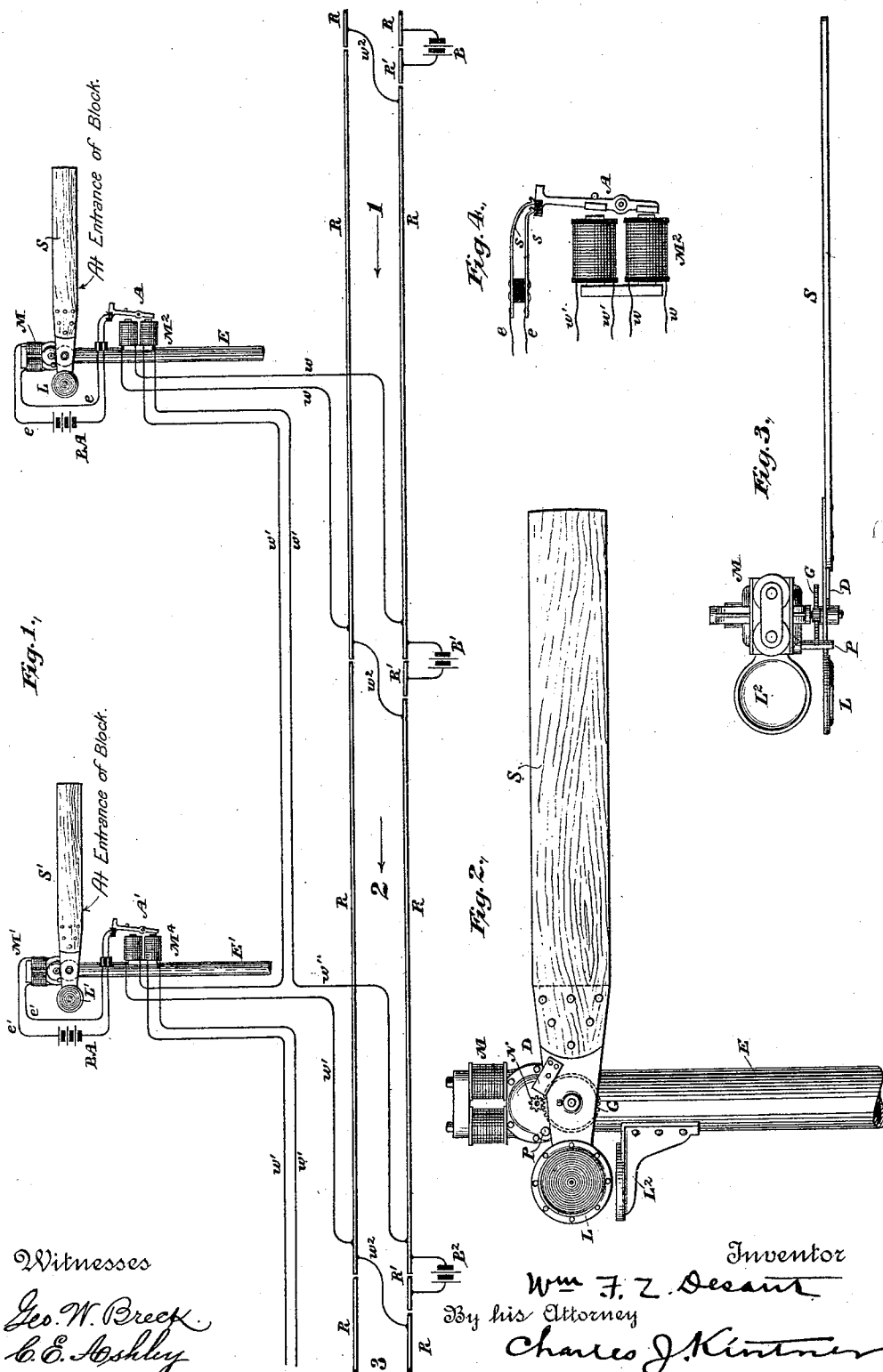


(No Model.)

W. F. Z. DESANT.
ELECTRICAL RAILWAY SIGNALING APPARATUS.

No. 460,524.

Patented Sept. 29, 1891.



Witnesses

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ELECTRICAL RAILWAY SIGNALING APPARATUS.

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To all whom it may concern:

Be it known that I, WILLIAM F. Z. DESANT, a citizen of the United States, residing in New York, county of New York, and State of New York, have made a new and useful invention in Electrical Railway Signaling Apparatus, of which the following is a specification.

My invention is directed to improvements in electrical railway signaling apparatus of that particular type known in the art as "block-signals," in which semaphoric or visual signals are displayed through the agency of electrical devices located in a series of electrically-divided blocks extending along the railway; and it has for its objects, first, the adaptation for use of a semaphoric or visual signal which always indicates "danger" to the engineer at the entrance of each block unless the block in advance is clear, in which event the signal is caused to indicate "safety" as the train enters the block; second, to control visual signals of this type solely through the agency of electrical appliances, and, third, the accomplishment of the several features hereinafter referred to, all of which objects are effected through the agency of the apparatus which I shall now proceed to describe, and which is particularly specified in the claims which follow this description.

Referring to the drawings, in all of which like letters and numerals of reference represent like parts wherever used, Figure 1 is a plan or diagrammatic view showing two adjacent blocks of my improved apparatus as attached to a double-track railway—that is to say, a railway on which traffic is always in the same direction—the apparatus shown in Fig. 1 being duplicated with signaling devices arranged for display through the agency of trains running from right to left. Such an arrangement being obvious, it is not deemed necessary to illustrate the second track here. Fig. 2 is an enlarged view of my improved semaphoric or visual signal with its operative attachments. Fig. 3 is a plan view of the apparatus illustrated in Fig. 2 as seen looking from the top of the drawing to the bottom thereof. Fig. 4 is a detail plan view

of the electro-magnetic switching apparatus for controlling the operation of the signals.

The general arrangement of the circuits through the two-part magnet M^2 (shown in Fig. 4) is not materially unlike that disclosed in a prior patent, No. 398,613, granted to Horace F. Hayden and myself on the 26th day of February, 1889; and the present invention is directed, mainly, to the adaptation of the block system of circuits therein disclosed in connection with cab-signals as applicable to visual signals at the end of each block, the cab-signal not being herein shown nor constituting any part of this invention.

In adapting the general system of block-circuits disclosed in patent to Hayden and Desant, above referred to, for use with semaphoric signals I have so arranged the semaphores that under normal conditions, when there are no trains upon the track, the semaphoric arms are in a horizontal or extended position, and the circuits and circuit-controlling arrangements are such that when a train enters a given block the semaphore at the entrance of that block, if there is no preceding train upon it, will immediately be raised to a vertical position, indicating "safety;" but should there be a preceding train in the block or a break between the rails or in the electrical circuit at any point the semaphore will then remain at its lowermost position, thus indicating to the engineer that he must not advance.

E E' are signal or semaphoric posts, the former located near the entrance of the first block 1 and the other near the entrance of block 2, the presumption being that the trains are passing from right to left in the direction of the arrows as they enter blocks 1 2 3, &c., in succession.

M^2 M^4 are switch-magnets secured near the top of the semaphoric posts and provided with double or tilting armature-levers A and A' , as shown.

w w are conductors, which pass from the distant ends of the opposite rails of the track through the upper portion of the two-part switch-magnet M^2 , and $w' w'$ are similar wires running from similar points at the distant end of block 2 through the upper portion of

magnet M^1 in block 2 and the lower portion of magnet M^2 in block 1. The successive sets of blocks are all joined in this manner, so that they are electrically connected together in pairs.

w^2 w^2 are conductors joining the opposite diagonal rails of each pair of blocks, and the batteries B B' B^2 are connected on one side to the ends of the parallel, main, or block rails and on the other side to the short sections of rails R' , all of said rails being well insulated and having insulated joints at their ends.

On the tops of the signal-posts E and E' are located pivoted semaphores S S' , each semaphore being provided with a gear-wheel G , which meshes with a pinion N on the armature-shaft of any well-known form of electric motor, said electric motor being in a normally-open electric circuit e e , having a battery B A , the circuit being held open by an insulating-block under the springs s s . (See Fig. 4.)

On the end of the semaphore-arm, near its pivotal point, is a mechanical stop D , adapted to come into contact with a fixed pin P when the semaphore is raised to its vertical position of "safety."

L is a balance-weight and lens, the latter of colored glass, adapted to lie in front of a lamp situated on a lamp-stand L^2 , as in well-known forms of illuminated semaphores.

The operation is as follows: As long as there are no trains on the track all of the semaphores S S' , &c., remain in their lowermost positions, indicating "danger." When a train enters block 1, proceeding from right to left in the direction of the arrows, as soon as the first truck passes over the insulated joints between the rails R R and the short section R' the circuit of battery B is closed, as follows: through the short section R' , the axle of the front pair of truck-wheels to rail R and to the distant end of block 1, to wire w , thence through the upper half of magnet M^2 and by the return-wire w to the other rail R , back to the entrance of the block, thence by wire w^2 to the rear set of truck-wheels and axle, and finally through them to the other pole of the battery. If there is no train preceding the incoming train in block 1, the armature A of magnet M^2 will be tilted forward, the insulating-block removed from under the springs s s , and the metallic portion of the armature-lever brought into electrical contact with said springs, thereby closing the local circuit of the battery B A through the motor M and causing it to lift the semaphore S . The semaphore S is therefore raised to its uppermost position through the agency of the motor M , energized by the local battery B A , and it remains in this vertical position during the entire time that this train is passing over block 1, so that should a succeeding train come to the entrance of block 1 during the time that the aforesaid train is passing over it the engineer of this succeeding train will perceive that the semaphore is in a vertical position and that therefore a train is within

the block and that he must not enter. As soon as the front truck-wheels of the preceding train pass out of block 1 the circuit from battery B' is made through the axles and wheels, as before, to the rails R of block 2 and through the wires w' through the upper half of the magnet M^1 and the lower half of the magnet M^2 , thereby causing the armature-levers A' and A to tilt, the former to the left and the latter to the right, thus causing the motor M' , energized by the battery B A , to elevate the semaphore S' of block 2 and at the same time breaking the circuit of battery B A through the motor M , thereby releasing the semaphore S and allowing it to return to its normal position, so that the engineer of the train now standing at the entrance of block 1 may proceed, while the train upon block 2, having set semaphore S' to its vertical position, will again restore said semaphore to its horizontal position when it passes out of said block in the same manner that the semaphore S was restored to its horizontal position when passing out of block 1. When the signal S reaches its extreme upward limit, the stop D comes in contact with a pin P , which prevents further rotation of the gear-wheel G . The same stop will also act as a limitation to the downward motion of the semaphore.

I am aware that semaphores have heretofore been actuated by electric motors, and I make no claim to such a construction as broadly includes the combination of an electric motor and a semaphore or visual signal.

I do not limit myself to the specific construction of parts and arrangement of circuits herein enumerated, as the apparatus may be very materially modified and still come within the scope of my claims herein-after made.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a system of electrical block-signals, sets of insulated rails connected together in diagonal pairs, one set being in one block and the other set in an adjacent block, in combination with a visual signal for each block and a two-part magnet adapted to control each signal, one portion of said two-part magnet being connected to the ends of the rails of one block and the other to the ends of the rails of the next succeeding block in advance, substantially as described.

2. In a system of block-signals, two lines of insulated rails located one in each of two adjacent blocks and electrically connected together at the junction of the two blocks by a diagonal conductor, as w^2 , in combination with parallel insulated rails and electrically-controlled semaphores, each semaphore having a two-part electro-magnet connected electrically with adjacent blocks, and a local circuit and a motor for controlling the action of the semaphore, substantially as described.

3. A block system consisting of electrically-insulated rails connected together in diagonal

pairs, so as to constitute a block, a battery connected to said rails and through additional conductors to switch-magnets located at the opposite ends of the block, a semaphore at
5 each end of the block, having each local-circuit connections through a local electrical generator, and an electric motor geared to the semaphore, substantially as described.

10 4. A semaphore consisting of a balanced pivoted arm carrying a gear-wheel geared to the armature of an electric motor, having local-circuit connections through a local generator

of electricity, and a switch-magnet located in a main-line circuit, consisting of a conductor joining the adjacent ends of a pair of insulated rails, the other end of one of said rails being connected to a parallel rail in an adjacent block, whereby the operations of said switch-magnet may be controlled by passing trains, substantially as described.

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Witnesses:

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