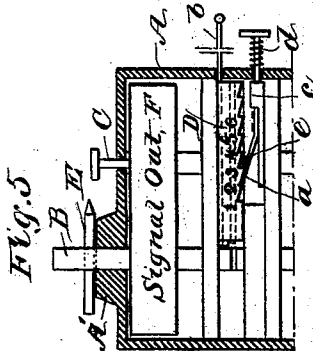
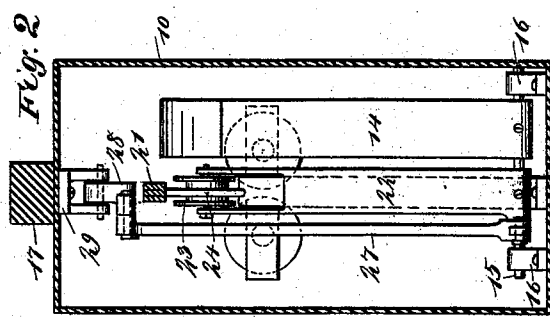
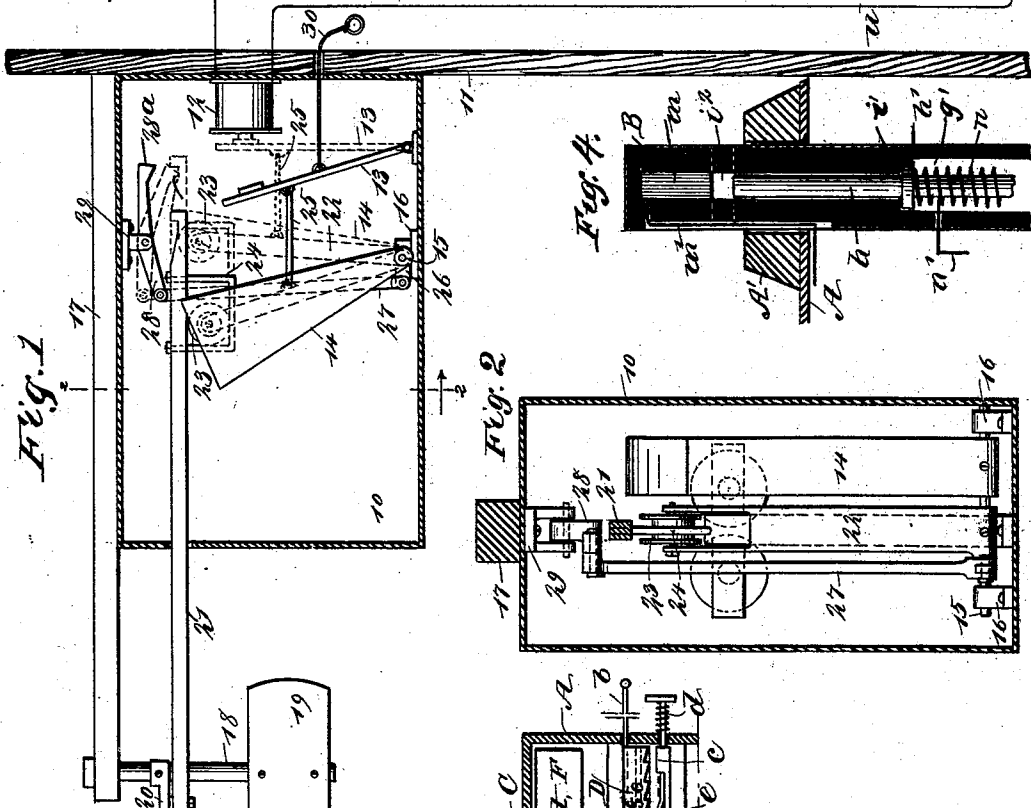
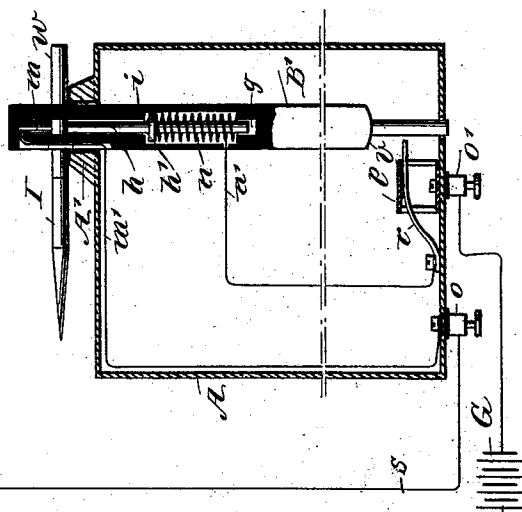
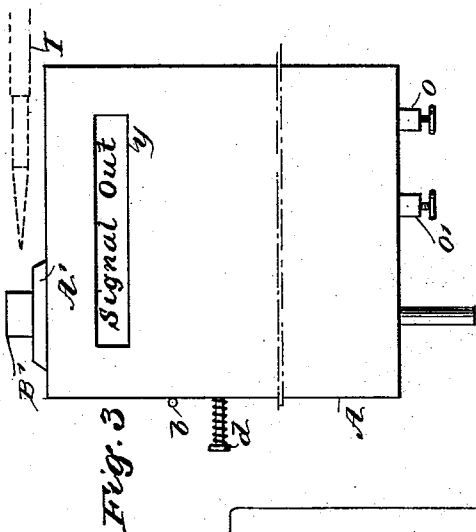


(No Model.)

L. T. CRABTREE.
RAILWAY TRAIN ORDER AND SIGNALING DEVICE.

No. 509,201.

Patented Nov. 21, 1893.



WITNESSES:
J. a. Bergstrom
Alfred Purcott.

INVENTOR
L. T. Crabtree
BY *[Signature]*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

LEONARD T. CRABTREE, OF NEW LONDON, WISCONSIN.

RAILWAY-TRAIN ORDER AND SIGNALING DEVICE.

SPECIFICATION forming part of Letters Patent No. 509,201, dated November 21, 1893.

Application filed June 24, 1893. Serial No. 478,768. (No model.)

To all whom it may concern:

Be it known that I, LEONARD T. CRABTREE, of New London, in the county of Waupaca and State of Wisconsin, have invented a new and useful Railway-Train Order and Signaling Device, of which the following is a full, clear, and exact description.

The invention relates to signaling devices for railroads having the block system in use, and particularly, to mechanism for the control of railway trains in transit over the road, which embody a train signaling device and a co-operating train order annunciator; the object of my invention being to improve the construction of the railway train order and signaling apparatus patented by me March 10, 1891, No. 448,125, and also February 14, 1893, No. 491,837, whereby greater efficiency in the operation of such mechanism is secured.

To this end, my invention consists in the construction and combination of parts, as is hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar numerals and letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view partly in section, of the features of improvement of the train order and signaling devices arranged for service, other parts being removed. Fig. 2 is a transverse sectional view of parts, on the line 2—2 in Fig. 1. Fig. 3 is a detached exterior view showing the front of the train order device, and a feature of improvement on it. Fig. 4 is a sectional side view of a detached and enlarged detail of construction, which is part of the improvement; and Fig. 5 is a partly sectional front view of the train order device in part, showing details of construction with which the features of improvement co-act.

The train order annunciator mechanism shown in part in Patent No. 491,837, and which is substantially the same in construction as that provided in Patent No. 448,125, is preferably used in connection with my present improvement, which patented device in brief comprises a rectangular case A, that is located in a way station telegraph office,

and has a vertically movable gravity bar B, in it, and another parallel slide bar C, loosely held at a suitable distance from the bar B.

The slide bar C, is designed to release a series of spaced horizontal sliding indicator plates D, by its depression, which will impinge projecting pins *e*, upon the spring catches *a*, and remove the ends of the latter from an interlocked connection with serrations in the lower edge of each indicator plate of the series, and that retain the plates where adjusted, they being adapted to receive longitudinal adjustment by providing each plate D with a pull rod *b*, that projects from its end through a side wall of the case A, so that a depression of the slide bar C, which is held elevated by a spring (not shown) at its lower end will release the indicator plates and permit any of them to be longitudinally adjusted.

On the front face of each indicator plate a series of spaced indicating numerals 1, 2, 3, &c., is placed, which are separately exposed through a sight hole (not shown) in the front wall of the case.

To adapt the catches *a*, for an adjustment that will permit any of the slide plates D to be moved into a proper position for the exposure of a correct indicating numeral on it, a pusher bar *c*, is provided for each spring catch *a*, said catches being secured by one end of each on an appropriate pusher bar, so that the free ends of the catch plates may engage with the serrations of the slide plates, and each pusher bar has a retracting spring *d*, placed on its outer end that extends through the case side wall, whereby the catches will be held in a proper position for successive use until they are released by the bar C.

In the patented train order annunciator device that has been described, the gravity bar B, is supported in an elevated position, by the use of a pencil or style E that is inserted through a transverse hole in the gravity bar near its upper end, and on the gravity bar B, a sign plate F, is secured, which will fall into position before a transverse slot in the front plate of the case A, and expose the legend "Orders for" through said slot when the gravity bar is released and the signal is set to call the attention of a train runner, that the ap-

proaching train is to receive "orders" within the office.

The patented signaling device used in connection with the train order annunciator mechanism hereinbefore described, has a visual signal blade, held over or near the railway track in a position to indicate "safety," by an electro-magnetic device, that has circuit wires maintained in closed circuit with a local battery, by the introduction of the pencil or style E, and opened when said style is removed, said style being necessary for the operator to use in writing and making a copy of the message or order received by telegraph from the main office of the railroad; it being imperative that this particular implement be used for the purpose mentioned, to insure the proper display of the signal, as when the circuit is opened by a removal of the style E, a gravity-actuated mechanism that is a part of the signaling device is brought into action, and sets the visual blade to indicate "danger" or "stop the train."

The described parts are not a portion of the present invention, but have been shown and described to enable the features of the improvement to be clearly understood, and their co-action with the patented train order annunciator mechanism made apparent.

The improvements embodied with the previously patented device and constituting the present invention, consist of a novel signal setting apparatus and a novel attachment to the train order mechanism, which will render these co-acting devices more reliable in service, and aid to secure the correct performance of duty by an operator at a station, who is in charge of the improved annunciator and signaling devices.

In the figures showing the improved details of construction for the signaling mechanism, 10 represents the casing that contains said actuating mechanism for the visual signal blade. Within said casing that is secured upon the exterior of the office side wall 11, an electro-magnet 12, is fastened to the case wall that is imposed on the side wall 11, and on the bottom of the signal casing 10, an armature bar 13, is pivoted at a point which will permit it to engage the pole of the magnet when drawn to an upright position. At a suitable distance from the armature bar 13, and toward the outer end of the casing 10, an elongated and preferably triangular gravity block 14 is located, having its wider portion uppermost, and the apex of its acute angle secured upon a transverse shaft 15, which shaft is journaled in the boxes 16, that are secured upon the bottom of the casing 10. A suitable support 17, is extended outwardly from the casing 10, to which the shaft 18 is loosely secured so as to depend therefrom, the visual signal blade 19, being transversely affixed upon the lower portion of the shaft. A crank arm 20, is projected from the shaft 18, at such a point as will adapt it to have a pivotal engagement

with the connecting bar 21, that passes therefrom through the front wall of the casing 10, to have connection with the mechanism within the latter. An upright lever 22 is secured on the shaft 15, and is given such a length as will permit the anti-friction wheel 23, which is journaled between parallel limbs that project from the upper end of the lever, to loosely engage with a metal rectangular loop 24, that is secured to the inner end portion of the connecting bar 21, and depends from it.

The construction and arrangement of parts, as described, will adapt the signal blade 19, to receive a partial revolution when the gravity block 14, is rocked toward or from the magnet 12.

For the efficient action of the signaling mechanism, it is essential that the armature bar 13, be loosely connected by a link, such as 25, with the upright lever 22, so that these parts will vibrate simultaneously, along with the gravity block 14, the length of the link being so proportioned, that when the armature bar is in contact with the pole of the magnet 12, the gravity block will be nearly vertical, a slight preponderance of its weight at the heavy upper end being afforded to the edge farthest from the magnet, and therefore nearest to the signal blade. On the shaft 15, a short limb 26, is projected therefrom toward the front of the casing 10, and to the outer end of this limb, the upright lifter rod 27, is pivoted by its lower end, the upper end of said lifter rod being secured to the forward end of a rocking dog 28, that is pivoted upon a bracket block 29, which is secured to the lower surface of the top wall of the casing 10. The connecting bar 21 is extended toward the magnet 12, and beyond the bracket loop 24, sufficiently to permit the locking toe that is produced on the free end 28^a of the dog 28, to interlock with a notch cut in the top edge of the connecting bar near its inner terminal, such a contact of parts being produced when the armature bar 13, is drawn into engagement with the magnet 12, there being a wire or flexible strand 30, attached by one end to the armature bar, and thence extended through the wall of the casing 10 and the wall 11 of the office, its free terminal that is a convenient distance from the office floor, having a ring or knob to afford a grip piece for the ready manipulation of the cord, and vibration of the armature bar.

In the annunciator case A, that is at present employed for the retention of the slide plates D and other working parts, the gravity bar B' is changed somewhat in its construction, to adapt it for the reception of parts that are features of the present improvement. Said bar, which is made of any suitable heavy material, is longitudinally excavated in its body from the rear side, as indicated in Figs. 1 and 4. In the elongated cavity produced by the excavation of the gravity bar B', from a point near its upper end toward its lower

end, a suitable non-conducting or insulating lining material *i*, is secured so as to completely fill the cavity. The lining material *i* is longitudinally and axially perforated to receive an elongated contact bar *h*, that is made of metal which is a good electrical conductor. A collar *h'* is formed on the bar *h*, occupying a laterally enlarged continuation of the longitudinal perforation *g* in the lining *i*, which enlargement *g'*, of the perforation produces a shoulder *i'*, as clearly shown in Fig. 4. Below the collar *h'*, a spiral spring *n*, is mounted on the bar *h*, and loosely engages its upper end with the lower side of the collar, and presses with its lower end on a shoulder *i'*, produced below in the enlarged perforation *g'*, by its reduction in diameter, which reduced portion of the longitudinal hole receives the lower end of the bar *h*, and loosely sustains it, permitting its free reciprocation. Above the upper end of the contact bar *h*, a plug *m* of metal which is a good conductor of electricity is secured in the upper portion of the perforation, that contains the contact bar *h*, said plug being axially aligned with the bar named. A suitable space *v*, is allowed between the adjacent ends of the contact bar *h*, and conductor plug *m*, when the bar is upwardly pressed against the shoulder *i'*, thus normally insulating these electrical conductors from each other, as represented in Fig. 4.

There are two binding posts *o* and *o'*, provided, that are secured in spaced perforations in the lower wall of the case A, and insulated therefrom if said case is made of material that is a conductor of electricity.

A skeleton metallic frame *p*, that is an electric conductor, is secured upon the inner surface of the lower wall of the case A, and is in electrical connection with the binding post *o'*.

A contact spring *r*, has one end secured upon the non-conducting case A, between the posts *o* and *o'*, and is so curved that it will normally press against the top of the frame *p*, its relative width preventing lateral contact with said frame.

From the conductor plug *m*, an electric conductor wire *m'*, is extended through a small passage in the insulation *i*, into the case A, and thence along the walls of the latter to have a secured contact with the binding post *o*; and from the spring *n* that is a conductor of electricity, another conducting wire *n'*, is extended laterally through the insulating lining of the gravity bar *B'*, along the wall of the case A, and down, to be attached by its lower end to the contact spring *r*.

From the binding post *o*, a wire *s*, is extended to one terminal of the helix of the magnet 12, another wire *u*, joining the remaining terminal of the magnet helix with the post *o'*, a local battery G, being introduced in the last named wire.

It will be seen, that the battery circuit is normally in an open condition owing to the space allowed to intervene between the adja-

cent ends of the conductor plug *m*, and the contact bar *h*.

The bar *B'* is transversely perforated, at a point opposite the separated ends of the conductor plug *m*, and contact bar *h*, as shown by dotted lines in Fig. 4, the diameter of which hole is sufficient to freely admit the body of a copying pencil or style, that the operator is required to insert and thus hold the bar elevated as shown in Figs. 1 and 4.

The style I, that is provided to maintain the gravity bar *B'* in an elevated condition so as to remove its shoulder *v*, from the free end of the spring *r*, that is pressed down and away from the top wall of the skeleton frame *p*, by the imposed weight of the gravity bar, is made of a material which is a good conductor of electricity, or if it is an ordinary lead pencil has an encircling sleeve *w*, secured upon its body to form a part of its exterior surface, so that by an insertion of the pencil sufficiently to introduce the sleeve *w*, between the plug *m* and bar *h*, a completion of the electric circuit between the battery G and the magnet 12, is effected.

The arrangement of parts in the signaling device is such, that the "danger" or "stop" signal will be displayed by the full exposure of the signal blade 19, transversely of the railroad track to be guarded, when the magnet 12 is dormant, and the armature bar 13 is released therefrom, the slight over-weight of the gravity block 14, causing it to fall toward the signal blade and arrange it as shown by full lines in Fig. 1, and as before indicated, the pressure of the released gravity bar *B'* on the spring *r*, serves to open the battery circuit and demagnetize the electro-magnet 12, whereby the action of the mechanism in case 10, to set the blade 19, as shown in Fig. 1, is permitted.

A transverse slot *y*, is cut in the front of the case A, at a point which will allow the placard F to be exposed when the signal is set to indicate "stop" or "danger," which sign is marked with the words "Signal out," or others of a like import, so that frequenters of the telegraph office will be enabled to know that the signal has been properly set; these words on the placard taking the place of the legend "Orders for" that is used in my prior patented signaling devices.

Ordinarily the signal blade 19 is held longitudinally of the track, so that its ends only will be visible from a train, by the operator inserting his style I, into the transverse perforation of the gravity bar that has been elevated a proper degree above a raised portion A', of the case A, which will close the battery circuit and render the magnet 12, active. The operator then pulls upon the strand 30, which will rock the gravity block toward the magnet, and the armature bar 13 also, the poles of the energized magnet becoming forcibly engaged with said bar and holding the signal blade at safety. At the same time the

gravity block 14, is adjusted to assume a nearly vertical position, the dog 28 is interlocked with the notch in the connecting bar 21, which latter provision is made to prevent an accidental release of the block 14, by an agitation of the signal blade when it is exposed to wind currents, or an attempt is made to tamper with it from the exterior of the office. As soon as a train order message is to be received the way station operator removes his style I, from the gravity bar B', which will permit it to drop and open the circuit as before explained, which act will simultaneously cause the signal blade 19 to be swung across the line of the track, and expose the "danger" signal, that in this case requires a full stop of the train that next approaches the station, to allow the engineer or conductor to receive one or more messages that he will at once see are to be delivered, by an inspection of the slide opposite his train number, that has been set in the annunciator case A, to show the party he should call for the order.

The features of advantage in the construction of this improved signaling apparatus essentially consist in the provision of the top heavy gravity block 14, that is nearly poised, and in the co-acting locking device therefor, which will be simultaneously released by the first movement of the block when the armature bar 13 is free to rock away from the magnet.

The bracket looped connection of the connecting bar 21, with the anti-friction wheel on the upright lever 22, is such as to allow the gravity block to fall outwardly a short distance before the connecting bar is moved; this gives time for the dog 28 to be upwardly vibrated and fully released from the connecting bar before the latter is pressed upon by the outward movement of the lever 22, as the wheel thereon has to traverse the elongated bracket loop 24 before such a pressure can take place.

The impetus given by the top heavy block 14, to the bar, and sudden shock it transmits to the signal blade shaft, will loosen the latter if sleet or frozen snow has temporarily impeded its movement.

The provision of the improvements in the annunciator case A, require the operator to use the peculiar style I, in the regular work of the office, as without it the signal cannot be set to "safety," or if there is a substitution of any other conducting material, this will be seen by frequenters of the office, and render him liable to exposure for willful disobedience of orders.

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

1. In a train signaling device, the combination with a rotatable pendently-supported signal blade, a top-heavy gravity block pivotally supported near its lower end, and a device connecting said block with the blade, of

an electrical device that when active holds the block nearly upright, and releases the block to allow it to rock when said electrical device is dormant, substantially as described. 70

2. In a train signaling device, the combination with a rotatable pendently-supported signal blade, of a case, a top-heavy gravity block pivoted within and on the bottom of the case, mechanism connecting the support of the blade with the block to move said blade by the gravity of the block, and an electrical device which when active holds the block nearly upright, and releases the block for its rocking vibration when the electrical device is rendered dormant, substantially as described. 80

3. In a train signaling device, the combination with a supported electro-magnet, an armature bar pivoted at its lower end, a battery, and means to make and break a circuit between the battery and the magnet, of a top-heavy gravity block pivoted at its lower end, a pendently supported and rotatable signal blade, and a device connecting the signal blade support with the gravity block, substantially as described. 90

4. In a train order signaling device, the combination with a rotatable, pendently supported signal blade, a top-heavy gravity block pivotally supported by a transverse shaft secured thereto near its lower end, a lever on said shaft, a connecting bar between the blade support and lever, means to loosely connect the top of the lever with the bar, and a locking device for the connecting bar, of an electrical device that when active retains the gravity block nearly upright, and releases said block to allow it to rock, when the electric device is dormant, substantially as described. 100

5. In a train signaling device, the combination with a pendently supported rotatable shaft, a signal blade on the lower end of said shaft, a crank arm on said shaft, and a connecting bar pivoted to the arm, of a casing, a top-heavy block within the casing, a rotatable shaft whereon the block is secured near its lower end, an upright lever on said shaft, a loose connection between a wheel on the lever and the connecting bar, and a rocking dog adapted to interlock with a notch in the connecting bar and adapted for adjustment by an arm on the shaft, of an electro-magnet in the casing, an upright armature bar pivoted at its lower end in the casing, a connection between the armature bar and the upright lever, a pull cord on the armature bar, and means to make and break electrical connection between the magnet and a battery, substantially as described. 110

6. In a train order and signaling device, a signal blade pendently supported and adapted to rotate, gravity actuated mechanism that revolves the blade when free to move, an electro-magnet, a battery, and electrical connections extended from the battery and magnet to two binding posts in an annunciator case, 120

of a gravity bar within said case, an insulated conductor plug in the top of the gravity bar, an insulated spring pressed contact rod in the bar below the plug, an electrical connection
5 between the plug and one binding post, an electrical connection between the contact rod and a make and break device attached to the other binding post and controlled by the re-

ciprocation of the gravity bar, and an electric conducting style adapted to be introduced between the conductor plug and contact rod, substantially as described. 10

LEONARD T. CRABTREE.

Witnesses:

A. G. WEICHMAN,
A. L. CRABTREE.