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L. H. THULLEN.

RAILWAY SIGNAL.

APPLICATION FILED MAR. 18, 1905.

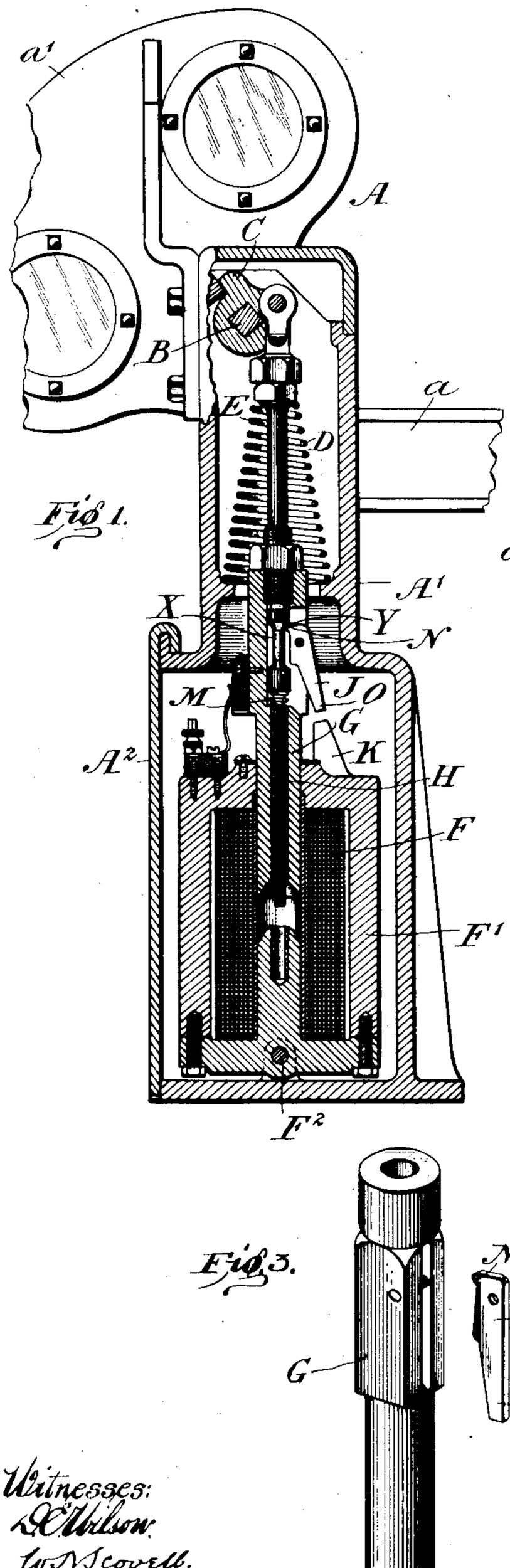

Fig. 1.

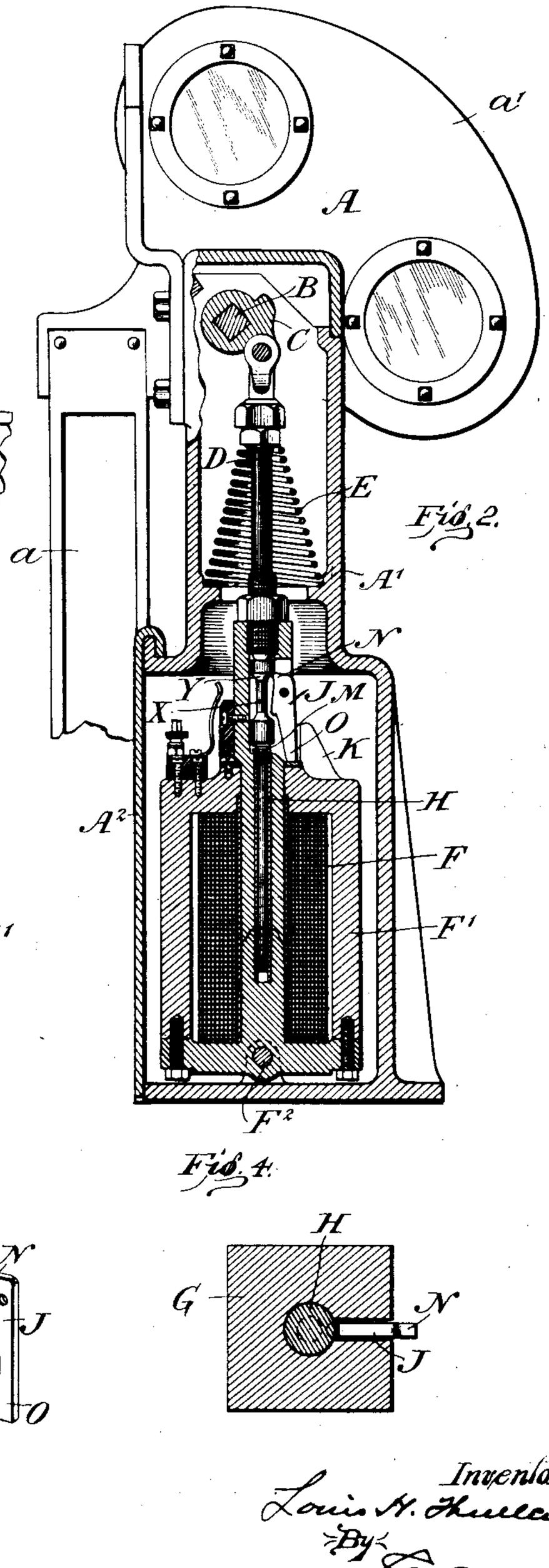

Fig. 2.

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

LOUIS H. THULLEN, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

RAILWAY-SIGNAL.

No. 871,378. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed March 18, 1905. Serial No. 250,760.

To all whom it may concern:

Be it known that I, LOUIS H. THULLEN, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention relates to railway signals, and particularly to that class of railway signals in which a solenoid or other form of electric motor is employed for moving the signal device from one of its positions of indication to another of its positions of indication.

My invention particularly relates to a lock for preventing unwarranted movements of the signal device from its "danger" position to its "safety" position.

I will describe a railway signal embodying my invention and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a rear elevation, partly in vertical section of a railway signal embodying my invention, the signal device thereof being in its "danger" position of indication. Fig. 2 is a view similar to Fig. 1, with the exception that the signal device is in "safety" or "clear" position of indication and the operating parts being correspondingly displaced. Fig. 3 is a detail and perspective view of a portion of the operating mechanism. Fig. 4 is an enlarged cross sectional view.

Similar letters of reference designate corresponding parts in all of the figures.

I have shown my invention as applied to what is technically known as a dwarf signal, though it will be understood that its use is not limited to that type of railway signal.

Referring now to the drawings: A^1 designates a suitable form of casing for completely inclosing the operating parts of the railway signal. The casing is provided with a removable closure A^2, which permits of access to the interior of the casing.

A designates a signal device which is shown as being in the form of a semaphore and as comprising a blade *a* and a spectacle casting a^1. The casting a^1 acts as a counterweight for the blade *a* and serves to move the signal device to its "danger" position of indication when not held in any other position of indication. The signal device is mounted on a shaft B which is suitably journaled in the upper portion of the casing.

C designates an arm fixed on the shaft B, and D an operating rod having one end connected with the arm C and its other end with one end of a plunger G which serves as a core for a coil F. The coil F and plunger G constitutes a solenoid which is one form of an electric motor. The coil F is arranged within a casing A^1 and is pivotally mounted at F^2 within the casing A^1. This is done to permit of the coil and plunger having radial movement in moving the signal device. It will be seen, therefore, from Fig. 1 that when current flows through the coil F, the plunger G will be drawn into the coil and thus move the signal device from its "danger" position (Fig. 1) to its "safety" or "clear" position (Fig. 2) against the action of the counterweight and a spring E which assists in moving the signal device from its "safety" position to its "danger" position.

As before stated, my invention has particular reference to a lock for preventing the signal device A being moved from its "danger" to its "safety" position other than through an operation of its motor. As shown, this lock comprises a catch movable with the plunger G, a stop or abutment and what I herein term a catch operating member, which, when operated by the motor prevents the latch from acting to prevent a movement of the signal device. In short, I provide a mechanical lock for preventing any external movement of the signal device from its "danger" position and means operated by and when the electric-motor is operated for rendering the lock ineffective. J designates the catch which is pivotally mounted on the plunger in such manner as to have its foot O extend outwardly therefrom as shown in Fig. 1, so that it will engage a fixed stop K, and to abut against the same when any external attempt is made to move the signal device from its "danger" to its "safety" position.

In order that the catch J, may not interfere with the ordinary working of the semaphore: that is to say, in order that it may not interfere when current is supplied to the coil to move the signal device from its "danger" to its "safety" position, a catch operating member H, is provided. This member, like the plunger G, is made of magnetic ma-

terial, and is adapted to be attracted by the coil. In this instance, the catch operating member comprises a rod-like member having a head, X, provided with an inclined catch engaging portion Y. The catch engaging member is seated within the hollow interior of the plunger, G; sufficient clearance being allowed over and above the length of the catch operating member in order that it may reciprocate freely back and forth within limits in the interior of said plunger. The motion of the catch operating member within its seat in the plunger G, consists of a motion towards the coil, when the latter magnetically attracts said member, and a motion in the opposite direction away from the coil due to the spring M, which acts as soon as the current is cut off the coil.

The catch engaging surface Y, of the catch operating member is so called because it is the surface which engages the nose N of the catch J and, due to the inclination of said surface and the reciprocation of said catch operating member, moves the foot O of the catch into or out of the way of the fixed stop K so that it will or will not engage same, as the case may be. Thus in Fig. 1 the nose of the catch is made to engage that portion of the inclined surface Y, which is nearest the axis; the catch, therefore, assumes the inclined position shown, with its foot extending into the path of the fixed stop K. The catch may be made heavier at its nose portion so that when free to move on its pivot it will assume the position shown in Fig. 1. In Fig. 2, however, the nose of the catch engages that portion of the inclined surface on the catch operating member which is furthest away from the axis. The catch, therefore, assumes the vertical position shown with its foot drawn inwardly out of the path of the fixed stop K. It will be noted that this change in the position of the catch has been brought about by the inclined catch engaging portion gradually pushing the nose of the catch outward as the catch operating member is pulled downward against the bottom of its seat by the magnetic attraction of the coil.

The operation of the device will now be apparent. When the signal device is in its "danger" position, as shown in Fig. 1, the plunger G will be in the position shown; that is to say, pushed out of the coil by the spring E, and will occupy its upper limit of travel. The catch operating member will likewise occupy its upper limit of travel through the action of the spring, M; the catch-engaging surface of the catch-operating member will allow the nose of the catch to occupy its inner limit of travel; and the foot, O, of the catch will, therefore, occupy its extreme outward limit of travel. Should any attempt now be made to tamper with the signal by forcing the signal device from its "danger" to its "safety" position, the foot of the catch will strike against the fixed stop, and will thereby prevent the plunger, G, from being inserted into the coil, and, consequently, will prevent also any rotation of the signal device. Should current now be supplied the coil in the ordinary operation of the railway signal to change the position of the signal device, the coil will pull both the plunger G and the catch operating member H into it. The catch operating member, however, being smaller, and having less inertia, will move first, and as it moves downward in the direction of the coil its inclined catch engaging surface will press the nose of the catch outward, and consequently move the foot of the catch inward, so that it is no longer in the path of the fixed stop, K. All this will take place before the plunger G has made sufficient headway to move from its position of rest to a position where the foot of the catch is opposite the fixed stop. The plunger will, therefore, be free to continue its motion under the influence of the magnetic attraction of the coil, until it is entirely seated within the coil. It is clear, therefore, how the catch does not interfere with the ordinary operation of the signal, but does interfere with the mechanical operation of the same from the outside. When the current is cut off from the coil to change the signal device back to its "danger" position,—the plunger G, and the catch operating member H, being no longer magnetically attracted,—the spring E will force the plunger G and its related parts out of the coil and the signal device will move to its "danger" position. Moreover, the spring M, will raise the catch operating member into its upper limit position, and its inclined catch engaging surface will allow the nose of the catch to move inwardly from the position shown at Fig. 2 into the position shown at Fig. 1; thereby moving the foot of the catch outwardly into the position shown in Fig. 1, where it will be in the path of the fixed stop K, and will abut against the same should the attempt be made to tamper with the signal device to move it to its "safety" position.

What I claim as my invention is:

1. The combination in a railway signal, of a signal device, an electric motor comprising a plunger and coil for moving said signal device, a catch carried by the plunger, a stop with which the catch engages when the signal device is moved otherwise than by its motor, and means also operated by the coil for moving said catch out of the path of the stop when the signal device is to be moved by the motor.

2. The combination in a railway signal, of a signal device, an electric motor comprising a hollow plunger and coil for moving said signal device, a catch, a stop with which said catch engages upon a movement of the signal

device other than by its motor, and means within the plunger operated by the coil for moving said catch out of the path of the stop when said signal device is to be moved by the motor.

3. In a railway signal, the combination of a coil, a plunger operatively connected to the signal device of the railway signal, and adapted to be attracted into the coil, a catch pivoted to said plunger, a fixed stop, and catch operating means for moving said catch out of the path of the stop when said plunger is magnetically attracted into the coil.

4. In a railway signal, the combination of a coil, a plunger operatively connected with the signal device of the railway signal and adapted to be attracted into the coil, a catch pivoted to said plunger, a fixed stop adapted when it engages said catch to prevent movement of the signal device, and catch operating means comprising a member composed of magnetic material, and adapted to be moved by the coil, the said member being moved in the direction of the coil by magnetic attraction, and in the opposite direction by a spring, said member to move the catch out of the path of the stop when magnetically attracted, and to move the catch into the path of the stop when it is moved in the opposite direction.

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

LOUIS H. THULLEN.

Witnesses:
W. L. McDANIEL,
JAMES CHALMERS, Jr.