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S. M. YOUNG & F. TOWNSEND.

ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED OCT. 18, 1904.

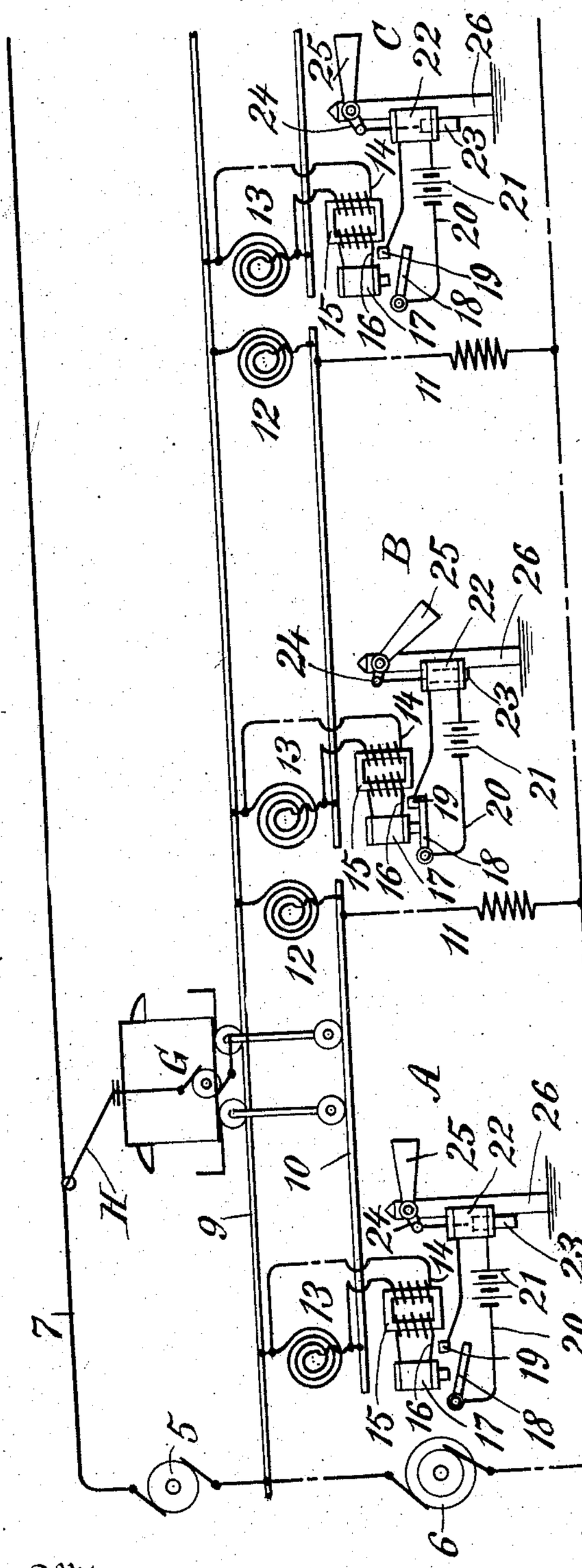

FIG. 1.

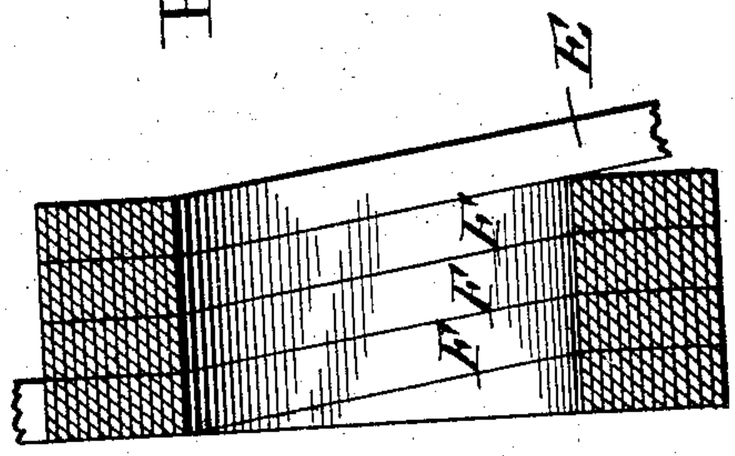

FIG. 3.

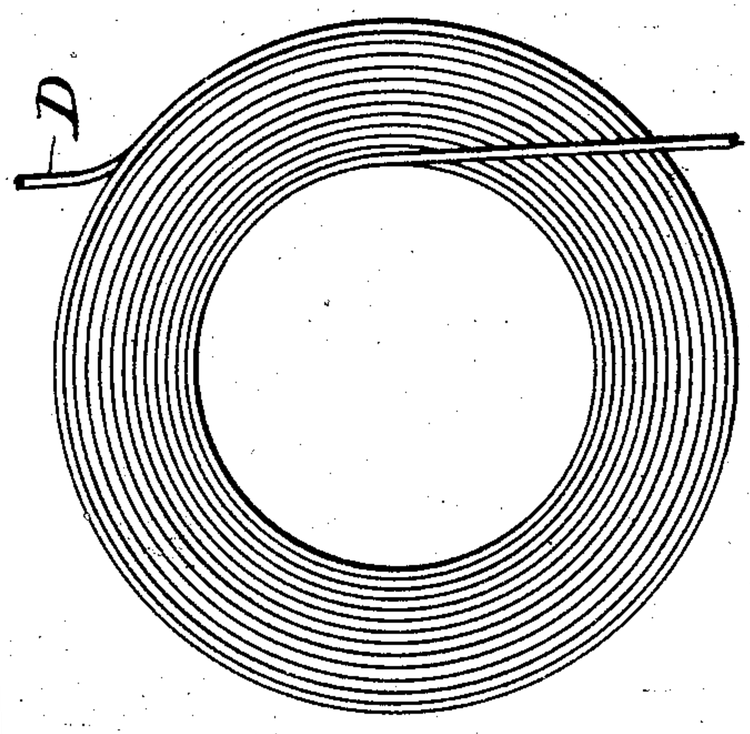

FIG. 2.

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UNITED STATES PATENT OFFICE.

SAMUEL MARSH YOUNG AND FITZHUGH TOWNSEND, OF NEW YORK, N. Y.

ELECTRIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 790,095, dated May 16, 1905.

Application filed October 18, 1904. Serial No. 228,955.

To all whom it may concern:

Be it known that we, SAMUEL MARSH YOUNG and FITZHUGH TOWNSEND, citizens of the United States, residing at New York city, county and State of New York, have invented certain new and useful Improvements in Electric Signaling Systems, of which the following is a specification.

Considered broadly, our invention contemplates, first, a source of power-current; second, a source of signaling-current; third, a trackway divided into block-sections; fourth, means for rendering the block-sections electrically continuous for the power-current and electrically separated for the signaling-current, and, fifth, means for visually indicating the absence or presence of a motor-vehicle on a block.

Considered specifically, our invention contemplates the employment of induction-bonds made without iron as the means for rendering the block-sections electrically continuous for the power-current and electrically separated for the signaling-current, and, further, the disposition of such bonds in and between the different sections of the trackway.

The objects of our invention are to provide a system of signaling which will automatically indicate the presence or absence of a motor-vehicle on a block; to provide means whereby both of the traffic-rails serve as return-conductors for the power-current; to provide bonds between the block-sections which are cheap in cost of construction, occupy little space, and effectually prevent the passage over them of the signaling-current, but freely permit the passage of the power-current.

The accompanying drawings will serve to illustrate our invention, and in which—

Figure 1 is a diagram illustrative of our improved signaling system as a whole. Fig. 2 is a plan view of a bond such as we may employ, and Fig. 3 is a transverse section through such bond.

In the drawings, 5 indicates a direct-current generator for the power-current; 6, an alternating-current generator for the signaling-current; 7, conductor leading from generator 5 and which may serve as the working or contact conductor; 8, conductor leading from generator 6; 9 10, traffic-rails. The rail 9 is continuous and is connected to the generators 5 6. The rail 10 is divided into separate block-sections A B C and is connected to the generator 6 through the branch conductor 11 and conductor 8.

Interposed between the rail 9 and the sections of rail 10 and at the opposite ends of the blocks-sections are inductive bonds 12 13. These bonds may be constructed from a round insulated wire D, Fig. 2, or flat insulated wire E, Fig. 3. In forming the bond the wire is first wound concentrically to form a layer F of any definite number of turns and then to form a second, a third, and a fourth layer, or as many layers superposed as may be required. For instance, we have found a bond formed of twelve turns (four layers)—*i. e.*, fifty-two turns of 00 insulated copper wire—to be such a bond suitable for use. Such a bond will freely conduct the power-current, will not be saturated by the power-current owing to the absence of iron, but will when traversed by an alternating current set up an opposing electromotive force (reactance) sufficient to reduce the voltage of the current transmitted to the rail 9 a certain amount below that transmitted from the generator 6 to the sections of rail 10, thereby effecting a difference of potential between the sections of rail 10 and the rail 9 and sufficient under normal conditions to energize apparatus controlling a local circuit to carry the signaling apparatus of a block to the position to indicate a clear signal, as will be more fully described. We wish it understood that we do not limit ourselves to the particular winding or shape shown and described for the bond, as such bond may be differently wound or shaped without affecting the general electrical principle involved.

The bond 12 is connected across the rails at the right-hand end of each block-section and the bond 13 across the rails at the left-hand end of each block-section (each block-section thereby forming a closed circuit) and also in the present drawings across the primary terminals 14 of a transformer 15, which transformer has its secondary terminals 16 connected to the terminals of a magnet 17, be-

low which is a pivoted armature 18, adapted to coact when attracted by the magnet 17 with a contact-stop 19. The armature 18 and contact-stop 19 are connected to the terminals of a local circuit 20, which includes a battery 21 and solenoid 22. In the solenoid is a core 23, connected to the short arm 24 of a semaphore-signal 25, pivoted on post 26.

G indicates a motor-vehicle, and H trolley-contact.

In a former application, made by Fitzhugh Townsend, Serial No. 212,298, filed June 12, 1904, there is shown and described as connected across the terminals of the bond 13—*i. e.*, across the rails 9 10—the movable member of a selective relay, which movable member is provided with a device for closing a local circuit similar to that indicated at 20. We therefore wish it understood that the mechanism described for controlling the semaphore-signal is merely illustrative and that in place of such mechanism we may use any suitable electrically-controlled mechanism which will do the work.

The operation of our improved system is as follows: A current from the alternating generator 6 creates a difference of potential, which preferably is of few volts, between the rails 9 10 of the closed-circuit block-sections A B C. This difference of potential in the present case excites the transformers 15 and through them the magnets 17, which magnets attract their armatures 18, thereby closing the local circuits and moving the semaphore signaling-arms to the position which indicates that the trackway is clear—*i. e.*, to the position shown in block-section B. When a motor-vehicle moves into a section, the wheels of the vehicle bridge the rails 9 10 of that section, and thereby shunt the difference of potential created between the rails around the transformer 15 of the section. The magnet 17 thus being deënergized drops its armature, whereupon the local circuit is broken and the semaphore-arms, influenced by the weight of the core, move to the danger position, as shown in block-sections A and C. The above description relates to the operation of the signaling-current. So far as regards the power-current this current proceeds from generator 5, along conductor 7, is collected by the trolley-contact H of the motor-vehicle G, thence by the axles and wheels of the vehicle to the rails 9 10. The rail 9 being continuous, the current flows immediately back to the generator 5. The rail 10 being divided into sections, the current traverses the following path, assuming the vehicle G to be on section C: rail 10, bond 13, rail 9, bond 12, rail 10, bond 13, rail 9, bond 12, rail 10, bond 13, rail 9 to generator 5. It will be observed from the above description of the path for the power-current that the rail 9 may be broken at any point except between the generator 5 and the bond 13 and between the bonds 12 and 13 or the rail 10 at any point between the bonds 12 and 13 of a section without destroying a return-path for the power-current to the generator. The rails 9 and 10, therefore, may be considered as forming a collective return-path and limitedly separate return-paths to the generator.

Having thus described our invention, we claim—

1. An automatic signaling system for railways, comprising a source of power-current, a source of signaling-current, a trackway divided into sections, reactance-bonds formed of a coiled copper body introduced between the track-sections, and means for indicating the absence or presence of a motor-vehicle on a block.

2. An automatic signaling system for railways, comprising a source of power-current, a source of signaling-current, a trackway divided into block-sections, one of the rails of the trackway continuous and common to all of the sections, and the other rail made up of a series of independent rails each having the length of a block, reactance-bonds formed of a coiled copper body introduced between said block-sections, and means for indicating the absence or presence of a motor-vehicle on a block.

3. An automatic signaling system for railways, comprising a source of power-current, a source of signaling-current, a trackway divided into block-sections, one of the rails of the trackway continuous and common to all of the sections, and the other rail made up of a series of independent rails each having the length of a block, and ironless bonds introduced between the opposite ends of the independent rails of each section and the continuous rail.

4. An automatic signaling system for railways, comprising a source of power-current, a source of signaling-current, a trackway divided into block-sections, one of the rails of the trackway continuous and common to all of the sections and connected to both sources of current, and the other rail made up of a series of independent rails each having the length of the block and connected to both sources of current, reactance-bonds formed of a coiled copper body introduced between said independent rails and the continuous rail, and means for indicating the absence or presence of a motor-vehicle on a block.

5. As a means for rendering independent block-sections of a trackway, electrically continuous for a power-current, and electrically separated for a signaling-current, and where the trackway is formed of a continuous rail common to all the block-sections, and a series of independent rails each having the length of a block-section, a series of reactance-bonds formed of a coiled copper body connected across the continuous rail of the trackway and the independent rails of each block-section.

6. In an automatic signaling system for railways, the combination with the rails of the railway, where such rails are divided into a continuous rail, and a series of independent rails of definite length, a series of reactance-bonds formed of a coiled copper body interposed between the opposite ends of the independent rails and the continuous rail, and each bond formed of a number of turns of insulated copper wire.

7. In an automatic signaling system for railways, the combination with the rails of the railway, where such rails are divided into a continuo rail, and a series of independent rails of definite length, a series of ironless bonds interposed between the opposite ends of the independent rails and the continuous rail, and each bond formed of an insulated copper wire disposed in concentric turns to form a series of superposed layers.

In testimony whereof we affix our signatures in the presence of two witnesses.

SAMUEL MARSH YOUNG.
FITZHUGH TOWNSEND.

Witnesses:
J. E. PEARSON,
FRANK O'CONNOR.