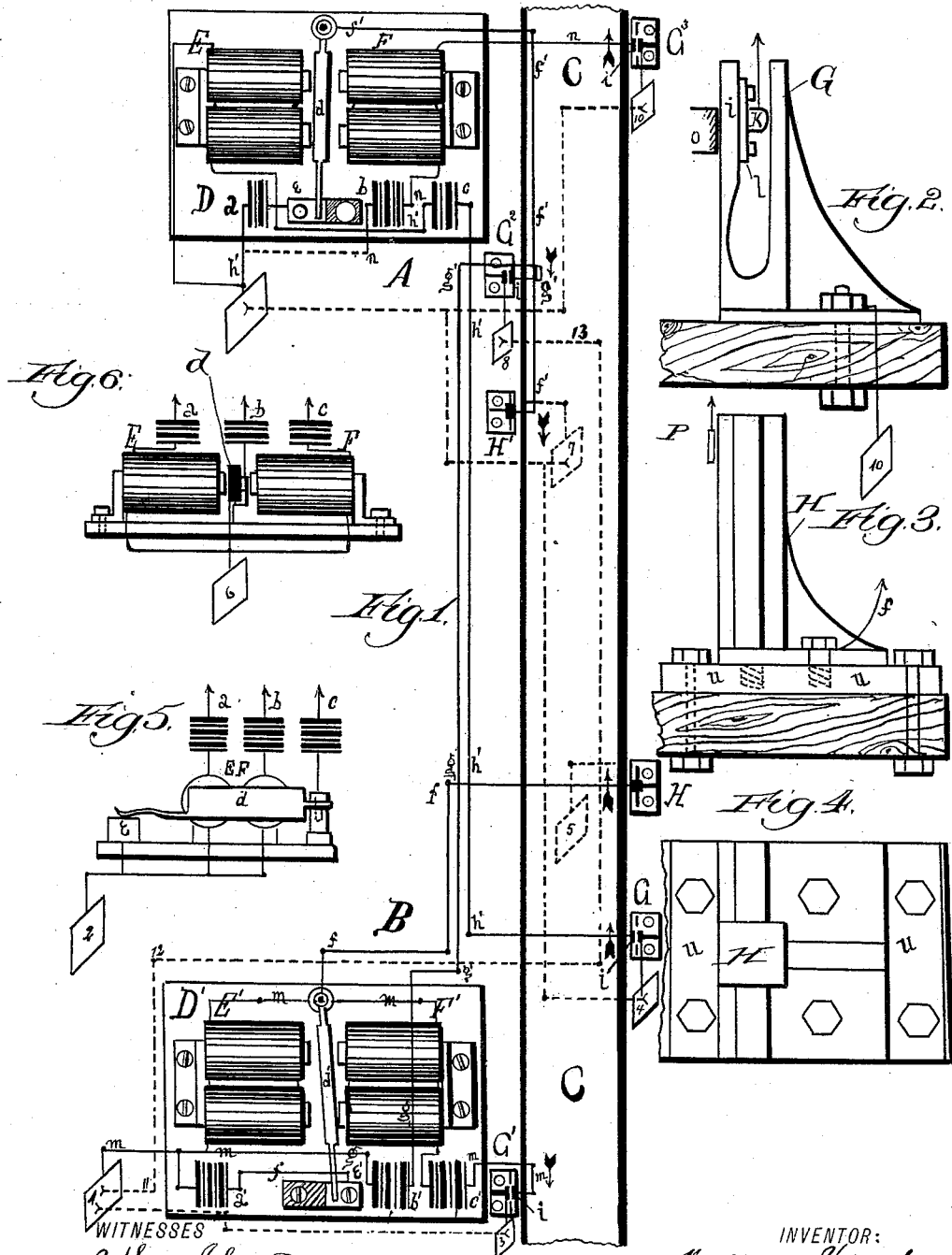


W. VOGEL.  
RAILROAD SIGNALING APPARATUS.

No. 347,753.

Patented Aug. 17, 1886.



WITNESSES  
*Arthur Johnson.*  
*Wason Brass.*

INVENTOR:  
*William Vogel,*  
BY *Dynsforth and Dynsforth*

ATTORNEYS.

(No Model.)

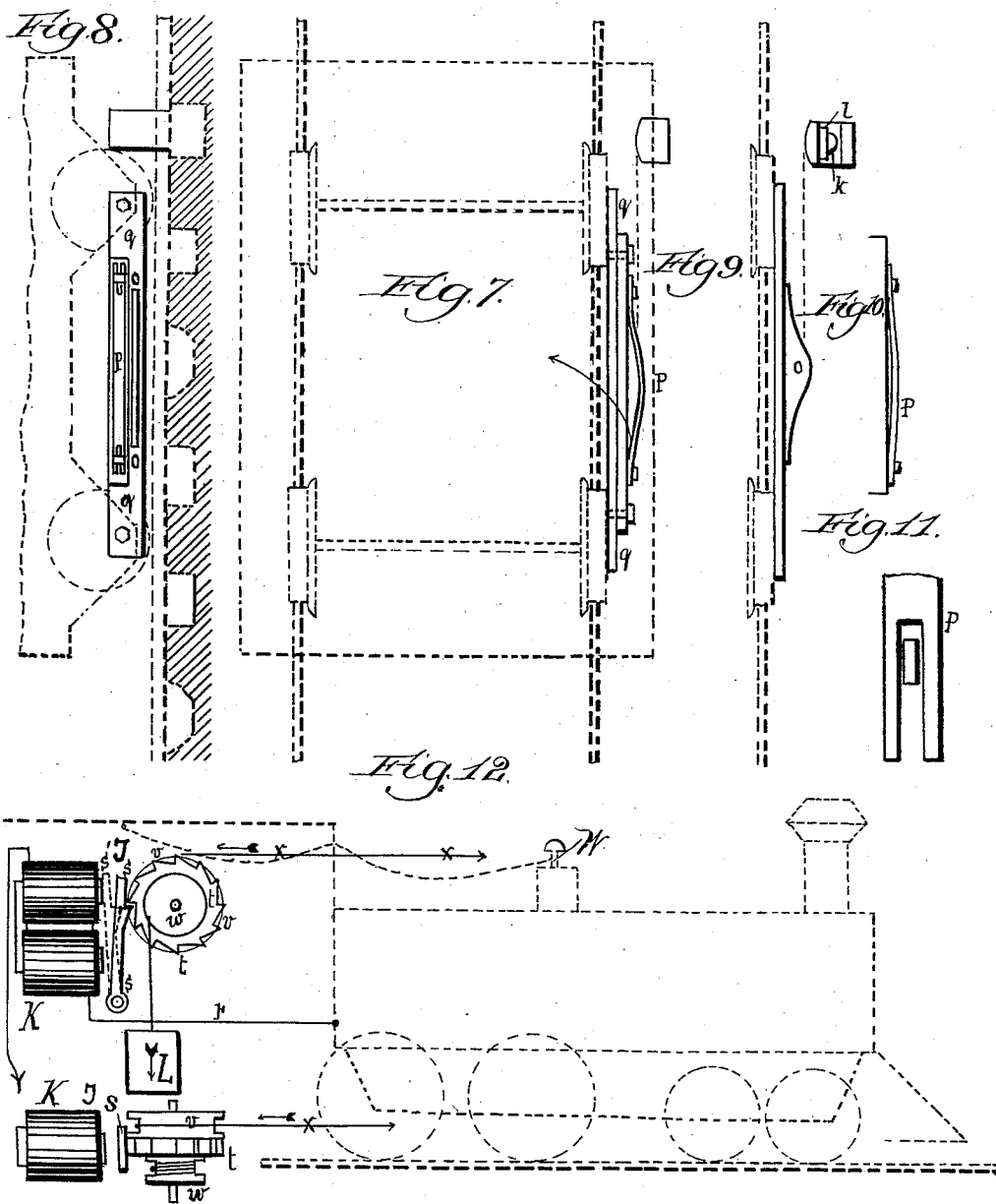
2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

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

## RAILROAD SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 347,753, dated August 17, 1886.

Application filed November 19, 1885. Serial No. 183,275. (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 Railroad Signaling Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of railroad-signals wherein the apparatus is actuated by means of electricity.

It is my object to permit the prevention of collision between trains moving toward each other on the same track by causing a warning-signal to be transmitted automatically from the locomotive of one train to that of the other from certain predetermined points.

To this end my invention consists in the general construction of the mechanism which I employ for the purpose; and it also consists in certain details of the construction of such mechanism, and in combinations of parts forming the same, all as hereinafter more fully set forth.

Referring to the drawings, Figure 1 represents a railroad-track supposed to extend between two stations, each provided with an electrical apparatus adapted to the particular purpose; Fig. 2, a side elevation of one form of signaling-post; Fig. 3, a similar view of a signaling-post of the other form employed; Fig. 4, a plan view of the same; Figs. 5 and 6, detail views of the electrical apparatus; Fig. 7, a plan view of the truck portion of a locomotive provided with details of my improvement; Fig. 8, a side elevation of the same; Fig. 9, a top view of the lower rubber on the locomotive about to rub a post; Figs. 10 and 11, detail views, and Fig. 12 a side elevation of a locomotive provided with the signal-receiving apparatus.

A represents a station containing the electro-magnetic apparatus D, and B a station containing the electro-magnetic apparatus D', both apparatuses D and D' being alike and connected by telegraph-wires, and between which stations is the railroad-track C.

E F and E' F' are electro-magnets, respectively, at the stations A and B, connected with batteries *a b c* and *a' b' c'*, and provided with armatures *d* and *d'*.

The numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 denote ground-plates, and *e* and *e'* designate metallic plates at the respective stations for contact of the vibratory armatures *d d'*, for a purpose hereinafter described, the unlettered shaded portions of the plates *e e'* being of non-conducting material.

G, G', G<sup>2</sup>, and G<sup>3</sup> are iron posts of a particular construction, and serving a purpose hereinafter described, and H and H' are also iron posts, differing in purpose and construction from the posts first named, and these posts are placed along the track, on both sides of the same, at desired points near the stations, being secured in position upon the sleepers.

The posts are connected with the apparatuses D and D' at the stations by means of telegraph-wires *f f'*, *g g'*, *h h'*, *m*, and *n*, which descend from the poles supporting them (not shown) and are connected underground with such posts and apparatuses.

The dotted lines in Fig. 1 of the drawings indicate the earth-currents. Each of the posts G G' G<sup>2</sup> G<sup>3</sup> is recessed vertically, as represented in Fig. 2 of the drawings, to afford to the part *i* a springy nature, and which carries a metallic contact-point, *k*, insulated from it by means of an interposed plate, *l*, of non-conducting material. From the several insulated contact-points *k* lead, respectively, the wires *m*, *h'*, *g'*, and *n* through the batteries, electro-magnets E F and E' F', and to earth, the battery *a* and electro-magnet E thus being in the circuit of the conductor *h'*, battery *b* and electro-magnet F in that of the conductor *n*, battery *a'* and electro-magnet E' in the circuit of the conductor *m*, and battery *b'* and electro-magnet F' in that of the conductor *g'*.

Rubbers *o*, of non-conducting material, and *p*, of conducting material and springy, the functions of which are hereinafter more fully described, and which are clearly shown in Figs. 2, 7, 8, 9, and 10, are provided upon the locomotive—the one *o* being below the one *p*, and projecting laterally less far than the latter, to strike the posts G, G', G<sup>2</sup>, and G<sup>3</sup>, which are nearer to the track than the posts H and H'—by being secured to wooden bolsters *q* on the right sides of the same at the truck portion, as shown in Fig. 8, and the rubbers *o* can come into contact only with posts G, G', G<sup>2</sup>, and

$G^3$ , while the rubbers  $p$ , which are higher than the rubbers  $o$ , can only touch the posts  $H$   $H'$  above the levels of the first-named posts, which are lower than the posts  $H$   $H'$ . The latter are insulated from the ground by, preferably, glass blocks  $u$ , (shown in Figs. 3 and 4,) and from these posts, respectively, lead the wires  $f$  and  $f'$ .

Owing to the fact that the rubber  $p$ , which is slotted at its extremities, as shown in Figs. 8 and 11, to permit to it a slight longitudinal motion in its bearings, is insulated from the locomotive, the electric current from a wire,  $f$  or  $f'$ , when either a post  $H$  or  $H'$  is rubbed by the part  $p$ , cannot reach the metal of the locomotive, but must pass along the conducting-wire  $r$ , (see Fig. 12,) which must be connected at one end with the rubber  $p$  and lead thence to the signaling mechanism  $I$  in the locomotive. This signaling mechanism comprises an electro-magnet,  $K$ , armature  $s$ , ratchet-wheel  $t$ , spools  $v$  and  $w$ , (the three parts  $t$ ,  $v$ , and  $w$  being integral, as shown in a detail view at the lower side of Fig. 12,) and a weight,  $L$ , attached by a rope to the spool  $w$ . Another rope,  $x$ , connects the spool  $v$  with the valve of the whistle  $W$  of the locomotive, in order that when the armature  $s$  is attracted by the electro-magnet  $K$  to the position  $s'$  (shown by the dotted lines) the ratchet wheel  $t$  will be released and the spool device rotated by the descent of the weight  $L$ , whereby the rope  $x$  will be pulled, opening the whistle-valve and causing the whistling to continue until stopped by hand.

The operation of my device to cause a train started from  $A$  to go to  $B$  to signal another train on its way from  $B$  to  $A$  of its approach is as follows: The locomotive of the first-named train will cause the armature  $d'$  of the apparatus  $D'$  to move upon the metal plate  $e'$ , since the electro-magnet  $F'$  is in the circuit of the conducting-wire  $g$  and the rubber  $o$  will have come into contact with the post  $G^2$ , producing contact with the rear inner side of the same of the contact-point  $k$ , thus closing the circuit otherwise open, owing to the normally-separated condition of the insulated part  $k$  from the post, and the current will flow upon the part  $i$ , upon the wire  $g'$ , through the electro-magnet  $F'$ , battery  $b'$ , wires  $g$   $m$ , to the ground-plate 1, thence to the ground plate 8 and back to the starting-point  $k$ . If while the train is running from  $A$  to  $B$  another leaves  $B$  for  $A$ , the rubber  $p$  on the locomotive of the last named train will come into contact with the post  $H$ , causing a current of electricity to enter such locomotive by the following course: From the insulated post  $H$  over the wire  $f$ , through the armature  $d'$ , plate  $e'$ , battery  $a'$  in the course of the wire  $f$ , by way of the wire  $m$  and the ground-plate 1, back through the ground plate 5, railroad-track, wheels of the locomotive over the wire  $r$ , (see Fig. 12,) through the electro-magnet  $K$  to the starting-point  $H$ . At the moment the foregoing course of the current is started the armature  $s$  will be released from the ratchet-

wheel  $t$ , and the weight  $L$  will draw the rope  $x$ , causing the whistle  $W$  to act, thus warning to stop, owing to the danger ahead imminent from the approaching train, and seek a side track. On the arrival at  $B$  of the train from  $A$  the rubber  $o$  on its locomotive will produce contact in the post  $G'$ , whereby the armature  $d'$  will be attracted by the magnet  $F'$  from the metallic plate  $e'$ . The course of this current is as follows: From the post  $G'$  over wires  $m$ , and through the intervening battery  $e'$  to the ground-plate 1, thence to the ground-plate 3 and back to the starting-point. In case a train shall be started first from  $B$  to  $A$ , the contact will occur by the rubber  $o$  on the locomotive with the post  $G$ , whereby the armature  $d$  in the apparatus  $D$  will be moved upon the plate  $e$ , and the locomotive of a train afterward started from  $A$  to  $B$  will produce contact of its rubber  $p$  with the post  $H'$ , causing the current to be led into the signaling apparatus on the locomotive to actuate the whistle of the latter, the course of the current in the last instance being as follows: From the post  $H'$ , over the wire  $f'$  to the armature  $d$  metallic plate  $e$ , battery  $a$ , ground-plate 9; thence to ground-plate 7 by way of the rail, over the locomotive-wheels to the wire  $r$ , Fig. 12, and thence through the electro-magnet  $K$  to the starting-point  $H'$ . On the arrival of the train at station  $B$  it will make contact of its rubber  $o$  with the post  $G^3$ , causing the armature  $d$  in the station  $A$  to move out of contact with the metallic plate  $e$  by the attraction of the electro-magnet  $F$ , the course of the current being from the post  $G^3$  over the wire  $n$  and electro-magnet  $F$ , through the battery  $b$  to the ground-plate 9, to the ground-plate 10, and back to the contact  $k$ , or starting-point in the post  $G^3$ .

With the aid of the foregoing description it will be understood that the normal condition of the contact-posts  $H$  and  $H'$  is in open circuit, owing to the normal position of the armatures  $d$  and  $d'$ , in contact with the non-conducting portions of the blocks  $e$  and  $e'$ , and that it is the purpose of the contact-posts  $G$  and  $G^2$ , by being actuated to close the circuits containing them, to excite the electro-magnets  $E$   $F'$  to attract the armatures upon the conducting-plates  $e$   $e'$ , and thereby close the circuits containing the posts  $H$   $H'$ , thus electrifying the latter and rendering them capable of communicating their condition, by way of a rubber,  $p$ , to the signaling device upon a passing locomotive to be warned of an approaching train, and such approaching train, before reaching a station, brushes with its part  $o$  a contact-point,  $G'$  or  $G^3$ , thereby exciting the electro-magnet  $E'$  or  $F$ , and attracting the armature  $d$  or  $d'$  upon the non-conducting portion of a plate,  $e$  or  $e'$ , and opening the circuit containing a post,  $H$  or  $H'$ , whereby the resultant non-electrified condition of the latter will prevent either from producing any effect upon a rubber,  $p$ , on a passing locomotive, the signal device on

which will thus be unaffected, and thereby indicate a clear track ahead. In short, the normal condition of each circuit is open, and the closing of one containing a post, G, G', G<sup>2</sup>, or G<sup>3</sup>, closes or opens, as required, that containing a post, H or H'. It will thus be seen that the mechanisms on the locomotives is actuated only by the currents from the posts H and H', while those from the posts G, G', G<sup>2</sup>, and G<sup>3</sup> only serve the purpose of moving the armatures *d* and *d'* into and out of contact with the metallic plates *e* and *e'*, the two varieties of posts being located in the immediate vicinities of the respective stations.

Of course each station is provided with two apparatuses, D or D', to serve for the signaling of trains moving toward and from it, the connections of the various devices hereinbefore described being always the same, except as to the ground-plates, which may be omitted by connecting the wires which lead to them direct to the rails, whence the currents will ground.

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

1. A railroad-train signal having electro-magnet devices D and D' in the way-stations connected by conducting-wires from one station to the other, metallic contact-posts G, G', G<sup>2</sup>, and G<sup>3</sup>, adjacent to the track near the stations in circuits connecting the same, and recessed to afford springy sides *i* adjacent to the tracks, and containing in the recesses insulated contact-points *k*, forming the termini of the broken circuits connecting the stations, insulated metallic contact-posts H and H' within circuits connecting two stations, and means, substantially as described, upon the trains for making electrical contact in and with the said posts to produce the desired signals, substantially as set forth.

2. A railroad-train signal having in the way-stations electro-magnet devices D D', comprising electro-magnets provided with vibratory armatures *d d'*, metal plates *e e'*, and batteries, contact-posts G, G', G<sup>2</sup>, and G<sup>3</sup>, adjacent to the track near the stations, and recessed to afford springy sides *i* adjacent to the tracks, and containing in the recesses metallic contact-points *k*, and connected with the devices D and D' by means of conductors *h' m g' n*, leading from the said contact-points, insulated contact-posts H H' farther from the track than the posts G G' G<sup>2</sup> G<sup>3</sup> and higher than the latter, and connected with the armatures *d d'* by

means of conductors *f f'*, and means, substantially as described, upon the trains for making electrical contact in and with the respective posts to produce the desired signals, substantially as set forth.

3. A railroad-train signal having electro-magnetic devices D and D' in the way-stations connected by conducting-wires from one station to the other, contact-posts G, G', G<sup>2</sup>, and G<sup>3</sup>, adjacent to the track, near the stations, in circuits connecting the same, and recessed to afford springy sides *i*, and containing in the recesses insulated contact-points *k*, forming the termini of the broken circuits connecting the stations, insulated contact-posts H H' within circuits connecting two stations, rubbers *o* on the locomotives to produce contact in posts G G' G<sup>2</sup> G<sup>3</sup> in passing the latter and cause the armatures *d d'* to vibrate, and insulated rubbers *p* on the locomotives connected with suitable signaling apparatuses in the same, substantially as described, to rub the posts H H' in passing the latter and actuate the signals in the locomotive, substantially as set forth.

4. A railroad-train signal having in the way-stations electro-magnetic devices D D', comprising electro-magnets provided with vibratory armatures *d d'*, metal plates *e e'*, and batteries, contact-posts G G' G<sup>2</sup> G<sup>3</sup>, adjacent to the track, near the stations, and recessed to afford springy sides *i*, and containing in the recesses insulated contact-points *k*, and connected with the devices D and D' by means of conductors *h' m g' n*, leading from the said contact-points, insulated contact-posts H H' farther from the track than the posts G G' G<sup>2</sup> G<sup>3</sup> and higher than the latter, and connected with the armatures *d d'* by means of conductors *f f'*, rubbers *o* on the locomotives to produce contact in posts G G' G<sup>2</sup> G<sup>3</sup> in passing the latter and cause the armatures *d d'* to vibrate, insulated rubbers *p* on the locomotives to rub the posts H H' in passing the latter, the signaling devices on the locomotives, comprising each an electro-magnet, K, armature *s*, spool-and-ratchet mechanism *t v w*, connected with the signal-producer, and weight L and conductor *r*, connecting the rubber *p* with the signaling device, the whole being constructed and arranged to operate substantially as described.

WILLIAM VOGEL.

In presence of—

MASON BROSS,  
WM. SADLER.