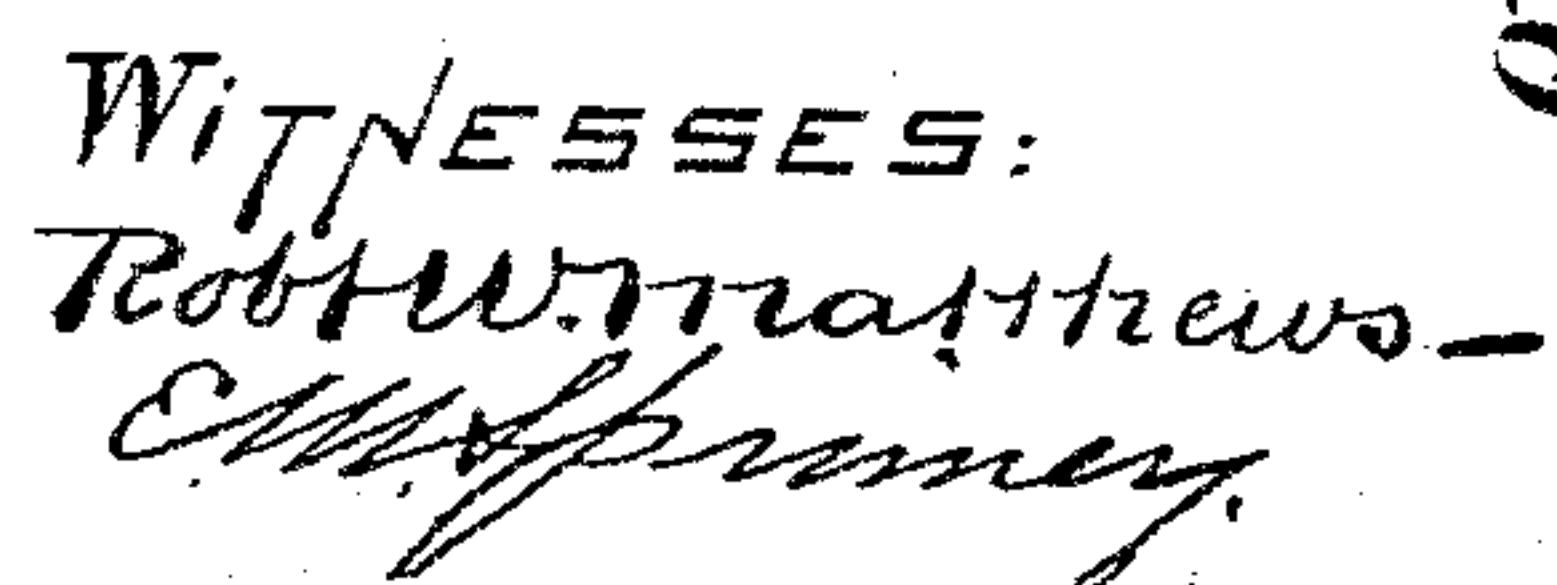


A. B. FISK.
RAILWAY SIGNAL.

Patented Sept. 24, 1889.



INVENTOR:
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UNITED STATES PATENT OFFICE.

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RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 411,742, dated September 24, 1889.

Application filed November 3, 1888. Serial No. 289,935. (No model.)

To all whom it may concern:

Be it known that I, ALONZO B. FISK, of Winthrop, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Railway-Signals, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view of a semaphore-box and the electric wires connecting it with the signal-tower illustrating my improvement, the body of the box being broken away to show the operating mechanism of the semaphore and the post being shown as broken off, and Fig. 2 a front elevation showing my improved semaphore in position for use.

Like letters and figures of reference indicate corresponding parts in both figures of the drawings.

My invention is designed as an improvement on the semaphore shown and described in United States Letters Patent No. 382,741, dated May 15, 1888, and granted to Charles D. Tisdale for an improvement in railway-signals; and it consists in certain novel features, as hereinafter fully set forth and claimed, the object being to produce a more effective and otherwise desirable device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the post and B the box. The post is hollow and the box B is secured to the top thereof. Within the box is journaled a shaft *b*, one end of which projects through the side thereof and is adapted to receive a winding-crank. A drum *d* is disposed on said shaft within the box, and at one end of said drum is secured a scape-wheel *f*, provided with two teeth *g*. At the opposite end of the drum is disposed a check-wheel *h*, having four cam-teeth *i*. A cord D is secured by one end to the drum *d* and wound around the same, a weight H being attached to the other end of said cord,

and a check-nut *j* disposed thereon above said weight. This cord and weight constitute an actuator for said shaft. A retaining-pawl K is pivoted to the side of the box above the scape-wheel *f* and is provided with teeth or pallets *k m*, adapted to alternately engage the teeth *g* of said wheel. An ordinary electromagnet L is secured within the box in such a position that an armature P, secured to the rear end of the pawl K, is always within the field of said magnet. The magnet is connected with the main-line wire Q, which has a ground-connection at R, and is operated in the usual manner by a key *p*, situated in the signal-tower. A horizontally-arranged bar *q* is pivoted by means of a pin *r* in the side of the box, said pin being provided with a key *t* outside the box by which the bar may be tilted. The end of the long arm of said bar engages a tooth on the check-wheel *h* and prevents said wheel from rocking. The short arm of said bar is connected by a wire V with the main-line wire Q.

A vertically-arranged rod *w* is fitted to slide in a bracket *x*, secured within the box B, and to the lower end of said rod is secured a horizontally-arranged forked bar T, between the arms of which the cord D passes, and which is adapted to be engaged by the check-nut *j* on said cord when sufficiently wound on the barrel *d*. A horizontally-arranged lever *y* is pivoted within the box directly above the check-wheel *h*, the upper end of the rod *w* being pivoted to one arm of said lever. In the opposite arm of said lever a vertically-arranged pin *z* is fitted to slide, the lower end of said pin resting on the long arm of the pivoted bar *q*. A check-nut 15 is disposed on the pin *z* to prevent it from sliding too far in the lever *y*. A curved spring 25 is secured by one end to the side of the box by a screw-bolt 35, the free end of said spring projecting over the long arm of the pivoted bar *q*, in position to be engaged thereby. The arm *q* and spring 25 constitute a circuit-changer for uniting the main and auxiliary circuits when the shaft is turned. The end of the shaft *b* adjacent to the scape-wheel *f* projects through the side of the box and secured thereon is a semaphore-arm C.

An ordinary switch E, provided with the

usual switch-key p , pivoted at p' , is situated in the signal-tower, the main-line wire Q being connected with one of its metallic points 45 and the main battery F . An indicator or
 5 detector M is situated in the signal-tower near the switch-board, said indicator consisting of a plate 55, to the face of which an arm 65 is pivoted on a stub-shaft 75, the movement of said arm being designed to corre-
 10 spond with the movement of the semaphore-arm C , and indicate to the operator in the tower the exact position of the semaphore on the post A . An electro-magnet 85 is secured to the plate 55, and a supplemental wire 95
 15 connects said magnet with the main-line wire Q and a second metallic point 100 on the switch-board. A lever 14 is secured to the shaft 75, and a horizontally-arranged arma-
 20 ture 24 is attached to the lower end of said lever in the field of the magnet 85. A local wire G is grounded at N and connected with the key p of the switch-board; thence it passes into the local battery Z and to the spring 25 in the semaphore-box B . An ordinary elec-
 25 tric bell 50 is connected with the wire G in a convenient position to be heard by the operator in the tower.

In apparatus of this class as ordinarily constructed much difficulty is experienced
 30 by the dispatcher in the signal-tower in determining whether the line-men have properly wound up the semaphore. Moreover, should the current in the main-line wire be weak from any cause, and the operator en-
 35 deavor to set the semaphore-arm, the indicator being near the battery and easily affected by the current, will frequently show that the arm is properly adjusted when it has not moved.

40 My invention obviates these objections and produces a more effective device, the operation being as follows: The semaphore-arm C , when in a horizontal position, as shown in Fig. 2, indicates "danger" and is held in such
 45 position by the tooth k on the pawl K , being in engagement with a tooth g on the scape-wheel f . Should the operator desire to adjust the arm C to a vertical position, indicating
 50 "safety," the key p of the switch-board is brought into contact with the point 45, thus closing the circuit in the main-line wire and sending the current into the magnet L , caus-
 55 ing it to act upon the armature P and disengage the tooth k of the pawl K from the tooth g of the scape-wheel and at the same time throwing the tooth m of said pawl into the
 60 path of the tooth g . The weight H on the cord D at once revolves the shaft b from left to right a quarter-revolution, when the pawl-
 65 tooth m engages the tooth g and stops the shaft, the semaphore-arm C thereon being then vertical, or indicating safety. The teeth i on the check-wheel h are cam-shaped, and as the shaft makes the quarter-revolution de-
 scribed one of said teeth, passing under the end of the long arm of the pivoted bar q , forces it upward into contact with the spring 25.

As said arm is connected with the main wire Q by the wire v , this closes the circuit in the local wire G and causes the bell 50 to ring 70 until the tooth i has passed the end of the bar q , which occurs simultaneously with the stopping of the shaft b by the tooth m of the pawl, thus announcing to the operator that the
 75 shaft has revolved and turned the semaphore-arm. To verify this and ascertain that the bell 50 was not rung from some other cause, the operator puts the key p into contact with the point 100, which it reaches before leaving
 80 the point 45, when, if the circuit is complete through the main-line wire Q , the magnet 85 on the indicator M will be charged and act on the armature 24 and move the indicating-
 85 arm 65. This avoids the possibility of mistake by the operator from the indicator-arm being moved by a current too weak to charge the magnet L and operate the pawl K , as the in-
 90 dicator-arm is not actuated until after the bell 50 has rung, showing that the semaphore has moved. To set the semaphore-arm at "danger" or in a horizontal position, the op-
 95 erator breaks the circuit in the main wire Q by disengaging the key p from the point 100. This releases the armature P from the magnet L , said armature at once falling by
 100 its own weight and freeing the scape-wheel from the tooth m of the pawl, thus permitting the weight H to again revolve the shaft b a quarter-revolution, or until the pallet k on
 105 said pawl engages a tooth g on the wheel and stops it, the circuit being again closed in the wire G and the bell 50 rung, as before described. When the circuit is broken in the
 110 main wire, the armature 24 of the indicator is also freed and the arm 65 allowed to again assume a horizontal position, corresponding to that assumed by the semaphore-arm C . It
 115 will be seen that the pivoted bar q , being in engagement with a tooth on the check-wheel h , prevents the shaft from being turned back- ward or from right to left, the pallet k and
 120 tooth m of the pawl K at the same time securing said shaft from being accidentally turned in the opposite direction. It will also be seen that the operator is at once apprised
 125 when it is necessary to wind the cord D upon the barrel d from the fact that when he closes the circuit in the main wire Q the bell 50 will not ring, because the bar q is not brought into
 130 contact with the spring 25 and the circuit closed in the local wire G . The semaphore is wound by means of a crank adjustable on the end of the shaft b , the operator placing the
 135 key t on the pin r and turning the bar q upward until the wheel h is freed therefrom. The bar q at once comes again into contact with the spring 25, closing the circuit in the
 140 wire G and ringing the bell 50, which continues to ring until the cord is sufficiently wound onto the barrel, when the check-nut j on said
 145 cord engages the arms of the forked bar T , which is forced upward, carrying with it the vertical rod w . This actuates the lever y , to which said rod is pivoted, its end coming into

contact with the nut 15 on the pin *z*, thereby causing said pin to force the bar *q* downward again into engagement with the teeth of the check-wheel. The circuit in the local wire
 5 being thus again broken and the ringing of the bell stopped, the operator in the tower is thus notified that the winding is completed. The length of the cord *D* is determined and the wheel *f* and pawl *K* so adjusted that when
 10 the cord has completely unwound from the drum the semaphore-arm will be in a horizontal position, indicating danger.

It will be understood that the spring 25 is properly insulated at the end by which it is
 15 secured, to prevent the current passing therefrom into the metallic box.

Having thus explained my invention, what I claim is—

1. The combination of a signal apparatus,
 20 a main circuit, an electro-magnet in said circuit in connection with said apparatus for controlling it, an auxiliary circuit having an alarm, an indicator, a supplemental wire connecting said indicator with the main circuit,
 25 a switch-board having two contact-studs adjacent to each other, one being connected with the main circuit and the other with said supplemental wire, a switch-key connected with the auxiliary circuit, and a circuit-changer
 30 connected with the main circuit and actuated by the signal apparatus to unite both circuits when the signal apparatus is actuated.

2. The combination of a shaft, a signal operated thereby, an actuator for rotating said
 35 shaft, an escapement for controlling the movement of said shaft, a main circuit, an electro-magnet in the main circuit for releasing the escapement, an auxiliary circuit, a pivoted arm connected with the main circuit, and a
 40 cam-wheel on said shaft engaging said arm and lifting it to unite both circuits when the shaft is turned.

3. In a semaphore-signal device, the combination of the post *A*, the shaft *b* in said post

bearing the semaphore-arm, scape-wheel *f*, and
 45 check-wheel *h*, the retaining-pawl *K*, in engagement with the scape-wheel, an electro-magnet for releasing the same, a cord in said shaft provided with a weight, the pivoted bar
 50 *q*, in engagement with said check-wheel, and the insulated spring 25, connected with an auxiliary electric circuit, whereby a bell may be rung when said bar is elevated to enable the semaphore-shaft to be wound, substantially as described.

4. In a semaphore-signal device, a lever *y*,
 and pivoted bar *w*, provided with the forked bar *T*, in combination with the semaphore-shaft *b*, provided with the check-wheel *h*, the
 60 pivoted bar *q*, in engagement with said wheel, the pin *z*, fitted to slide in said lever and having the check-nut 15, and the cord *D* on said shaft, provided with the weight *H* and check-nut *j*, whereby said nut will engage the forked
 65 bar and force the pivoted bar *q* into engagement with the check-wheel after the cord has been wound onto said shaft, substantially as set forth.

5. In a semaphore-signal device, the combination of the post *A*, the shaft *b*, bearing the
 70 arm *C*, scape-wheel *f*, and check-wheel *h*, the cord *D*, provided with the weight *H*, and check-nut *j*, the pawl *K*, provided with the armature *P*, the magnet *L* in the main-line wire *Q*, the pivoted bar *q*, the branch wire *v*, the lever *y*,
 75 and rod *w*, provided with the forked bar *T*, the pin *z*, fitted to slide in said lever and provided with the nut 15, the insulated spring 25, connected with the auxiliary-line wire *G*,
 80 provided with the bell 50, the indicator *M*, operated by a magnet in a branch wire 15, and the switch *E*, all being combined and arranged to operate substantially as described.

ALONZO B. FISK.

Witnesses:

O. M. SHAW,
 E. M. SPINNEY.