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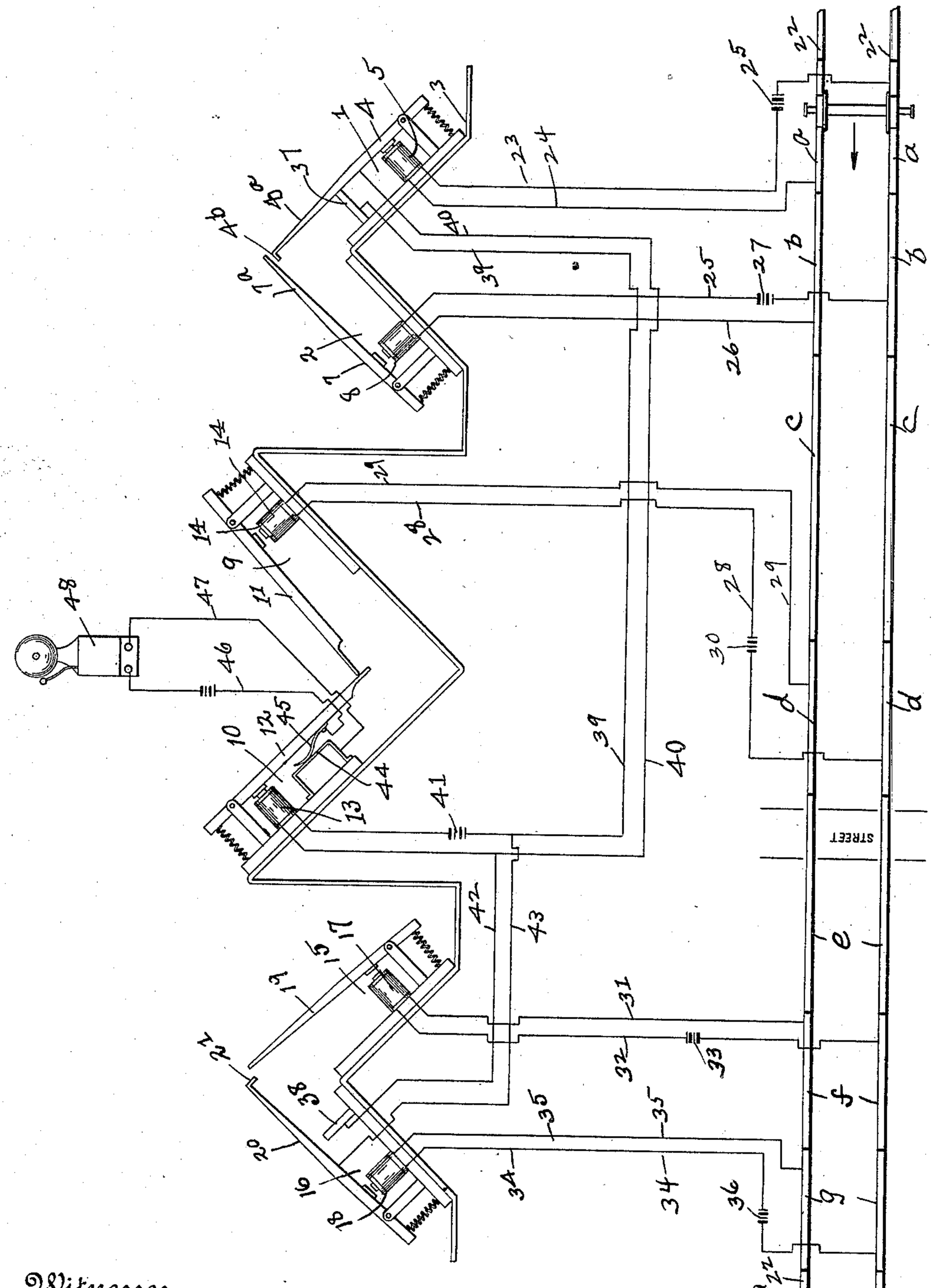
N. RATCHFORD.

RAILWAY CROSSING SIGNAL.

(Application filed June 26, 1899.)

(No Model.)



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NICHOLAS RATCHFORD, OF GREENVILLE, OHIO.

RAILWAY-CROSSING SIGNAL.

SPECIFICATION forming part of Letters Patent No. 662,498, dated November 27, 1900.

Application filed June 26, 1899. Serial No. 721,869. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS RATCHFORD, a citizen of the United States, residing at Greenville, in the county of Darke and State of Ohio, have invented a certain new and useful Improvement in Railway-Crossing Signals, of which the following is a specification.

My invention relates to the improvement of mechanism for ringing alarm-bells at railway-crossings; and the objects of my invention are to provide an improved mechanism of this class of superior construction and arrangement of parts, to so construct and arrange the same as to insure the ringing of a bell as the train approaches a crossing from either direction and to cause the ringing of the bell to be discontinued when the train reaches or has passed the crossing, to so construct my improved apparatus as to insure a positive operation of the same, and to produce other improvements the details of which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawing, in which a partial elevation and partial diagram of my improved apparatus is shown.

Similar numerals and letters refer to similar parts.

1 and 2 represent electrical instruments, the bases of which are preferably arranged in the manner indicated in the drawing—that is, at right angles with each other, being thus suitably supported within a casing or upon a desirable form of framework 3. Of the instrument 1, 4 represents a spring-actuated armature-bar, which is normally out of contact with the magnet 5. Of the instrument 2, 7 represents a spring-actuated armature-bar, and 8 a magnet-coil. In constructing said armature-bars 4 and 7 I form the same with extensions 4^a and 7^a, which converge in the manner indicated, said extension 4^a having an inturned end portion 4^b, which although adjacent to is normally out of engagement and out of the path of the end of the armature-bar extension 7^a.

9 and 10 represent electrical instruments, which are also supported at right angles one with the other, the armature-bars 11 and 12 thereof being provided with extensions, which although normally out of engagement with each other are so arranged as to admit of the extension of the armature-bar 11 engaging or contacting with the outer side of the armature-bar 12 and retaining the latter in contact with its magnet 13 when the armature-bar 11 is out of contact with its magnet 14. At a point preferably on the opposite side of the street-crossing from the instruments heretofore described I provide a set of instruments 15 and 16, which correspond in arrangement and construction with the instruments 1 and 2, being provided with magnets 17 and 18 and armature-bars 19 and 20, the extension of said armature-bar 19 being adapted to engage the hook or bent end 21 of the bar 20.

22 represents the parallel rails of a railway-trackway, which are insulated at intervals to form on one side of the crossing oppositely-located rail-sections *a*, *b*, *c*, and *d*, and are so insulated as to form on the opposite side of said crossing insulated rail-sections *e*, *f*, and *g*.

23 and 24 respectively represent wires which lead from the magnet 5 of the instrument 1 to the rail-sections *a* through a battery 25. Through wires 25 and 26 the rail-sections *b* are connected through a battery 27 with the magnet 8.

28 and 29 represent wires which through a battery 30 connect the rail-sections *d* with the magnet 14 of the instrument 9.

31 and 32 represent wires which through a battery 33 connect the rail-sections *f* with the magnet 17 of the instrument 15.

The rail-sections *g* are through the medium of wires 34 and 35 and a battery 36 connected with the magnet 18 of the instrument 16.

The instrument 1 is provided with a contact bar or post 37, with which the armature-bar 4 is adapted to contact when said bar is in contact with the magnet 5. The instrument 16 is provided with a similar contact-post 38, with which the armature-bar 20 is adapted to contact when the latter is in contact with the magnet 18.

39 and 40 represent wires which respectively connect the contact-post 37 and armature-bar 4 with the magnet 13 of the instrument 10, this contact being made through a battery 41. The contact-post 38 and armature-bar 20 I connect with the wires 39 and 40 through wires 42 and 43.

In constructing the instrument 10 I provide

the post thereof with an upwardly-projecting contact frame or standard 44 and provide the under side of the armature-bar 12 with a depending spring-strip 45, which when said armature-bar is drawn downward is adapted to contact with said contact-frame.

46 and 47 represent wires which respectively connect the spring-strip 45 and contact frame or standard 44 with the binding-posts of an alarm-bell 48.

In order to illustrate the operation of my improved crossing-signal, we will suppose that a train is approaching the track-section *a* in the direction of the arrow and that the armature-bars are raised out of contact with the magnets of the various instruments and the armature-bars of each set are out of engagement or contact with each other. The forward axle of the train having reached the position indicated in the drawing—that is, having run upon the track-section *a*—it will be seen that a circuit will be established through the wires 23 and 24 and magnet 5 which will draw the armature-bar 4 down to the position indicated in the drawing, in which position it will contact with said magnet and with the contact-post 37. It will also be seen that the drawing down of the armature-bar 4 will have caused its distended end portion 4^b to project within the path of the extension 7^a of the armature-bar 7. The inward movement of the armature-bar 4, as will readily be seen, must also establish a circuit through the wires 39 and 40, battery 41, and magnet 13, which in turn must draw the armature-bar 12 into contact with the frame 44. This contact of the spring 45 and frame 44 and the connection of the latter through the bell 48 results in a ringing of said bell so long as the contact is maintained. It will be observed that in the above-described operation the extension of the armature-bar 12 will depress and then slip by the end of the armature-bar 11, causing the latter to engage the upper or outer side of said bar 12 and retain its spring 45 in contact with the frame 44, thereby maintaining the bell-ringing action after the car-axles have left the rail-section *a* and the armature-bar 4 has assumed its normal position. In passing over the section *b* it is evident that a circuit will be established through the wires 26 and 25 and magnet 8, but that until the last car has left the sections *a* the armature-bar 7 will not be drawn downward, owing to its contact with the depressed end of the armature 4. We will assume now that the train has reached the rail-sections *d* which are adjacent to the street-crossing and at which point it is desired to stop the ringing of the bell. This track-section *d* being reached, it will be seen that a circuit will be established through the medium of the wires 28 and 29 and magnet 14 which will operate to draw the armature-bar 11 down until it is disengaged from the armature-bar 12, this disengagement resulting in said bar 12 being released and allowed to spring upward and in a consequent breaking of the circuit through the bell. When the front axles of the train are upon the sections *f*, it is obvious that the armature-bar 19 will be drawn downward into contact with the magnet 17 and that the end of said armature-bar will thus be in position to stop the downward movement of the bar 20 when the cars are running over the section *g*, thus preventing any ringing of the bell which might be produced through the closing of a circuit between the wires 42 and 43. Assuming that the train is approaching the crossing in the opposite direction from that indicated in the drawing, it is evident that when the front axle reaches and connects the sections *g* a current will be established through the wires 34 and 35 and magnet 18, causing the armature-bar 20 to drop into contact with said magnet and with the post 38. In this manner the hook end of the armature 20 is brought into the path of the outer end of the armature-bar 19, and the latter is thus prevented from descending its full limit when the axles of the front cars are upon the section *f*. Owing to the wires 42 and 43 and their connections through the wires 39 and 40 with the magnet 13, it is obvious that the armature-bar 12 will be dropped to the position shown in the drawing and locked in the manner heretofore described when the front axles are upon said section *g*. In this manner a ringing of the bell 48 is attained until the forward car-axles are upon the sections *d*, when in the manner heretofore described the armature-bar 11 will be forced downward and the bar 12 released, thus stopping the ringing of the alarm. When the forward car-axles reach the sections *b*, it is obvious that the armature-bar 7 will be pulled downward to a position which will result in the armature-bar 4 engaging the same when said axles are upon the sections *a*, the ringing of the bell being thereby prevented when the cars are upon the last-named sections.

From the construction shown and described it will readily be seen that simple, reliable, and effective means are provided for ringing the bell as the train approaches the street-crossing from either direction and for preventing the ringing of said bell after the train has reached or passed the crossing.

Although the instruments 1 and 2 and 19 and 20 are shown set at right angles with each other, it is obvious that the same might be set horizontal or in any other desirable position in which the armature-bar extensions might engage in the manner described. It will be observed that by employing the spring-contact strip 45 in connection with the armature-bar 12 a positive contact is maintained with the frame or standard 44, thus obviating any tendency toward a failure of the parts to remain in contact during the depression of said armature-bar.

It will readily be seen that the instruments

herein described may be suitably boxed or incased and located with reference to the track-sections.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In a crossing-signal, the combination with a trackway having insulated rail-sections on opposite sides of a street-crossing, of an electric alarm-bell, pairs of electrical instruments 1 2 and 15 16, the instruments of each pair having extended armature-bars and so situated with relation to each other that the depression of one armature-bar of each pair prevents the depression of the other bar of that pair through engagement of their end portions, a pair of electrical instruments 9 and 10, the armature-bar of said instrument 9 adapted to contact with and retain the armature-bar of the instrument 10 in a closed position, wires connecting the magnets of the instruments 1, 2 15 and 16 with separate insulated track-rail sections, wires 39 and 40 connecting the armature-bar 4 and a contact-post of the instrument 1 with the magnet of the instrument 10, wires 28 and 29 connecting one of said track-sections adjacent to the street-crossing with the magnet 14 and wires 42, 43 connecting the armature-bar 20 and a contact-post of the instrument 16 with the wires 39 and 40 an electrical alarm-bell comprising a bell, an electrically-operated tapper and binding posts and wires 46 and 47 connecting the armature-bar of the instrument 10 and a contact-frame of said instrument through the alarm-bell, substantially as specified.

NICHOLAS RATCHFORD.

In presence of—
C. C. SHEPHERD,
A. L. PHELPS.