

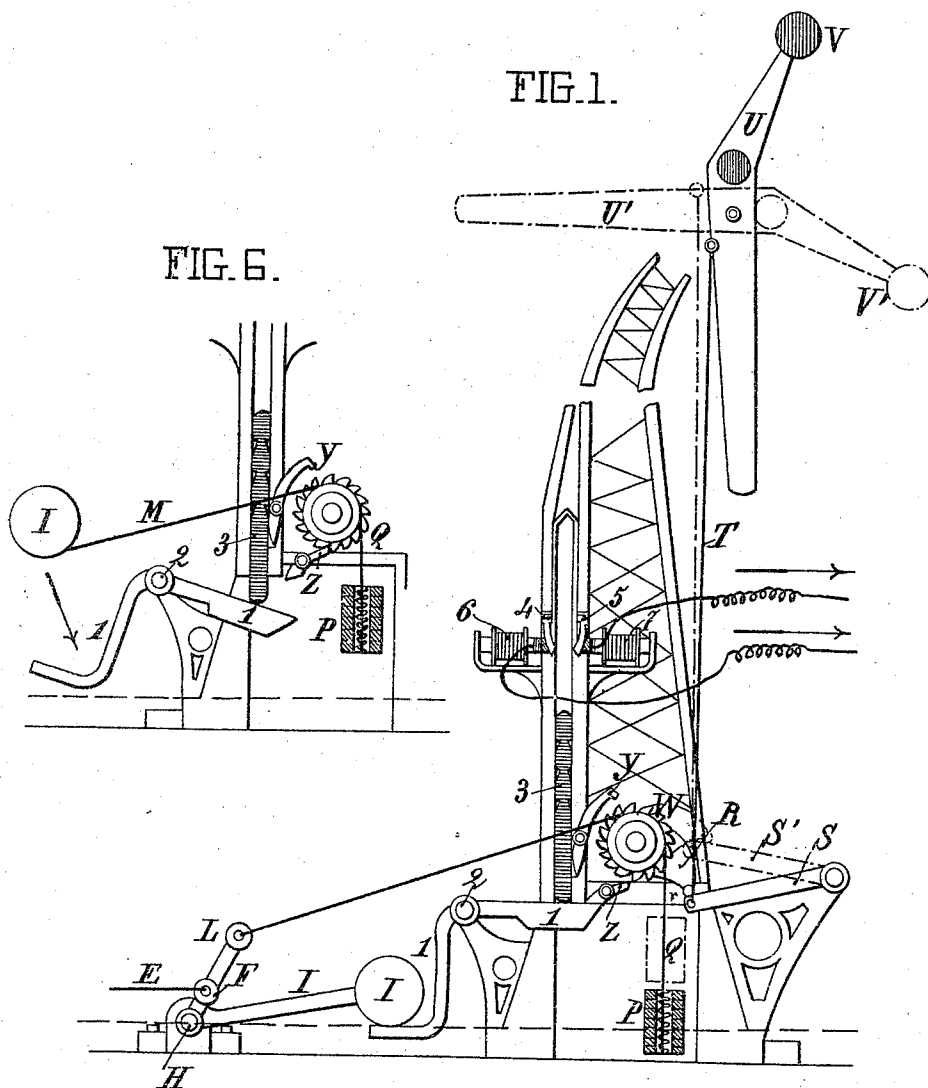
(No Model.)

4 Sheets—Sheet 1.

J. C. G. MUGNIER.
RAILWAY SIGNAL APPARATUS.

No. 500,668.

Patented July 4, 1893.



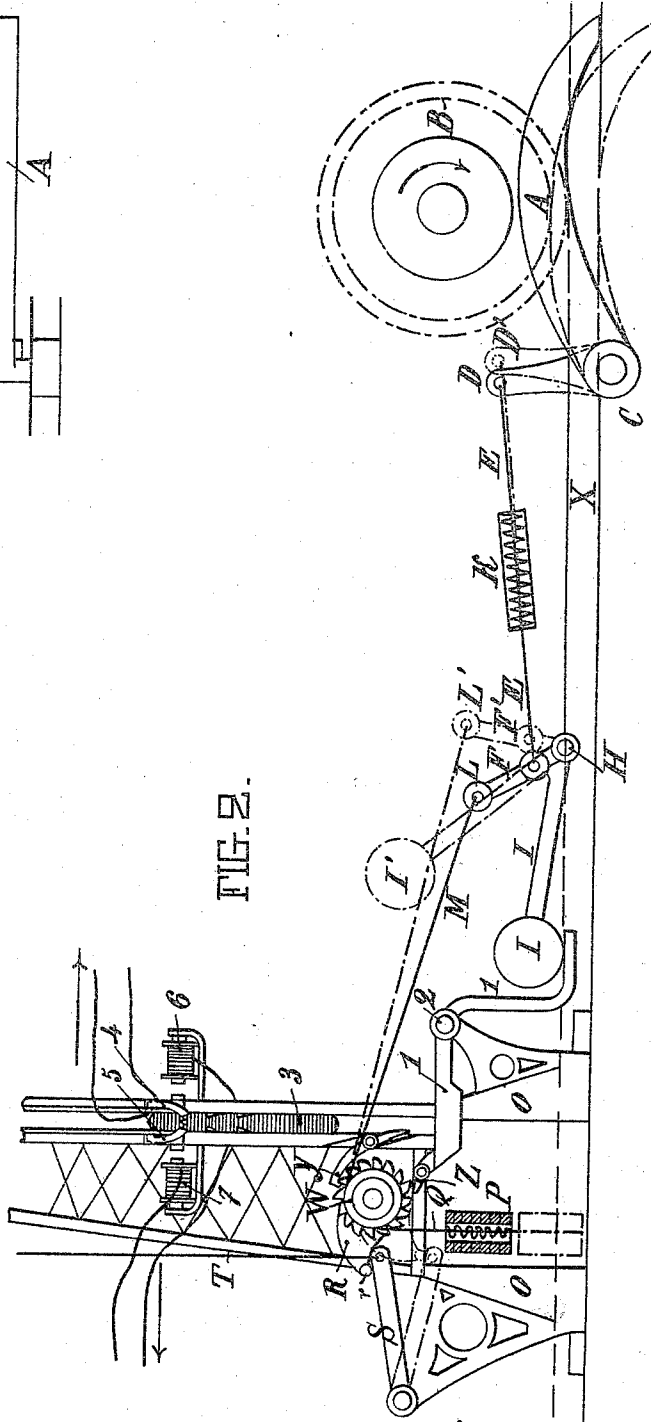
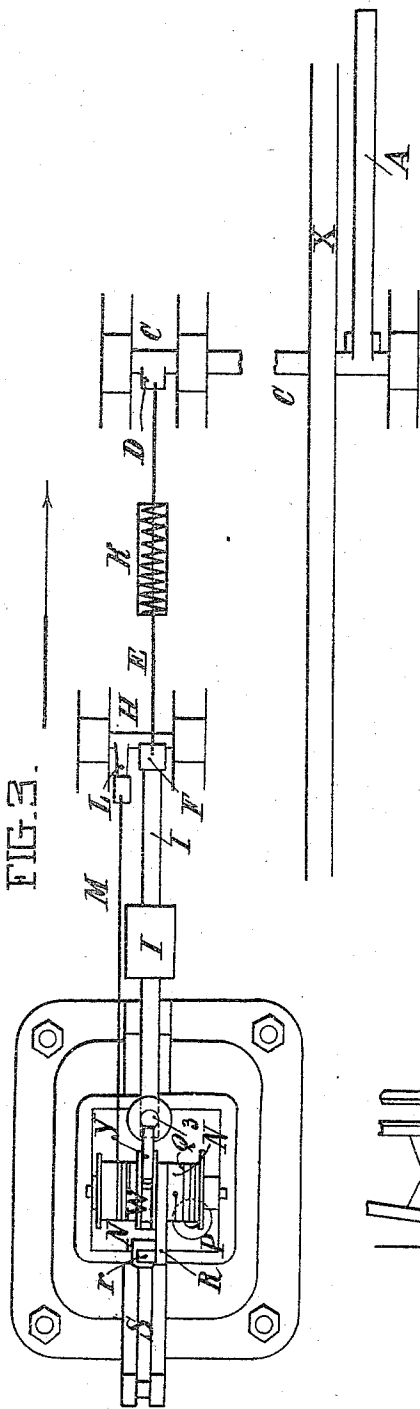
Witnesses:
L. M. Wachschrager
E. L. Sherman

Inventor
Joseph C. G. Mugnier,
by Brissen Knaut,
his Attorney.

J. C. G. MUGNIER.
RAILWAY SIGNAL APPARATUS.

No. 500,668.

Patented July 4, 1893.



Witnesses:
L. M. Haschlag, Jr.,
E. L. Sherman

Inventor
Joseph C. G. Mugnier,
by Briesen Thwaitz
his attorneys.

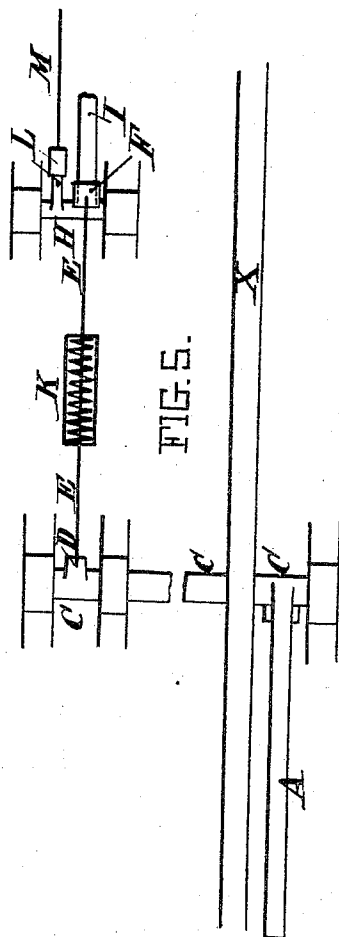
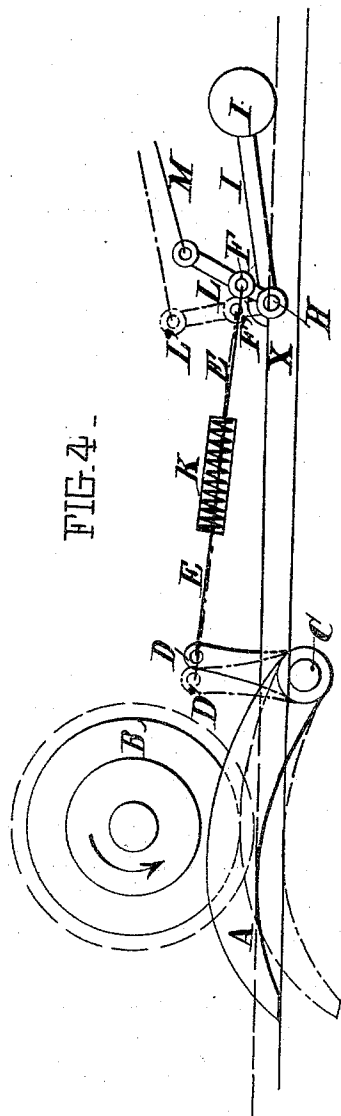
(No Model.)

4 Sheets—Sheet 3.

J. C. G. MUGNIER.
RAILWAY SIGNAL APPARATUS.

No. 500,668.

Patented July 4, 1893.



Witnesses:
L. M. Hackicklager,
E. L. Sherman

Inventor
Joseph C. G. Mugnier,
by Briesen Thwaite
his attorneys.

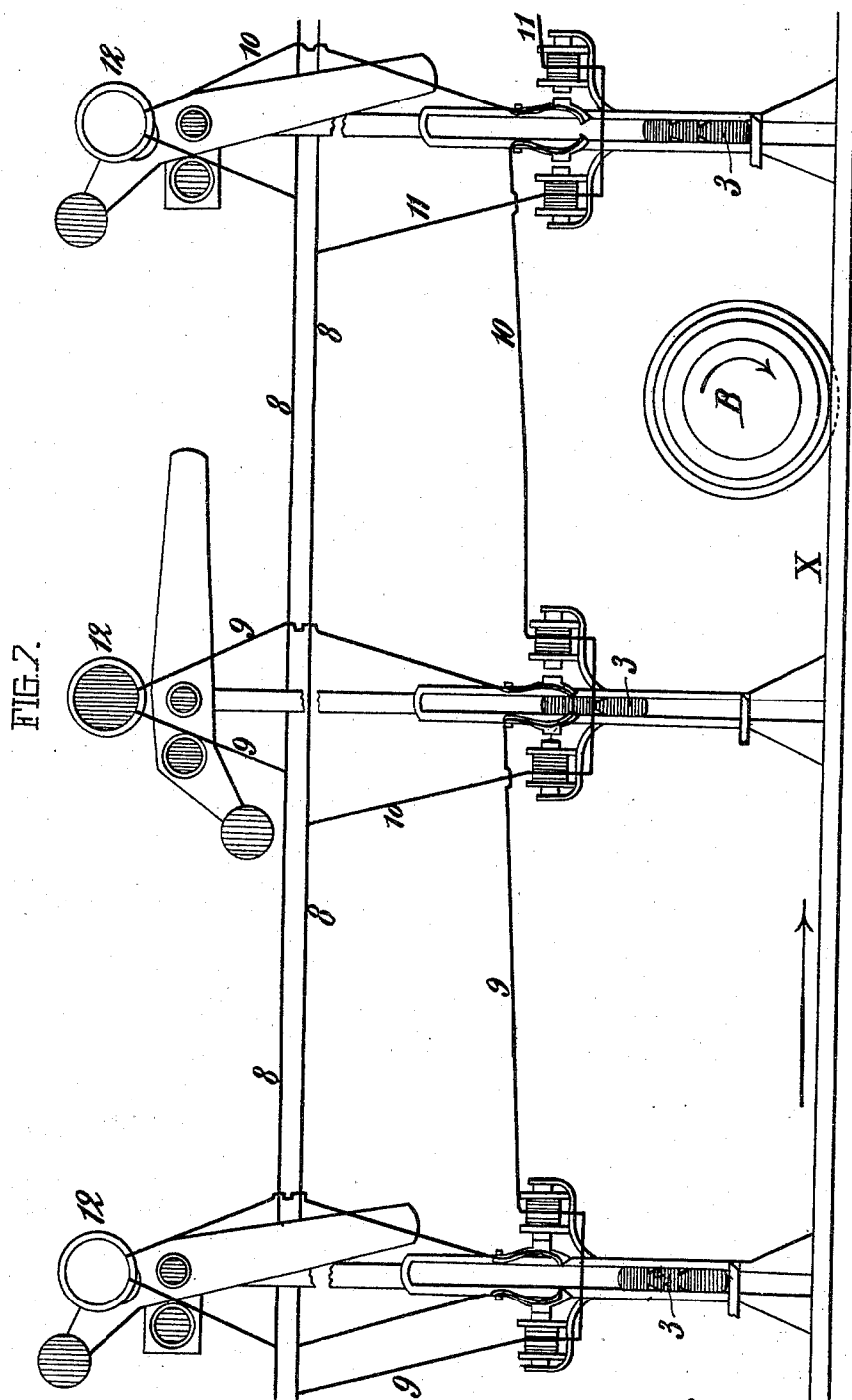
(No Model.)

4 Sheets—Sheet 4.

J. C. G. MUGNIER.
RAILWAY SIGNAL APPARATUS.

No. 500,668.

Patented July 4, 1893.



Witnesses:
L. M. Wachschrager
E. L. Shuman

Inventor
Joseph C. E. Magnier,
by Briesa Knautt,
his Attorneys.

UNITED STATES PATENT OFFICE.

JOSEPH CLAUDE GEORGES MUGNIER, OF PARIS, FRANCE.

RAILWAY SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 500,668, dated July 4, 1893.

Application filed October 19, 1892. Serial No. 449,320. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH CLAUDE GEORGES MUGNIER, engineer, of the city of Paris, France, have invented Improvements in Railway Signal Apparatus, of which the following is a full, clear, and exact description.

My invention relates to signal apparatus for railways in which the train itself controls the line on the block system. The signals are operated by mechanism which is put into action by the train itself in such manner that as the train enters on one section of the line it will automatically set the signal controlling that section to danger or "line blocked" and will simultaneously therewith release the signal controlling the section the train has just passed (which signal it had previously set at danger) and allow it to indicate "line clear."

The apparatus comprises what may for convenience be termed treadle mechanism consisting of an inclined lever arranged in proximity to the line in position to be acted on by the wheels of the passing train, a weighted lever or striker operated by the inclined lever, devices on the signal post for retaining the signal in its "line clear" position and bringing it to danger, together with a rocking lever on which the striker acts to bring the signal to danger and simultaneously therewith allow the signal in rear to fall to "line clear."

The invention is characterized more particularly by the employment of a weight or sliding piece which serves both as a circuit-closer for an electrical circuit which extends from each signal post to the one next in rear of it, and also as a means of releasing or tripping a pawl which retains the signal at danger. Each signal post is of course provided with similar mechanism and the weight acts as a circuit-closer or trip when in one or other of its two positions, as hereinafter more fully described.

The invention will be described with reference to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents, in elevation, one of the signal posts provided with the mechanism of my invention the parts being in their normal position, that is to say the position they occupy before the signal is operated and the line is clear. In Fig. 2 the parts are shown in the position they occupy when the mechanism

has been acted on by the train and the signal has been brought to danger or "line blocked." Fig. 3 is a plan of the latter figure. Fig. 4 is an elevation and Fig. 5 a plan of the so-called treadle mechanism upon which the train acts. Fig. 6 shows the position assumed by certain of the parts at the moment the treadle is depressed by the train. Fig. 7 is an elementary view, showing the mode of connecting the several signal apparatus controlling the different sections of the line.

A is an inclined lever or treadle placed inside of and rising above the level of the rail but at a sufficient distance therefrom to clear the flange of the wheels. This lever is mounted on one end of a rock shaft C which passes beneath the rails and is adapted to be depressed by drum B which would preferably be mounted on the inside of one of the wheels, either of the locomotive or tender. The height of the lever A above the rails is such that when depressed the shaft C will be rotated sufficiently to operate the mechanism hereinafter referred to. On the other end of shaft C, there is fixed an arm D which is connected by a rod E to a weighted bell crank lever F, I, mounted on a rock shaft H which is pivoted on a level with the upper surface of the rails. The lever F, I, constitutes a striker and its long arm I is set at an angle of rather more than forty-five degrees to its short arm F. The rod E which connects the arms D and F is made in two parts between which is interposed a spring K for modifying the effects of concussion. To shaft H there is fixed another lever arm L longer than and parallel to the arm F. This arm L is connected by a chain M to a drum or chain barrel N on the signal post, upon which drum chain M is wound in the reverse direction to that of a chain Q by which a weight P is suspended. To the barrel N is fixed a curved arm R which controls an arm S to which the signal arm V is connected by a rod T, this said arm R being provided with a friction roller *r* rolling on the lever S. The drum is provided with a ratchet wheel W and with pawls *y* and *z* which serve to hold the drum against the action of weight P.

3 is a weight mounted to slide freely in vertical guides in the signal post. This weight constitutes a trip for the pawl *y* and also serves as a closer for an electrical circuit ex-

tending from one signal post to the one next in rear of it, and 4 and 5 are spring catches which engage the weight 3 when in its raised position and retain it until they are withdrawn from engagement with the weight, as hereinafter described.

1 is a bent lever or rocker pivoted at 2 and serving to project the weight 3 into its raised position, when struck by the striker I.

The action of the apparatus is as follows and will be readily understood by reference to Figs. 2 and 4 of the drawings. Here it will be seen that the depression of lever A by the train, rocks shaft C thereby bringing the parts D, F, L and I to the dotted positions D', F', L' I'. This movement causes lever L to draw on chain M and revolve the drum N, thus raising lever R and permitting lever S to rise and setting the signal arm which is weighted at V to danger, as shown in dotted lines in Fig. 1. At this moment the rocker 1 which is heavier at one end being relieved of the weight I rocks on its pivot 2 to the position seen in Fig. 6 and the weight or slide 3 falls. This movement of the rocker 1 allows the pawl z to engage with the ratchet wheel W to retain the latter in place while the pawl y is temporarily disengaged and maintains the signal at danger. As the drum B passes from the treadle mechanism, the weight of the striker I which has been raised, as shown, asserts itself and returns the parts D, F, L and I to their original position, the striker I by its impact on the rocker 1 projecting the weight 3 up between the spring pressed catches 4 and 5 on the signal post by which it is retained. The lever 1 also trips the pawl z from the ratchet W and the absence of weight 3 allows pawl y to again engage ratchet wheel W. In this position the weight 3 closes the electrical circuit extending to the signal protecting the section of line which the train has just passed.

The moving of the signal to danger having been thus produced by mechanical means, I will now describe the means by which it is subsequently moved to "line clear" immediately the train reaches the next signal upon which it operates as above described.

Referring to Fig. 7 it will be seen that the signal in the center is the one I have just described as having been set to danger or "line blocked," its weight 3 having been raised and having closed an electrical circuit extending to the signal post to the left in such manner as to energize the electro-magnets and withdraw the catches from the weight 3 which being released has fallen and tripped the pawl y thereby allowing the weight P to assert itself and through levers R and S and rod T draw the signal down as shown in full lines in Fig. 1.

The arrangement of the circuits of three successive signal apparatus is shown in Fig. 7 in which the middle signal is shown at "line blocked" and the two outer ones at "line clear." 8—8 are the line wires, 9—9, 10—10,

11—11 are shunt circuits for the electro-magnets of each signal respectively and in which circuits may be placed an electric lamp or luminous signal 12 which is brought into circuit by the weight 3 establishing connection between the catches 4, 5. The lamp is thus lighted when the signal is brought to danger. The weight 3 is a cylindrical rod of copper or bronze, having circular nicks or grooves in its surface so that it forms a ratchet with which the catches 4 and 5 engage. As will be seen the weight preferably has several nicks or grooves to provide for the varying height to which the weight may be thrown consequent on the speed of the passing train. Should either rod E or other part of the mechanism happen to break, the drum N becomes free, and there being no longer any check upon the action of the weight P the friction roller on the end of the curved arm R will escape from and release the lever S in connection with the signal arm which being free to recover its equilibrium will assume the horizontal or "line blocked" position and there remain until the damage is repaired. The same effect is produced should either the chain of weight P or the rod T chance to break.

I would have it understood that the form, dimensions and details of arrangement of the various parts of the apparatus may be varied without in any wise changing the nature of the invention.

I claim—

1. The herein described automatically locked and released railway semaphore signal apparatus comprising a slide or weight 3 and electric contacts to which the weight serves as a closer at the proper moment, together with the treadle-mechanism acted on by the train and the intermediate parts for transmitting movement to the signal apparatus as specified.

2. The herein described automatic railway signaling apparatus, consisting in the combination, with mechanism placed in proximity to the line and adapted to be acted on by the wheels of a train of the weighted lever or striker I, F, the balanced rocker 1 the chain barrel N connected to the arm F of lever I, F, so as to be partially rotated in a direction in opposition to a weight P and provided with a ratchet wheel W and pawls y z , a vertically sliding weight 3 serving either as a trip for pawl y or as a circuit closer, spring pressed catches 4, 5 engaging with the weight to retain it in its raised position until withdrawn from engagement with the weight, electrically, substantially as herein shown and described.

The foregoing specification of my improvements in railway signal apparatus signed by me this 29th day of September, 1892.

JOSEPH CLAUDE GEORGES MUGNIER.

Witnesses:

ROBT. M. HOOPER,
ALBERT MOREAU.