damage due to current overloads, and also effects an economy in the operation of the system by preventing an unnecessary waste of current in starting the motor or motors.

The operating handle of the main drum comprises an arm 10 fixed on the end of the shaft 7, and a second arm 11 movable relatively to the arm 10 and carrying a knob 12 adapted to be grasped by the operator. The arm 11 is shown pivoted on the hub portion of the arm 10 so that the two arms turn about the same axis, but if desired the arm 11 may be pivoted at any other point on the arm 10. The relative movement between the arms 10 and 11 is limited by bosses 25 and 26 on aprons 13 which extend down from the arm 11 upon either side of the arm 10. A pin 14 extends downwardly from the arm 11 into a diagonal slot 15 in the enlarged end or head of a sliding latch or pawl 16 carried by the arm 10. This pawl can slide longitudinally between projections 17 and 18 which extend downward from the arm 10, and is supported from beneath by a plate 19 attached to the arm 10 as by screws 20. As the projections 17 and 18 are not in line transversely of the pawl 16, said pawl can also turn slightly about the projection 17 as a fulcrum, this turning movement being limited by other projections 21 and 22 from the arm 10. The latch 16 is biased, as by a



spring 23, toward engagement with the notches of a stationary notch-plate 24 which may be attached to the cap plate 6 of the controller. The notches of this plate mark the operative positions of the controller.

In the operation of my controlling handle when the knob 12 is grasped by the operator and the handle is moved in a clockwise direction, the boss 25 engages the arm 10 and the two arms 10 and 11 of the handle move forward together to rotate the shaft 7. During this forward movement the pawl 16 is drawn into one of the notches of the notched member 24 by the spring 23. The forward movement of the controller is stopped when the parts reach a position corresponding to that shown in Fig. 1. It is now necessary for the operator to move the arm 11 a comparatively slight distance backward independently of the arm 10. During this movement the pin 14 engages the side of the slot 15 which is away from the notch plate 24 and by a cam action draws the latch or pawl 16 by a sliding movement out of the notch with which it is in engagement. As soon as the pawl 16 clears the side of the notch in which it was seated, the spring 23 acts to rotate it about the projection 17 to bring it into the position shown in Fig. 2, so that when the pawl is released by the next forward movement of the arm 11, it will not engage in the same notch from which it has just been moved. When this next forward movement of the arm 11 takes place the boss 25 again engages the arm 10 and through this engagement the handle in its entirety moves the shaft 7 forward until the pawl 16 engages the next notch of the plate 24. This step-by-step movement may be continued until the controller reaches its "full on" position. During the backward or counter clockwise movement of the controller, the arm 10 and the shaft 7 are moved from the arm 11 by the engagement between said arm and the boss 26 on the flange 13, and the pawl 16 is held away from the notch plate 24 against the action of the spring 23 by the engagement between the pin 14 and the outer side of the slot 15. Even if the latch 16 should not be far enough out to clear the member 24, the inclined sides of the teeth which will be engaged by said pawl will act as inclined planes to move said pawl outward so that the teeth of the notched member 25 do not interfere with the backward movement of the controller.

By having the movement of the latch or pawl substantially perpendicular to the direction of movement of the handle, it is possible to have any desired number of notches in the notch-plate. And by having the latch entirely beneath the handle the general appearance of the device is much improved.

In the appended claims I aim to cover all modifications which do not involve a departure from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent is:—

1. In combination, a controller handle, a single pawl carried thereby and arranged to have both a turning movement and a longitudinal sliding movement relative to the handle, a notched member with which said pawl coöperates, means for disengaging the pawl and the notched member by a cam action during a slight backward movement of the handle, and a spring for biasing said pawl toward said notched member and for giving the pawl a slight turning movement when it is disengaged from the notched member.

2. In combination, a controller handle, a single pawl carried thereby and movable relatively thereto both longitudinally and rotatably, a notched member with which said pawl coöperates to stop the forward movement of the handle at predetermined points, a pin and diagonal slot connection between said pawl and handle for releasing the former from the notched member upon a slight backward movement of the handle, and a spring for giving the pawl a bias for both of its movements relative to the handle.

3. In a controller, the combination of a controller shaft, an arm fixed thereon, a pawl mounted on said arm for both sliding and turning movements and biased in both movements, a fixed notched member with which said pawl coöperates, a handle member pivotally mounted to have a limited turning movement relative to said arm, and means for disengaging the pawl and the notched member by a cam action during a slight backward movement of the handle member.

4. In a controller, the combination of a controller shaft, an arm fixed thereon, a pawl mounted thereon and slightly movable relatively thereto both by rotation and translation, means for giving said pawl a bias in both of its movements, a fixed notched member with which said pawl coöperates to stop the forward movement of said controller shaft at predetermined points, and a handle member pivotally mounted to have a slight turning movement relative to said arm and connected to said pawl by a pin and diagonal slot connection.

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

CHARLES E. LORD.

Witnesses.

GEO. B. SCHLEY,  
FRED J. KINSEY.