(No Model.)

T. H. PATENALL.

ELECTRO MECHANICAL SLOT MECHANISM FOR RAILWAY SIGNALS.

No. 509,093. Patented Nov. 21, 1893.

Fig. 1.

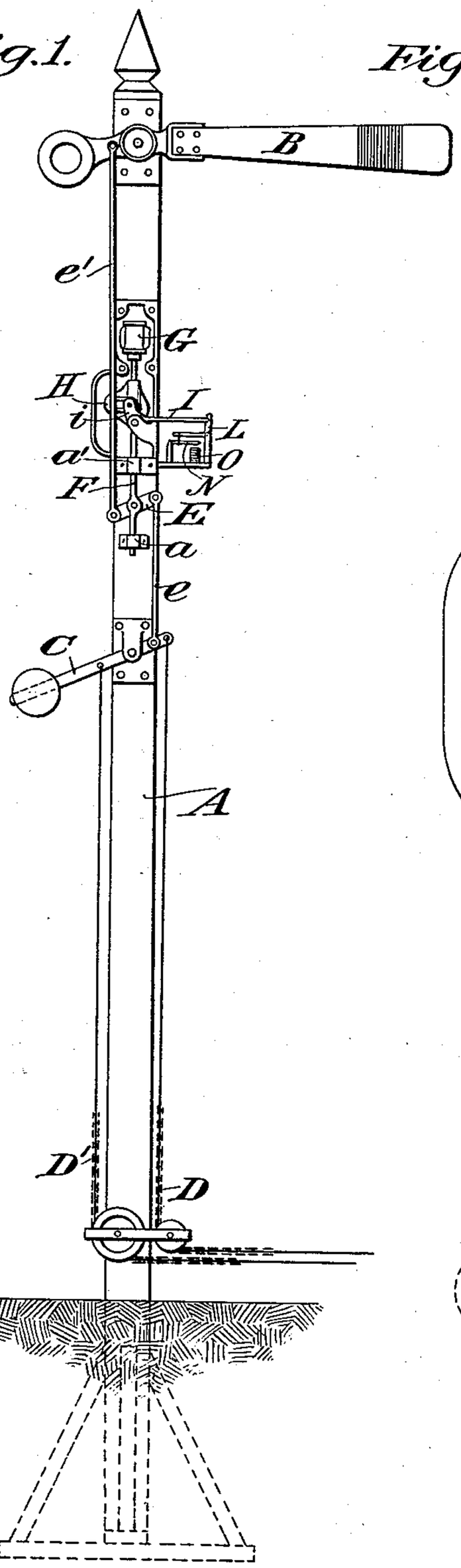
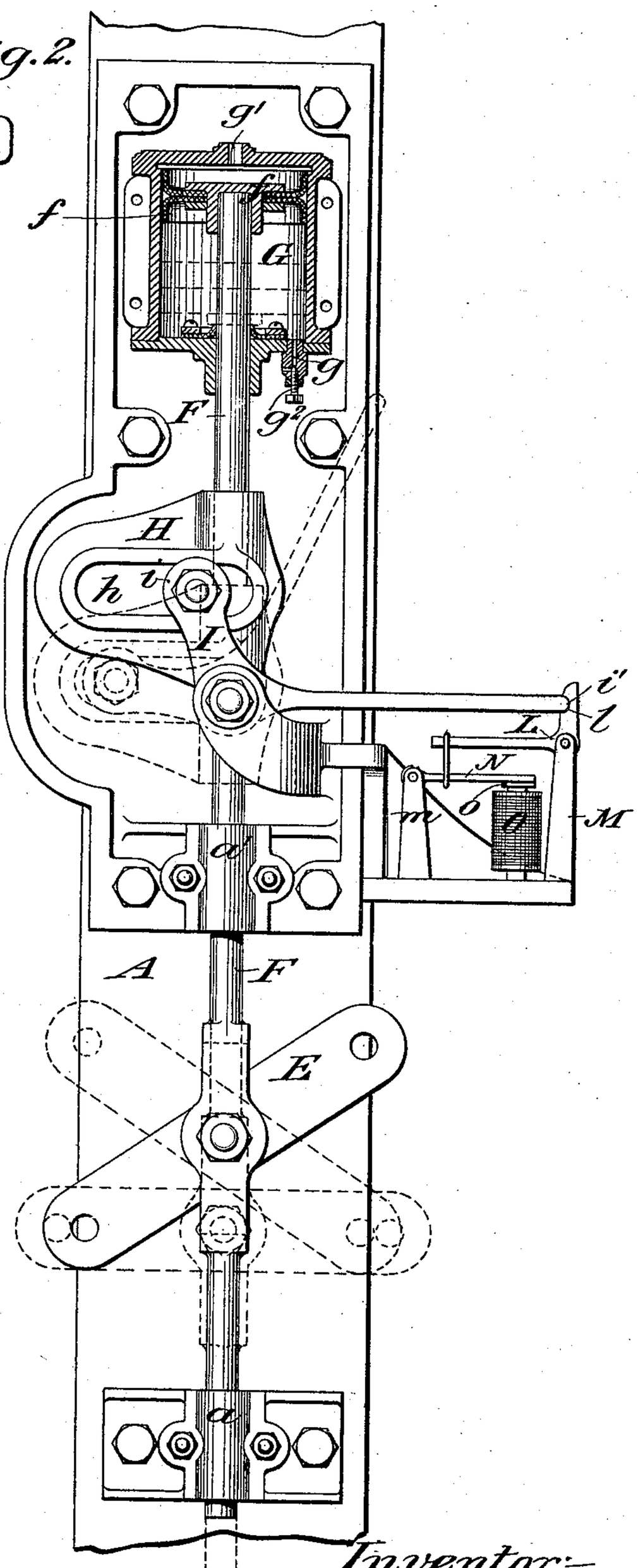


Fig. 2.



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ELECTRO-MECHANICAL SLOT MECHANISM FOR RAILWAY-SIGNALS.

SPECIFICATION forming part of Letters Patent No. 509,093, dated November 21, 1893.

Application filed January 6, 1893. Serial No. 457,440. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. PATENALL, of Rahway, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Electro-Mechanical Slot Mechanism for Railway-Signals, of which the following is a specification.

My invention relates to an improvement in electro-mechanical slot mechanism for railway signals in which the signal when mechanically set to "safety" may be set to "danger" by the manipulation of an electric circuit.

My present invention relates more particularly to the system of levers controlled by an electro magnet for holding the signal at safety under the greatest strain which is liable to occur and at the same time admit of the prompt return of the signal to danger when the electro magnet is de-energized and it further relates to means for cushioning the signal operating bar so as to prevent it from being thrown by a jerk beyond its positions of safety and danger while at the same time providing for a prompt and regular movement of the signal from safety to danger and vice versa.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the signal post, semaphore arm, and its operating mechanism, as it appears when set up for use and Fig. 2 is an enlarged view in detail in side elevation, partly in section, of the signal operating mechanism controlled by the electric circuit.

The signal post is denoted by A, the semaphore arm by B, the weighted lever by C and the connections for mechanically operating the signal by D and D′, the former for mechanically setting the signal to safety and the latter for setting it to danger. The vibrating arm E is connected at one end with the weighted lever C by a rod *e* and at its opposite end with the semaphore arm by the rod *e′*. The connections are such that when a pull is exerted upon the connection D, it will rock the weighted lever C and simultaneously therewith the vibrating arm E in a direction to swing the semaphore arm down into the position of safety. The vibrating arm E is pivotally secured intermediate of its ends to a vertically movable rod or bar F mounted in suitable bearings *a* and *a′* secured to the post A. The bar F has secured thereto a piston *f* which is adapted to reciprocate within a dash pot G. The dash pot G is here represented as a cylinder and the resisting fluid which I prefer to use is air admitted to the cylinder G through openings *g* and *g′* which enter the cylinder upon opposite sides of the piston *f*. The opening *g* which enters the cylinder G beneath the piston, is provided with a cut off plug g^2 for closing the opening more or less as may be desired to regulate the speed with which the piston *f* and hence the rod F shall fall when permitted so to do. To the rod F there is secured a plate H provided with an elongated slot *h* extending transversely to the rod F. An angle lever I pivotally secured to the stationary bracket K has its short arm provided with a stud *i* adapted to work loosely within the slot *h*, while the long arm of said angle lever has its end rounded as shown at *i′* for engaging a shallow recess *l* in the short arm of the angle lever L pivotally secured to a stationary bracket or standard M. The long arm of the angle lever L is linked to a lever N, of the second class, and pivoted at one end to a stationary standard or bracket *m* and having secured to its opposite end the armature *o* of the electro magnet O. The electro magnet O is supposed to be in electric circuit with the track instrument or circuit of any well known or approved form such that the passing of the train over it will momentarily break the electric circuit and thereby de-energize the magnet O.

The operation of the above described mechanism is as follows: Suppose the vibrating arm E be tilted into the oblique position shown in dotted lines in Fig. 2, to set the semaphore arm to safety for permitting a train to pass the signal. As soon as the train has passed the signal, its action upon the track instrument hereinbefore referred to will de-energize the electro magnet O and thereby release the armature *o* which because of the upward strain thereon will lift, permitting the lever L to rock sufficiently to allow the long arm of the lever I to escape from the shallow recess *l* in the lever L and thereby permit the rod F to drop. As the rod F drops, it will swing the vibrating arm E into the horizontal posi-

tion shown in dotted lines in Fig. 2, thereby returning the semaphore arm to the position of danger. The return of the mechanically operated weighted arm C to its position shown in Fig. 1, will again return the vibrating arm E into the position shown in full lines in Fig. 2 and will thereby lift the rod F, returning the angle lever I into position where its long arm will again catch into the shallow recess *l* in the arm of the angle lever L and the electro magnet O, being again energized, as soon as the train has passed, the armature *o* will be held in contact with the magnet and the lever I will be thereby locked in position to sustain the rod F until the magnet O shall again become de-energized. So long as the magnet O remains energized, the signal may be mechanically set to danger and safety at pleasure, the rod F remaining permanently locked in its elevated adjustment, but so soon as the train has passed the signal and by passing over a track instrument or circuit has de-energized the magnet O, the signal will be thrown to danger no matter whether it be mechanically operated to so set it or not. By the system of compound levers made up of the elemental levers I, L and N, I am enabled to sustain an enormous strain upon the rod F at a point sufficiently off from the center to cause the rod to operate promptly when released, and at the same time hold the said rod under perfect control by a comparatively weak electric current.

What I claim is—

1. The combination with a signal and mechanical means for operating it, of an auxiliary device for operating the said signal, an electro magnet and a system of compound levers, including two separable, interlocking angle levers, connecting the armature of the electro magnet with the auxiliary signal operating device for operating the signal by electricity, substantially as set forth.

2. The combination with the signal, a vibrating arm for operating the signal and a longitudinally reciprocating rod forming a support for the vibrating arm, of an angle lever adapted to support the rod upon one of its arms, an electro magnet, a lever carrying the armature of the magnet and an intermediate lever forming a connection between the armature carrying lever and the rod supporting lever, and adapted to release the rod supporting lever when the electro magnet is de-energized, substantially as set forth.

3. The combination with the signal, means for mechanically operating it and an additional mechanism for operating the said signal comprising a longitudinally reciprocating rod and an electro magnet for controlling the movement of the rod in one direction, of a cushioning device comprising a cylinder and a piston adapted to reciprocate within the cylinder and connected to the said reciprocating rod, the cylinder having escape openings upon opposite sides of the piston, substantially as set forth.

4. The cushioning device in connection with the longitudinally reciprocating signal operating rod, said cushioning device comprising a cylinder having air escape openings, a piston adapted to reciprocate within the cylinder between the air escape openings and means for regulating the size of an escape opening to regulate the speed of the moving piston within the cylinder, substantially as set forth.

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