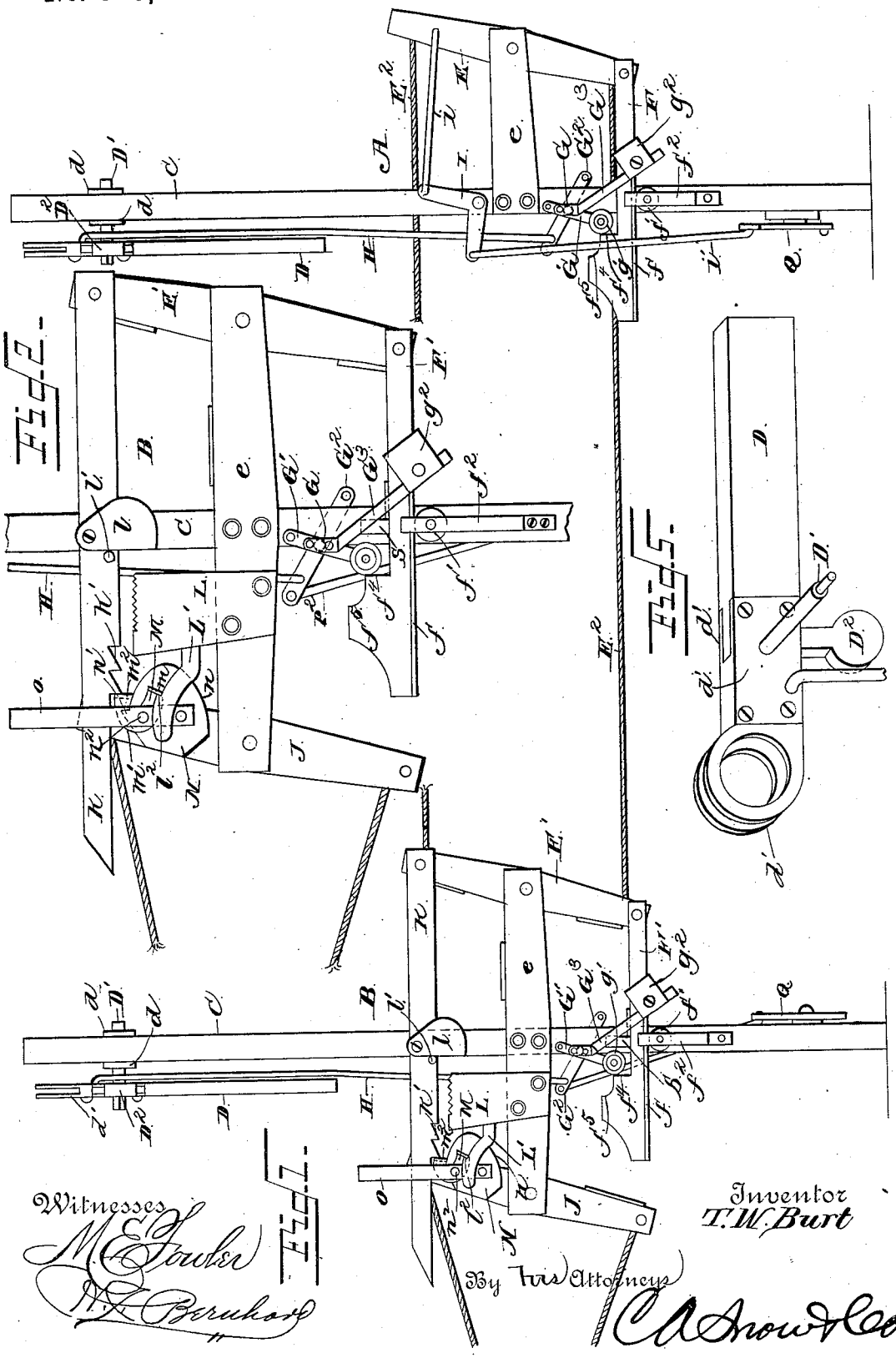
(No Model.) 2 Sheets—Sheet 1.

T. W. BURT.

AUTOMATIC BLOCK SIGNALING APPARATUS.

No. 346,893. Patented Aug. 10, 1886.



Witnesses
M. E. Fowler
A. L. Burchard

Inventor
T. W. Burt
By his Attorneys
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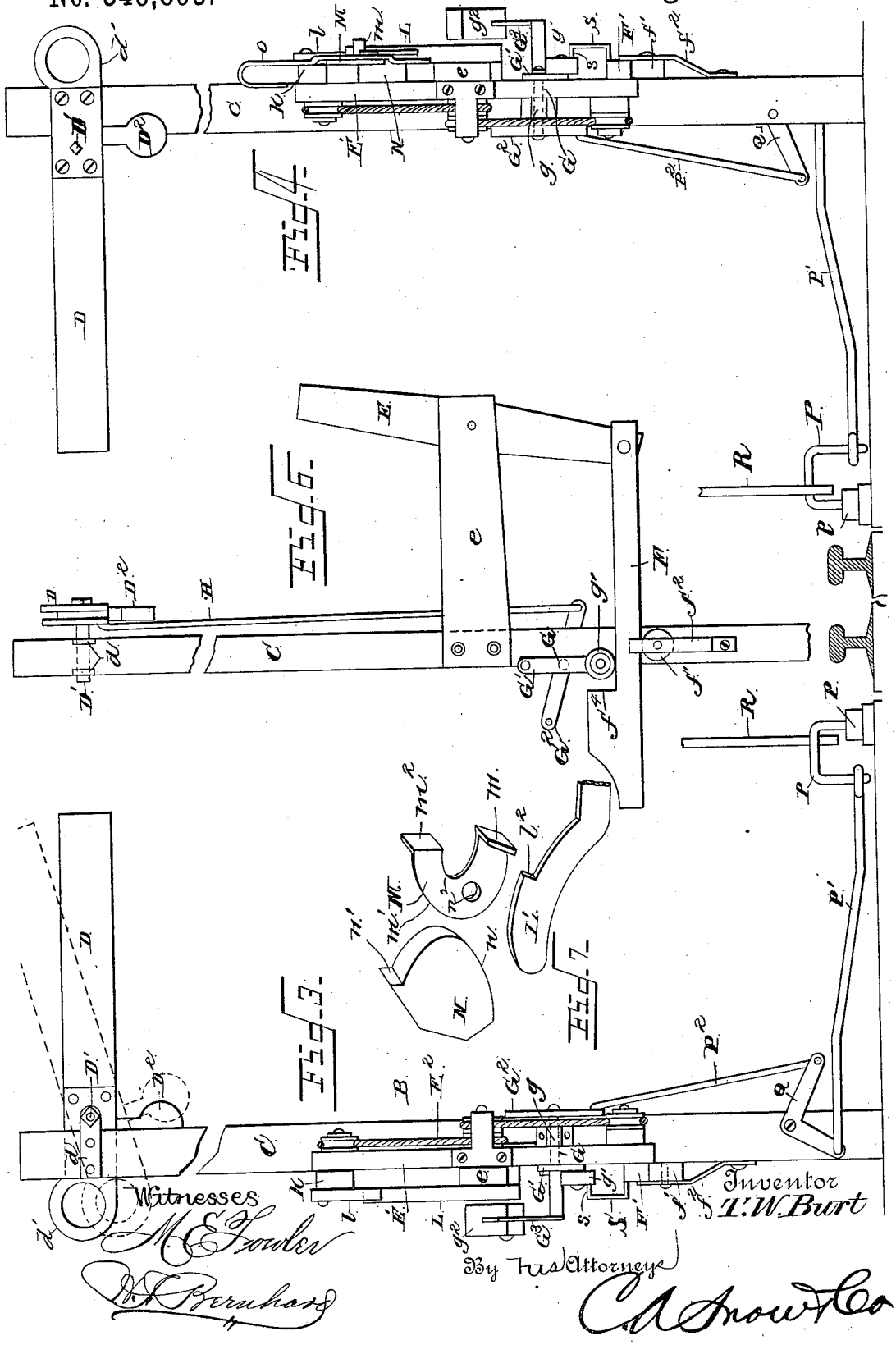
N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

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No. 346,893. Patented Aug. 10, 1886.



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W. C. Bernhard

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UNITED STATES PATENT OFFICE.

TOWNSEND W. BURT, OF MINEOLA, NEW YORK.

AUTOMATIC BLOCK-SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 346,893, dated August 10, 1886.

Application filed December 29, 1885. Serial No. 187,044. (No model.)

To all whom it may concern:

Be it known that I, TOWNSEND W. BURT, a citizen of the United States, residing at Mineola, in the county of Queens and State of New York, have invented new and useful Improvements in Automatic Block-Signaling Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in automatic block-signaling apparatus; and it consists in the peculiar construction and combination of parts, substantially as hereinafter fully set forth, and specifically pointed out in the claims.

My present improvements are especially designed to be used in connection with the block-signaling apparatus shown in a prior patent issued to me on the 1st day of June, 1886, and numbered 342,860; and they consist, first, of an improved automatic locking device, whereby when the signals of one block are operated and displayed at "danger" the signals cannot be operated or lowered except by the block in the front thereof; second, of an improved counterbalanced lever connected with the signal-rod to overcome its normal tendency to return to "danger," and of the minor details of construction and arrangement of parts, as hereinafter fully described.

In the accompanying drawings, Figure 1 is a view showing the connected home and distant signals of an automatic block-signaling apparatus provided with my improved devices. Fig. 2 is an enlarged view of the distant signal. Fig. 3 is an end elevation of the device shown in Fig. 2, the signal thereof being displayed at "danger." Fig. 4 is an opposite end view of Figs. 2 and 3, with the signal also at "danger." Fig. 5 is a detail view of the semaphore-signal. Fig. 6 is a view of a modification. Fig. 7 is a detail detached view of a part of my improvement.

Referring to the drawings, in which like letters of reference denote corresponding parts in all of the figures, A B designate the home and distant signals of my improved automatic block-signaling apparatus, which are adapted for use in connection with the devices shown in my prior patents numbered 342,860 and 338,824, bearing date June 1, 1886, and March 30, 1886, respectively.

Each signal A B comprises an upright post or standard, C, a semaphore-signal, D, pivotally connected to the upper end of the upright, an oscillating lever, E E′, respectively, a slide-bar, F F′, each pivoted at its outer end to the lower end of the oscillating lever of its upright or post, an oscillating shaft, G, having a weighted arm provided with a friction-roller operated by the slide-bar, and a signal-rod, H, connected with the semaphore-signal and the oscillating or rock shaft G.

The semaphore-signal D of each signal-post is rigidly secured at or near one end to a shaft, D′, that is journaled so as to move freely in boxes or bearings *d*, that are suitably secured to the upper ends of the uprights C, and the inner end of said semaphore-signal is provided with a weight, D^2, secured thereto at a point in rear of its shaft D′, whereby when the signal-rod is disconnected from the signal D or the oscillating rock-shaft G, as is sometimes the case, the weight will automatically elevate the free end of the semaphore-signal at "danger," as will be very readily understood. This weight D^2 of the semaphore-signal is secured thereto at a point in rear of its pivot or shaft, and it depends downwardly from the signal and the weight is of sufficient heaviness to overcome the weight of the free end of the signal itself, or, rather, the weight of that part of the signal that lies in front of the pivot or shaft. The function of this construction is to elevate the free end of the semaphore-signal into a higher or inclined position when any part of the signal-operating mechanism of the apparatus becomes detached from the signal or broken. It will be observed that should the signal-rod H become accidentally disconnected from the signal or the rock-shaft G, or be broken, as is sometimes the case, the weight D^2 will overcome the weight of the free end of the signal and elevate the outer end of the signal D into a higher position than it is elevated by the rod H, the rock-shaft, and the other mechanism of the home and distant signals, so that the engineer of an approaching train is notified that the signal-operating mechanism is out of order.

The weight D^2 of the semaphore-signal is secured to the same on one of its faces or side edges at a point a little in rear of the pivot, thus eccentrically weighting the signal, and

when the signal is raised to its horizontal position by the operating mechanism the weight D^2 depends therefrom, and should the rod H be broken or disconnected from the signal the weight D^2 will automatically elevate the signal into an inclined position, as shown in dotted lines in Fig. 3 of the drawings, the peculiar arrangement and disposition of the weight on the signal effecting the elevation of the latter to the inclined position, as described.

The signal D may be supported or pivoted on the upright post C in any suitable manner, and the pivoted end of the signal may be provided with a plate or plates, d', which carry the colored glass to change the color of the light thrown from a lantern supported on the post C.

The oscillating levers E E′ are pivoted centrally on supporting arms or brackets e, rigidly secured to the upright posts C, and said levers are connected by cables E^2. These cables are suitably connected to the oscillating levers, and serve to transmit the movement of said levers one to the other, being held taut or under tension; but, as the cables do not form a part of the present invention, and are made the subject-matter of Letters Patent issued to me on the 23d day of March, 1886, and bearing No. 338,387, I do not deem it necessary to describe them more fully.

The slide-bars F F′ are disposed in horizontal positions, and at one of their ends they are pivotally connected to the lower ends of the oscillating levers. The free inner ends of the said slide-bars are provided with bearing-plates f, which rest on friction-rollers f', that are journaled on pins which are supported on brackets f^2, secured to the uprights C, the friction-rollers and brackets being located beneath the free ends of the slide-bars to support the same. The upper face of each of the slide-bars is provided with an upwardly-extending shoulder, f^4, near the free end thereof, and it is further provided with another shoulder, f^5, at a short distance in rear of the shoulder f^4, these shoulders of each slide-bar being adapted to elevate the weighted arm of the oscillating shaft G to elevate the signal D when the slide-bar is operated.

The oscillating or rock shaft G is journaled in proper bearings or boxes g, secured to the upright C, and the ends of this shaft are provided with two arms, G′ G^2. The lower end of the arm G′ carries a loosely-mounted friction-roller, g', that normally rests or bears on the upper face of the slide-bar or against one of the shoulders f^4 f^5 thereon, and the arm G′ is further provided with a bracket-arm, G^3, rigidly secured thereon and extending outwardly to a point beyond the slide-bars F or F′, so as to be out of the way of said slide-bar. This bracket-arm G^3 is provided with a weight, g^2, and this weight is adjustable longitudinally on the bracket-arm to give greater leverage to the oscillating shaft G, which is connected to the signal by means of the rod H, pivoted to one end of the arm G^2 of the rock-shaft, the weight g^2 being clamped at any desired adjustment on the arm G′ by a clamping-screw or other suitable means.

Each of the uprights of the home and distant signals A B are provided with the above-described devices. The oscillating lever E of the home signal A is operated by a bell-crank lever, I, rods i i' connected thereto, and suitable connections between the rod i', and a setting apparatus which is operated by the wheels of a passing train, as shown in my Patent No. 342,860, hereinbefore referred to, and the movement of the lever E operates the slide-bar to set the signal D. Simultaneous with the display of the signals D of the home signal A, the signal of the distant signal B is also displayed, the movement of the oscillating lever E being transmitted by the cables to the lever E′ of the distant signal B, the slide-bar F′, and the rock-shaft G to the signal D, as is obvious.

The distant signaling device B is provided with another oscillating lever, J, which is pivoted on the opposite end of the arm e to the lever E′, and this oscillating lever is connected by means of cables with the home signal of the block in rear of the distant signal B, each block having a home and distant signal connected by the cables.

The oscillating lever E′ has a transmitting-bar, K, pivoted thereto at its upper end, and this transmitting-bar has its free opposite end provided with ratchet-teeth K′, located as shown.

L designates an upwardly-projecting block or support rigidly secured on one end of the arm e, and the upper face of this block is provided with a series of fine teeth, into which take the pointed end of a gravitating pawl, l, which is pivoted on the transmitting-bar K and abuts against a stop-pin, l', thereon, to hold it in proper position.

The ratchet-block L has a rearwardly and upwardly curved arm, L′, rigidly secured thereto, and this arm is provided on its upper edge with an elevated shoulder, l^2, with which engages a flanged arm or tooth, m, at the lower end of a locking device or latch, M. The latch M comprises a curved plate, as shown more clearly in Fig. 7, and it is pivoted centrally, as at n^2, on a guide-block, N, that is rigidly secured to the upper end of the pivoted lever J, and carried thereby in its movements. The guide-block N is curved on its rear face, as at n, and at its upper rear edge it is provided with a tooth, n', which is arranged in the path of and against which is adapted to strike a flange or tooth, m^2, of the centrally-pivoted latch M.

O designates a vertical guide for the transmitting-bar, having a looped-shaped bow at its upper end, which is arranged over the guide-block and receives the free end of the bar K, the lower end of the guide O being rigidly secured on the guide-block N, and it is thereby carried by the block and the lever J in their movements.

S designates a vertical bracket, which is rigidly secured on the upper face of and carried by the slide-bar F' a short distance in front of the lower shoulder, f^4, thereon, and this bracket is provided at its upper end with an inwardly-extended or lateral arm, *s*, that is arranged in the path of movement of and adapted to strike the friction-roller *g'* of the weighted arm. It sometimes happens that the rock-shaft or other parts of the signal will become partially inoperative and hang through exposure to the weather and other causes, and to obviate this objection I provide the bracket S, which will strike against the roller should the weighted arm fail to descend or fall, thus operating the arm by positive movement.

When the signals of the block are displayed at "danger," the levers E E' and cables move the transmitting-bar K rearwardly, so that one of the teeth *k'* thereof will strike the tooth n^2 of the pivoted latch M, which will be oscillated to elevate the tooth *m* from engagement with the shoulder l^2, and simultaneously with the release of the tooth *m* from the shoulder l^2, the tooth m^2 strikes the tooth *n'* of the guide-block, and the lever J is thus oscillated by the bar K to operate and lower the signals of the block in rear to "safety."

During the rearward movement of the transmitting-bar K the pivoted pawl *l* will strike and ride over the upper edges of the ratchet-block and assume an inclined position so that the lower pointed end will engage with the teeth to prevent retrograde movement of the said bar, and upon the return movement of the bar the pointed end of the pawl will engage with one of the teeth of the ratchet-block and the pawl will also turn on its pivot to assume substantially a vertical position, and thus elevate the free end of the transmitting-bar to disengage its teeth *k'* from the flange m^2 of the swinging locking-plate, the pawl being drawn or forced rearwardly by the impact thereon of the stop-pin *l'*. The pawl which is carried by the transmitting-bar thus acts to disengage the free end of the said transmitting-bar K from the lever J, whereby it is free to return to its normal position without affecting the lever in any way, and the pin *l'* of the lever retains the pawl in substantially a vertical position to cause its curved lower and front edge to slip or ride easily and freely over the teeth of the ratchet-block. When the pawl is free of the ratchet, the free end of the transmitting-bar K falls or drops by gravity and rests on the ratchet-block, so that it lies in the path of or is in a position to engage with the flange m^2 of the swinging plate to oscillate the latter and cause its flange *m* to engage with the shoulder l^2 of the arm L when the upper end of the lever J is forced or moved forwardly, as will be readily understood.

When the signals of the block just described are lowered to "safety" by the block ahead, the transmitting-bar K is drawn forwardly and the pawl *l* drops from engagement with the ratchet-block, this forward movement of the transmitting-bar taking place without affecting the lever J, which thus remains stationary. When the signals of the rear block are elevated to "danger" by a passing train, the lever J is oscillated by the cables to throw the upper free end thereof rearwardly, and when this rearward movement takes place the tooth m^2 of the pivoted latch abuts against the teeth *k'* and oscillates the latch to cause the tooth *m* to engage the shoulder l^2 of the arm L', the tooth *m* riding on the curved upper edge of the bar L' during the retrograde movement of the lever J. The lever J is thus locked in place against further movement without affecting the signal D, and it is in a position for instant use, to be acted on by the transmitting-bar K.

P designates an oscillating bar which is arranged alongside of the track at an angle thereto when the signals are exposed to "danger." One end of this bar is journaled so as to permit the bar to turn freely in a bearing, *p*, suitably secured near the track, and the other end of this oscillating horizontal bar has a rod, *p'*, connected thereto.

Q is a bell-crank lever pivoted on a pin or shaft at the lower end of the upright C of the distant signal B. The free end of the rod *p'* is pivoted to one arm of this bell-crank lever, and a rod, p^2, is pivoted to the other arm of said lever Q and to the end of the arm G^2, to which the signal-rod is connected.

When the semaphore-signal D of the home and distant signals A B are set to "danger," the horizontal oscillating bar is set at an angle to the track, so that when a train passes over the track a pivoted lever, R, thereon will strike the bar P and operate to strike a bell to give an audible alarm to the engineer. The purpose of this device is to give an audible alarm should an engineer attempt to pass a block having its signal set at "danger," as will sometimes be the case in foggy weather or on dark nights, when the semaphore-signals D are invisible. When the semaphore-signals D are lowered to "safety," the horizontal oscillating bar P will be moved parallel with the track so as to permit the lever R on the locomotive or train to pass without giving the audible alarm; but when the signals are displayed at "danger" the horizontal bar P will be simultaneously and automatically set thereby in an inclined position, so that the lever R will strike thereon, the horizontal bar P being locked against movement in such inclined position by the bell-crank lever and rods until the signals are lowered to "safety."

In Fig. 6 of the drawings the rock-shaft G has the arms G' G^2 rigidly secured thereon nearly at right angles to each other. The arm G' carries a friction-roller, *g'*, which rests on the upper face of the slide-bar F, which in this instance has a single shoulder, f^4. The signal D is pivoted on the upper end of the upright C, and has the weight D^2, and the said signal is connected with the arm G^2 by means of a link or rod, H. The semaphore-signal is

normally displayed at "danger," its weight serving to keep the free end thereof extended, and when the shoulder f^4 of the slide-bar strikes the friction-roller of the arm G′ the shaft G is rocked to depress that end of the arm G^2 to which the rod H is connected, whereby a draw is exerted on the rod to lower the signal D to "safety."

Should the upper one of the two cables break that connect the oscillating levers E E′ together, the slide-bar F is moved forwardly and the friction-roller moved to the recessed portion f^5 in the slide-bar and displays the signal D at "danger," and if the lower cable should break the reverse movement of the slide-bar would take place, and also display the signal D at "danger."

I do not desire to limit myself to the precise construction herein shown and described as an embodiment of my invention, as I am aware that many changes therein can be made without departing from the spirit or sacrificing the advantages of my invention.

Having thus fully described my invention, I claim and desire to secure by Letters Patent—

1. The combination, with an upright, a slide-bar having a projecting shoulder, a counterweighted rock-shaft supported on the upright above the slide-bar and provided with an arm that carries a friction-roller which normally rests on the slide-bar, and is thus arranged in the path of the shoulder thereon, a semaphore-signal pivoted on the upright, and a rod intermediate of the rock-shaft and the signal, substantially as described.

2. The combination of an upright, a longitudinally-sliding bar having at one end a shoulder, f^4, and the elevated rest f^5 in rear of the shoulder, a rock-shaft journaled on the upright and provided with an arm carrying a friction-roller normally bearing on the bar and adapted to impinge against and ride upon the shoulder, an elevated rest thereon, a pivoted signal, and a rod intermediate of the signal and rock-shaft, substantially as described.

3. The combination of an upright, a slide-bar having a shoulder and an elevated rest at one end, a rock-shaft having an arm carrying a roller bearing on the slide-bar, and an inclined arm, G^3, secured to the rock-shaft and having a weight arranged out of the path of the slide-bar, a pivoted signal, and a rod connecting the rock-shaft and signal, substantially as described.

4. The combination of an upright, a weighted semaphore-signal pivoted thereon, a shouldered slide bar, a rock-shaft journaled on the upright and provided with an arm carrying a friction-roller normally arranged out of the path of the bar and having an adjustable weight, and a rod intermediate of the rock-shaft and the signal, substantially as described.

5. The combination of an upright, a weighted semaphore-signal pivoted thereto, a rock-shaft having a counterbalanced arm and a friction-roller, a rod connecting the signal and rock-shaft, a slide-bar for operating the rock-shaft, and an oscillating lever connected to the slide-bar, substantially as described.

6. The combination of an upright, a weighted semaphore-signal pivoted thereto, a rock-shaft carrying a friction-roller and a weighted arm, a movable slide-bar having a shoulder to strike the friction-roller of the rock-shaft, a bracket carried by the slide-bar and having an arm to impinge against the friction roller, and an oscillating lever for moving the slide-bar, substantially as described.

7. In an automatic block-signaling apparatus, the series of sections or blocks each having a home signal, oscillating levers connected to the signals, cables connecting the levers, a transmitting-bar, and an oscillating lever connected to the home signal of the rear block and having an automatic locking device, whereby the signals of the rear block cannot elevate the signals of the block in front when the former are lowered, substantially as herein described.

8. The combination of the oscillating levers E′ J, a transmitting-bar pivoted to the lever E′, a locking-arm having a shoulder, and a pivoted locking-catch adapted to automatically engage the locking-arm, substantially as described.

9. The combination of the oscillating levers E′ J, a toothed transmitting-bar pivoted to the lever E′, a block having teeth, a pivoted dog carried by the transmitting-bar and adapted to engage the teeth of the block, a guide-block, N, having a tooth, a locking-arm having a shoulder, and a pivoted locking-lever carried by the lever J and adapted to engage the shouldered locking-arm, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of witnesses.

TOWNSEND W. BURT.

Witnesses:
E. G. SIGGERS,
H. F. BERUHOE,
WM. N. MOORE.