

(No Model.)

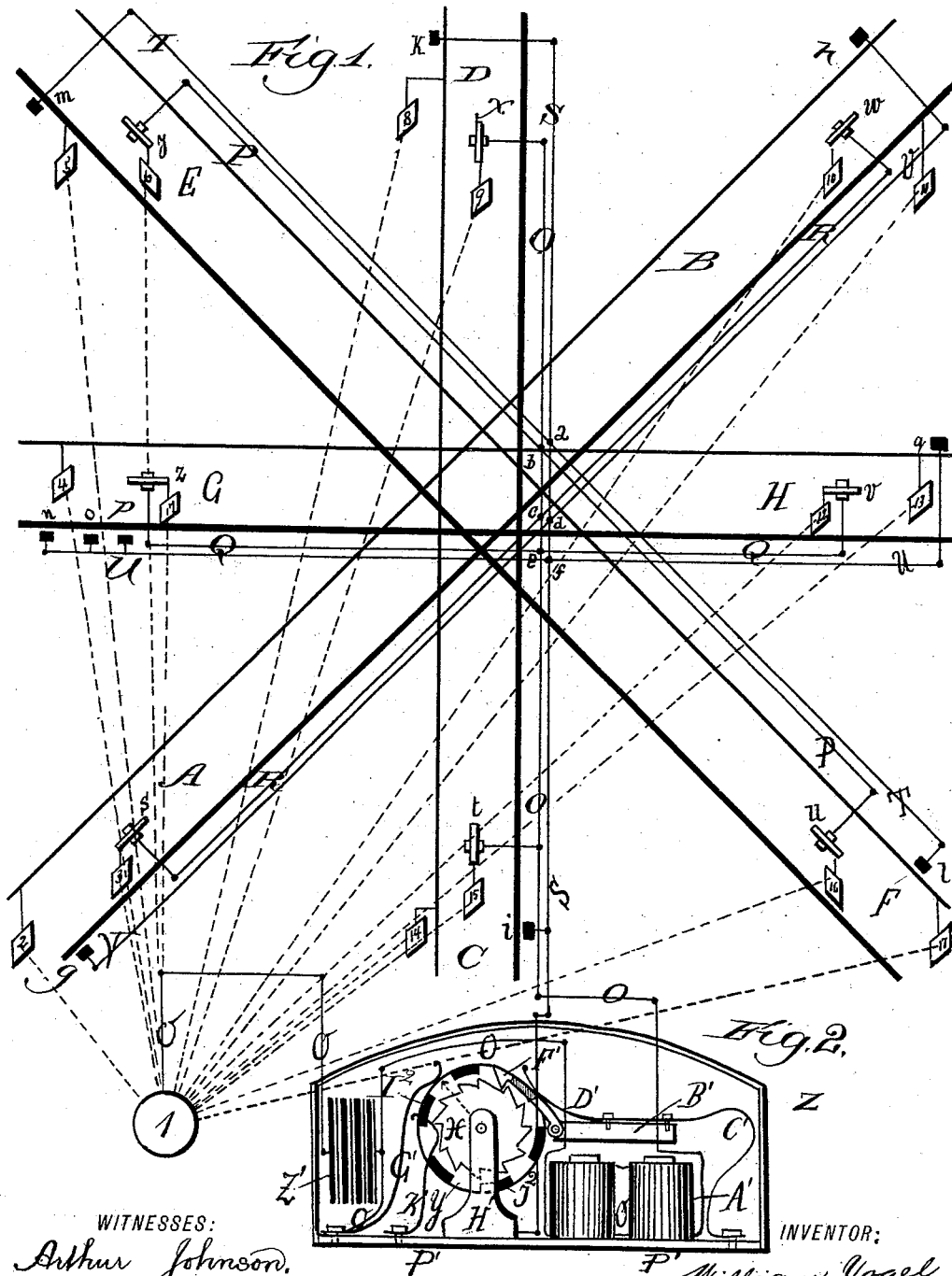
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W. VOGEL.

SIGNAL FOR RAILROAD CROSSINGS.

No. 347,752.

Patented Aug. 17, 1886.



WITNESSES:  
Arthur Johnson.  
Mason Brass.

INVENTOR:  
William Vogel,  
BY *D. J. Dyer*

ATTORNEYS.

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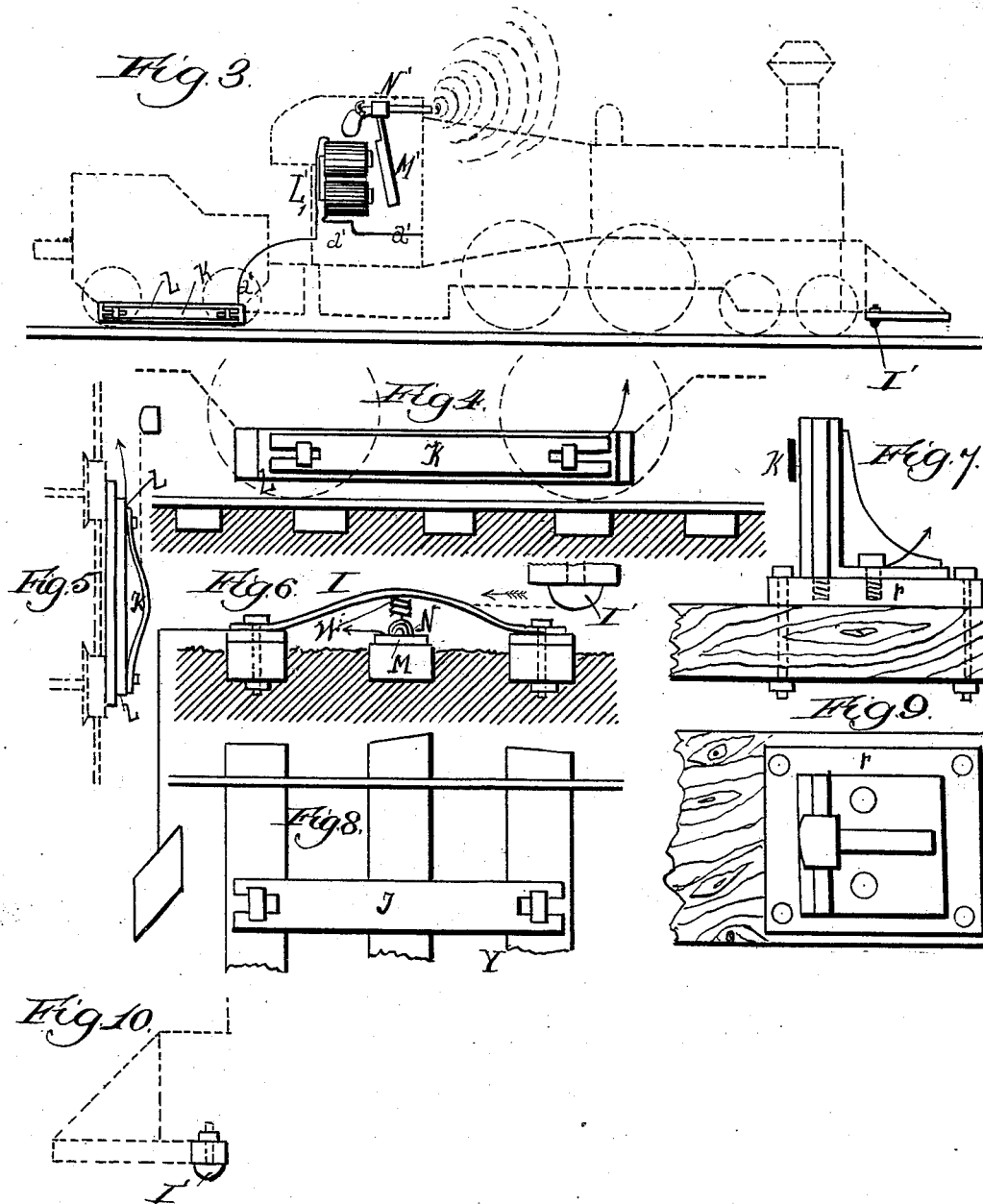
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BY *Dyrenforth & Dyrenforth*,

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# UNITED STATES PATENT OFFICE.

WILLIAM VOGEL, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE CONSOLIDATED RAILWAY TELEPHONE AND SIGNAL COMPANY.

## SIGNAL FOR RAILROAD-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 347,752, dated August 17, 1886.

Application filed November 19, 1885. Serial No. 183,274. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM VOGEL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Signals for Railroad-Crossings; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to apparatus to serve in affording danger-signals at the crossings of railroads, and is actuated by electricity.

It is my object to provide means whereby collisions at the crossing shall be avoided by causing the train which clears the crossing first automatically to set the electrical apparatus located adjacent to the crossing in a manner that will cause any other train or trains approaching the crossing to be warned of the position of the first train, and whereby the passage over the crossing of any train without being signaled, will be a reliable indication to it that it has the right of way and may proceed without danger.

To this end my invention consists in the general construction of the means for accomplishing the foregoing objects, and it also consists in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

The signal-producing means which I prefer to employ upon each locomotive to warn of imminent danger and notify the engineer to stop, is in the form of a revolver to be discharged for the purpose one or more times; but although other forms of signal-producers may be employed, for which reason I do not limit myself to the revolver device, the following description is confined to the latter, as it is shown in the drawings, for the sake of convenience of illustration.

Referring to the drawings, Figure 1 is a diagram of a railroad-crossing representing four tracks crossing each other and provided with my improved apparatus for use in the signaling of trains having means to co-operate with the same; Fig. 2, a side elevation of the electrical apparatus located in a station near the crossing, and serving to produce the signaling operation; Fig. 3, a side elevation of a lo-

comotive provided with mechanism co-operating with the mechanism shown in Fig. 1 to effect signaling; Fig. 4, a side elevation of the truck portion of the tender provided with a rubber for producing electrical contact; Fig. 5, a plan view of the same with the contact on the locomotive about to engage with it; Fig. 6, a longitudinal section between the rails of the track, showing in detail the contact mechanism to be actuated from the cow-catchers of the locomotives; Fig. 7, a side elevation of a metallic contact-post of the kind stationed along the sides of the tracks and insulated from the ground; Fig. 8, a plan view of the device shown in Fig. 6; Fig. 9, a plan view of the post shown in Fig. 7, and Fig. 10 a side elevation of a cow-catcher provided with an insulated metallic contact-point.

A B, C D, E F, and G H represent four railroad-tracks, each provided laterally with two wires, which are supported on the telegraph-posts commonly provided, but not shown in the drawings, and connecting with the electrical apparatus Z, (shown in Fig. 2,) the contact-posts *g h i k l m n o p q*, and the contact mechanisms *s t u v w x y z*, located centrally between the tracks, and these wires cross each other and are united at their points *a b c d e f*. The contact-posts are formed entirely of metal and are clearly represented in Figs. 7 and 9, and they serve to actuate the signal-producers in the locomotives by the transmission to the latter of electric currents, being insulated from the ground by means of glass plates *r*, and they are in the lines of the outer wires parallel with the tracks, sufficiently close to the latter to be rubbed by the rubbers K, hereinafter described, on the locomotives in the passage of the latter.

The contact mechanism between the tracks, and shown in detail in Fig. 6, comprises a metallic contact-point, N, forming one terminus of the conducting-wire on an insulating-block supported on the tie, and a spring forming the other terminus of the same wire and extending over the part N, carrying on its under side a spiral spring, W, and slotted at its extremities to permit to it a slight longitudinal play on the bolts which secure it to

the ties on each side of the tie supporting the contact-point N, as shown in Fig. 8.

Ground-plates 3 6 7 9 10 12 15 16 are provided, with which to connect the contact mechanisms, which are located between the tracks, and are all in the circuit of the battery Z', the circuit being closed by bringing the spring I' into contact with the part N. The rubber K is in the form of a spring having, like the convex spring I, slight longitudinal play, and is supported upon a wooden bolster, L, located on the right side of the tender outside between the wheels, and is connected by a wire, a', with the electro-magnet L' on the locomotive and serves to rub the metallic contact-posts.

The cow-catcher on each locomotive is provided with a contact-maker, I', which serves to rub the plate I of the contact mechanism between the tracks, the spring W thereon affording means to insure electrical contact thereof with the part N, and to assist the part I in its resilience.

The apparatus Z comprises a metallic ratchet-wheel, X, suitably supported in bearings on a metallic standard, H', and movable with a metallic contact-wheel, Y, provided in its periphery with segments I' of non-conducting material—such as ivory—an electro-magnet, A', an armature, B', carrying at one extremity a hook, F', to move with it against the resistance of a spring, C' D', and engaging with the ratchet-wheel, springs G' and K', and a battery, Z'. Whenever a current traverses the electro-magnet A', the armature B' is attracted, and the hook F' carries the ratchet-wheel around to the right the extent of one tooth, the spring D' presses upon the hook F' and the spring C' serves to raise the armature when the attraction ceases. The spring K', which is bent to engage with the ratchet-wheel, holds the latter to the position into which it is turned, and the spring G' is brought into contact by one movement of the ratchet-wheel with a metallic portion of the wheel Y, and by a succeeding movement of the same with a non-conducting portion, I', thereof, the spaces between such metallic and non-metallic portions corresponding and being coincident with the spaces between the points of the teeth of the ratchet-wheel.

Each locomotive is provided, as shown in Fig. 3, with an electro-magnet, L', and an armature, M', which forms the trigger of a revolver, N', supported in the locomotive-cab and having its nozzle extending without the same.

The functions of the foregoing devices are performed in the following manner: Supposing a train to be moving from A toward B, by rubbing with the contact-maker I' upon the locomotive the contact mechanism between the rails at s, it will cause the ratchet-wheel X to be rotated toward the right the distance of the space between two teeth, thereby bringing the spring G' into contact with the metallic portion of the wheel Y. This will give rise to an electric current having the follow-

ing course: From the contact-point s by way of the wire R to the point of junction c, thence over the wire O to the electro-magnet A', which will attract the armature B', causing the hook F' to turn the wheel X the extent of one tooth and placing the spring G' into contact with the conducting portion of the wheel Y, and thereby closing the circuit containing the contact-posts g h i k l m n o p, through the battery Z' over the wire O to the ground-plate 1, thence to the ground-plate 3, and back to the starting-point s. The same operation is performed by this train in leaving the crossing at the point w between the rails to bring the spring G' into contact with a non-conducting portion of the wheel Y. If, while this train is approaching the crossing, as just described, or on the same, another train shall approach upon a different track—say from F to E, or even a third train from G to H—each of the last-named trains will be signaled to stop by the automatic discharge of the revolver upon it, the number of reports from each revolver depending upon the number of contact-posts, as at n o p, employed and placed in close proximity to each other.

It will be understood that there are two circuits employed in operating my device—one containing the battery Z', and normally open owing to the normally-separated condition of the parts N and I of the contact mechanism between the tracks, and the other containing the same battery Z', and normally open owing to the break produced in it by the contact of the spring G' with an ivory segment, I', on the metallic wheel Y. The closing of the circuit by the contact-maker I' on the locomotive, as hereinbefore described, brings the spring G' into contact with the metallic portion of the wheel Y, whereby the circuit containing the various contact-posts is closed, and the latter are thus electrified (until the locomotive which originally closed the circuit opens it on leaving the crossing, as already described, and thereby breaks the circuit containing the contact-posts by turning the wheel Y, through the medium of the attracted armature B, to bring an ivory segment, I', of the wheel into contact with the spring G',) whereby when any of the electrified posts is rubbed by the rubber K on a locomotive, the electrical condition of such post will be communicated to the electro-magnet L', and thus produce the discharge of the revolver and give warning of the position of the first locomotive on the crossing. This last-named result is accomplished by the course of the current, which is as follows: When the train moving upon track F E effects contact with the post l, near F, of its rubber K, or such rubbers on both trains make contact with adjacent posts, the current, if such contact is made only at the post l, enters the locomotive, traversing the wire T to the point of junction a, over the wire S and metallic standard H' to the wheel Y, (insulated by the plate P',) thence over the wheel Y, spring G', wire O, and through the battery Z', by way of ground-

plates 1 and 16 and the rails, to the locomotive-wheels, thence by way of the wire *a'* around the electro-magnet *L'* and over the continuation of the wire *a'* to rubber *K*, and thence back to the starting-point or post *l*. The surrounding of the electro-magnet *L'* by the wire *a'* will have caused the armature *M'* to have been attracted, thereby discharging the revolver *N'*. The course of the currents are similar in all instances, always flowing upon the wires to the points of junction *a b c d e f*, and thence to the apparatus, either direct to the magnet *A'*, in the one case of contact being made at the contact-mechanism in the center of a track by the advent upon a crossing of a locomotive and to the contact-wheel *Y*, by the closing of the circuit containing the contact-posts, produced by the turning of the wheel *Y* to bring the spring *G'* into contact with a metallic portion thereof.

It is to be remarked that the ground-plates 2 4 5 8 11 13 14 17 are not indispensable, inasmuch as the rails will serve to ground the currents.

What I claim as new, and desire to secure by Letters Patent, is—

1. A signaling device for railroad-crossings, having contacts between the rails adjacent to and at opposite sides of the crossing-tracks in one of two electric circuits, said contacts comprising each an insulated part, *N*, and a spring, *I*, extending over the same, and the said circuits emanating from a station containing a battery, *Z'*, an electro-magnet, and means, substantially as described, for rotating a contact-wheel on its bearings, all in the said circuit, and a contact-wheel, *Y*, and a spring, *G'*, both in the said other circuit, in combination with a contact, *I'*, located on each train to engage with the contacts between the tracks and connected by a conductor with a signaling apparatus, substantially as described, on such train, whereby the wheel *Y* may be set to produce the signal on such train, or set to avoid the production of such signal, substantially as set forth.

2. A signaling device for railroad-crossings, having contacts between the rails adjacent to and at opposite sides of the crossing-tracks in one of two electric signals, said contacts comprising each an insulated part, *N*, and a spring, *I*, extending over the same, and the said circuits emanating from a station containing a battery, *Z'*, and an electro-magnet, *A'*, having an armature, *B'*, provided with a hook, *F'*, to move with it, all in the circuit of the contact *N I*, and engage with apparatus in the other of said circuits comprising a contact-wheel, *Y*, and ratchet-wheel *X*, supported in a standard, *H'*, of conducting material, and a spring, *G'*, in combination with a contact, *I'*, located on a train to engage with the contacts between the tracks, and connected by a conductor with a signaling apparatus on such train, comprising an electro-magnet, *L'*, having its armature *M'* connected with the signal-producer to be actuated by the attrac-

tion of the armature, whereby the wheel *Y* may be set to close the circuit containing the contacts *N I*, and thus, by the engagement thereof of the contact-point *I'*, produce the signal, substantially as described.

3. A signaling device for railroad-crossings, having insulated contact-posts at the sides of the tracks, near their points of crossing, in one of two electric circuits emanating from a station containing in the other circuit a battery, *Z'*, and an electro-magnet, *A'*, having an armature, *B'*, provided with a hook, *F'*, to move with it and engage with apparatus in the said circuit of the posts, comprising a contact-wheel, *Y*, and ratchet-wheel *X*, supported in a standard, *H'*, of conducting material, and a spring, *G'*, in combination with an insulated rubber, *K*, on a train to engage with a contact-post, and thereby cause the armature *A'* to attract the armature *B'* and actuate the hook *F'* to rotate the ratchet-wheel *X* and set the contact-wheel *Y*, with reference to the spring *G'*, to open or close the circuit containing the spring *G'*, substantially as and for the purpose set forth.

4. A signaling device for railroad-crossings, having contacts between the rails adjacent to and at opposite sides of the crossing-tracks in an electric circuit, said contacts comprising each an insulated part, *N*, and a spring, *I*, extending over it, and provided with a spring, *W*, insulated contact-posts at the sides of the tracks, near their points of crossing and in another electric circuit, both of the said circuits emanating from a station containing, in the circuit of the contacts *I N*, a battery, *Z'*, and an electro-magnet, *A'*, having an armature, *B'*, provided with a hook, *F'*, to move with it and engage with apparatus in the circuit of the posts, comprising a contact-wheel, *Y*, and ratchet-wheel *X*, supported in a standard, *H'*, of conducting material, and a spring, *G'*, in combination with a contact, *I'*, located on a train to engage with the contacts between the tracks, and connected by a conductor, *a'*, with a signaling apparatus on such train, comprising an electro-magnet, *L'*, having its armature *M'* connected with a signal-producer to be actuated by the attraction of the armature, whereby the wheel *Y* may be set to close the circuit containing the contacts *N I*, and thus, by the engagement therewith of the contact-point *I'*, produce the signal, and an insulated rubber, *K*, on such train to engage with a contact-post, and thereby cause the armature *A'* to attract the armature *B'* and actuate the hook *F'* to rotate the ratchet-wheel *X* and set the contact-wheel with reference to the spring *G'*, to open or close the circuit containing the spring *G'*, substantially as described.

WILLIAM VOGEL.

In presence of—  
MASON BROSS,  
WM. SADLER.