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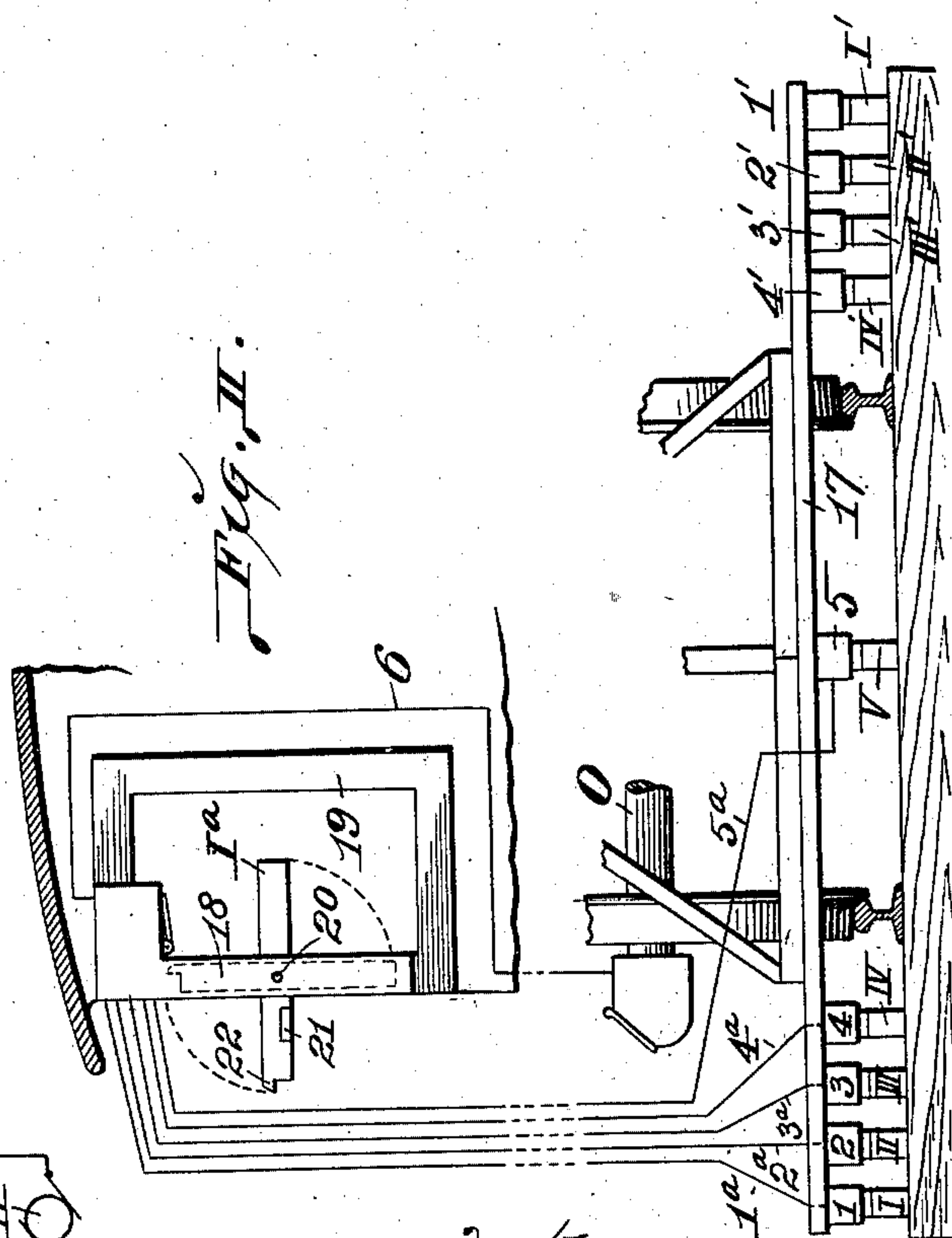
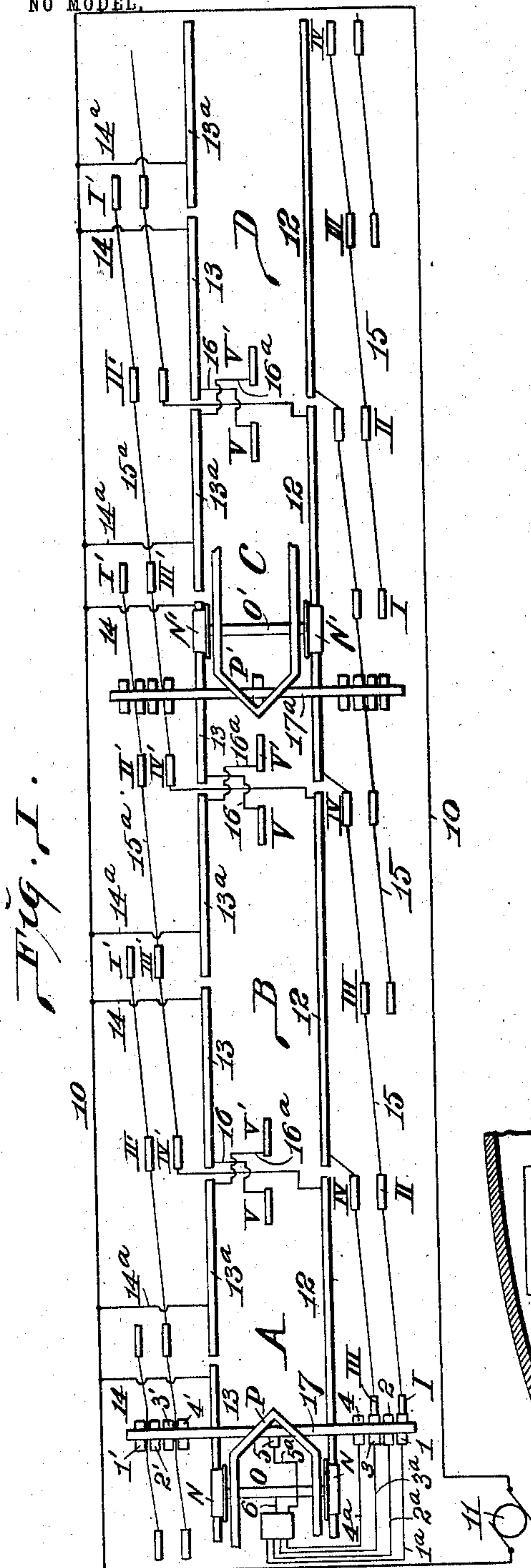
J. N. BASKETT.

ELECTRIC SIGNALING SYSTEM FOR RAILROADS.

APPLICATION FILED JULY 19, 1902.

NO MODEL.

2 SHEETS--SHEET 1.



attest:—
M. P. Smith.
E. J. Knight

Inventor: James N. Baskett -
By Wm H. Burt atty's

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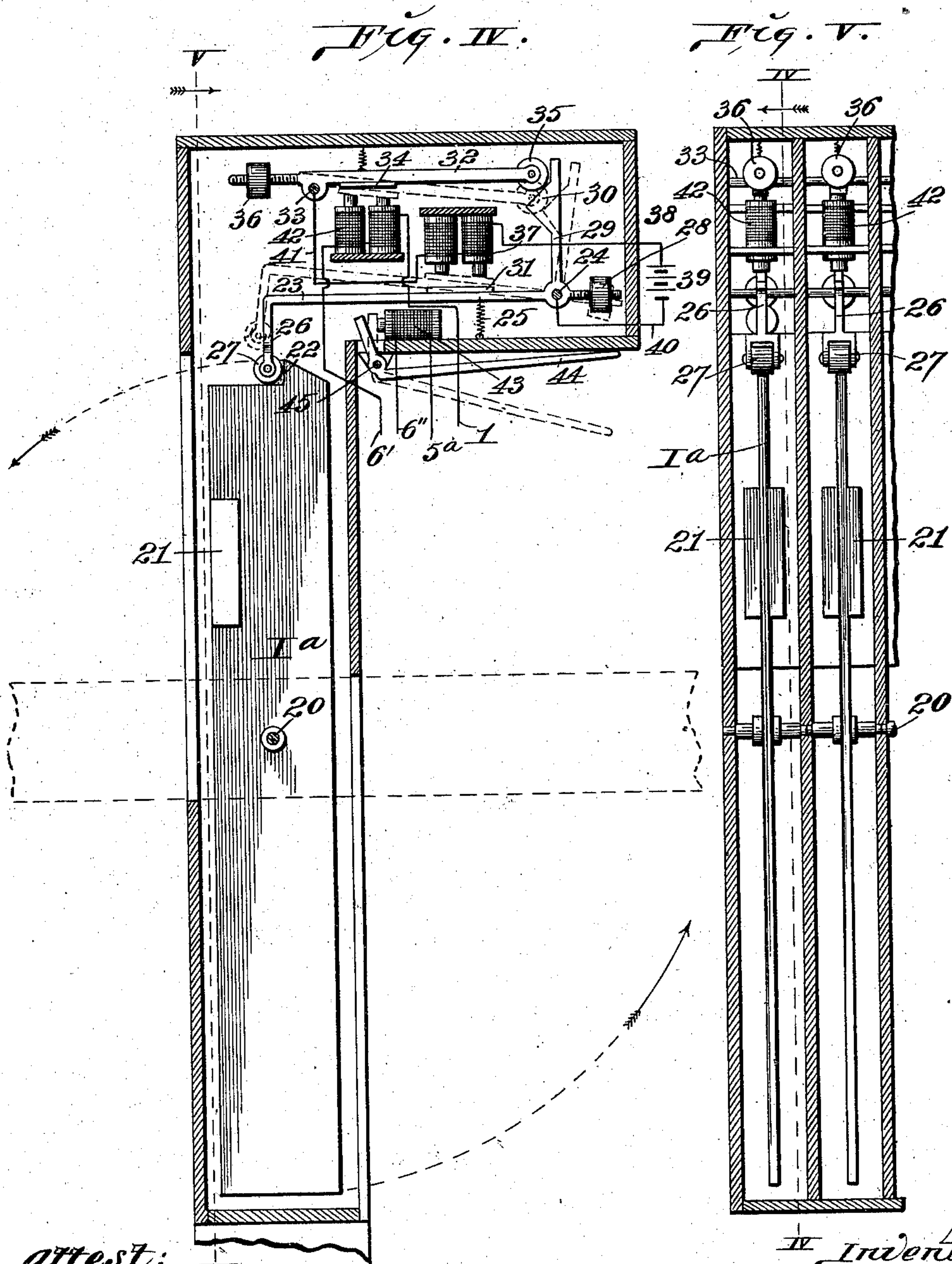
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E. J. Knight

IV Inventor:
James N. Baskett:—
By Wright, Port
attys

UNITED STATES PATENT OFFICE.

JAMES N. BASKETT, OF MEXICO, MISSOURI.

ELECTRIC SIGNALING SYSTEM FOR RAILROADS.

SPECIFICATION forming part of Letters Patent No. 741,952, dated October 20, 1903.

Application filed July 19, 1902. Serial No. 116,142. (No model.)

To all whom it may concern:

Be it known that I, JAMES N. BASKETT, a citizen of the United States, residing at Mexico, in the county of Audrain and State of Missouri, have invented certain new and useful Improvements in Electric Signaling Systems for Railroads, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a signal system for use on railroads for the purpose of preventing collisions or other accidents. It is of that class by means of which electrically-operated signals are actuated in or on the cab of a locomotive to furnish information to the engineer when the next block of railway-track on which his train is traveling is occupied and also as to whether the succeeding block beyond is occupied. The signals are effected through the medium of electrical currents, which are shunted from a main-circuit conductor through branch conductors and contacts that provide for the conveyance of the electrical current to the signal apparatus on the locomotive.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a plan and diagrammatical view illustrating my system. Fig. II is a view in elevation, showing a railroad-track with the contacts thereon, parts of the locomotive, the brush-carrying bar and brushes, and the wires leading to the signal apparatus on the locomotive from said brushes. Fig. III is a view, partly in section and partly in elevation, of one of the conductors and one of the brushes adapted to pass over said contact. Fig. IV is a view of the signal-box, partly in elevation and partly in section, taken on line IV IV, Fig. V. Fig. V is a view of the signal-box apparatus, the box being shown in section, taken on line V V, Fig. IV.

10 (see Fig. I) designates a circuit-conductor of high resistance, made, preferably, of small wire and over which an electric current of suitable intensity and volume is adapted to constantly flow, the current being supplied from a suitable generator 11, which may be

in the form of a dynamo or battery. The length of this circuit-conductor may be the entire length of the railroad equipped with my system or such other considerable length, as from one division to another; but it must necessarily be of sufficient length to include a number of the blocks into which the railroad-track is divided, as hereinafter set forth.

In carrying out my system the railroad-track is divided into a consecutive series of blocks, of which the rails of one side of the track are bonded together in long sections (see Fig. I) in such manner as to furnish thereover a good and ample conductor for an average electric current the entire length of a block, such as A, B, C, and D. The other line of track-rails are bonded together into sections 13 and 13^a, preferably of shorter lengths than the first-named sections 12, so that two or more of said shorter sections will be in a block. In the drawings two sections 13 and 13^a are shown and are all that are necessary in practice. All of the block-sections 12, 13, and 13^a of bonded rails should be insulated from each other, the longer sections being insulated at the ends of the blocks from the corresponding sections 12 of the next adjacent blocks and the shorter sections being insulated from each other in the blocks and also from the corresponding sections 13 and 13^a at the ends of adjacent blocks.

Each of the track block-sections 13 is connected to the circuit-conductor 10 by a large branch conductor 14, and each section 13^a is similarly connected to the conductor 10 by a large branch conductor 14^a. The branch conductors may meet said section and be connected to it at any point throughout their length, but are preferably applied to them at or near their extremities which are innermost in the blocks A B, &c.

Beside or near the railroad track-rails are two sets of contact-pieces, hereinafter called "contacts" and designated in one set by I, II, III, and IV and in the other set by I', II', III', and IV', a set of each of said contacts being provided in each block A B, &c. The exact location of these contacts with relation to their lateral distance or direction from the track-rails is not essential, as is also their

shape, size, or material; but their subsequence with reference to each other and their location with reference to the lengths of the sections in the blocks of railroad-track is essential. The contacts I and III are located at or near the middle of the long block-sections 12 and those II and IV are located at or near the ends of said long sections. On the opposite side of the railroad-track from that occupied by the contacts just described are the contacts I', II', III', and IV', that are located consecutively in the same manner as the contacts I, II, &c., but which extend in series in a direction the reverse of the first named. The contacts I, II, III, and IV are connected in a series in each set by conductors 15, of liberal size, which lead from the contacts IV and are joined to the long rail-sections 12 at or near their ends, and the contacts I', II', III', and IV' are connected in series in a similar manner by conductors 15^a, that lead across the track to the long rail-sections 12. The exact location of the conductors 15 and 15^a between the contacts to which they are connected is immaterial, and they may extend on the railroad-ties, on poles, or underneath the ground; but they must of necessity each be connected to the long rail-sections, as stated. For clearness of perception only the conductors are shown alongside of the track-rails. For the sake of economy they may be joined in series in the manner shown.

V and V' designate contacts located between the rails of the railroad-track at or near the termination of each block A B, &c. These contacts are joined to the adjacent ends of the short rail-sections 13 and 13^a at the ends of the blocks A B, &c., by conductors 16 and 16^a. For the purpose of illustrating the operation of my system I have shown parts of locomotives occupying different blocks of the railroad-track, (see Figs. I and II,) only sufficient of the locomotives being shown to illustrate the apparatus that applies to or is a part of my system. Of these locomotives N and N' designate the forward wheels, O and O' their axles, and P and P' their pilots. 17 and 17^a are cross-bars which may be carried by the pilots, as shown, or by any other part of a train of cars, which in turn carry brushes or instruments that are adapted to touch the contacts I, II, &c., in the instance of the locomotive traveling in one direction and to touch the contacts I', II', &c., in the instance of the locomotive traveling in the opposite direction. The location of the brushes on the left of such locomotive is also of service in the backing of the locomotive, and this being obvious need not be further considered.

1, 2, 3, and 4 designate the brushes carried by the cross-bar 17 and adapted to touch the contacts I to IV, inclusive.

5 is a brush carried by the cross-bar and adapted to touch the contacts V and V'. On

each locomotive is located a suitable signal-box containing apparatus capable of appreciating and exhibiting the passage of an electric current therethrough to actuate signal-bars or semaphores that are moved on the entrance of the current into the signal-box across the line of vision of the engineer in the locomotive-cab. This signal apparatus is shown in detail in Figs. II, IV, and V and will be hereinafter more particularly described. Leading from the brushes 1, 2, 3, 4, and 5, that are adapted to touch, respectively, the contacts I, II, III, IV, and V, are conductors 1^a, 2^a, 3^a, 4^a, and 5^a, which extend to separate corresponding instruments in the signal-box to control the corresponding signal-bars or semaphores. From each of said instruments extend branch conductors that are connected to a common conductor 6, (see Fig. I,) through which electrical contact with the locomotive running-gear is secured to pass thence via the wheels of the locomotive to the track-rails and therefrom to the circuit-conductor, completing the shunt-circuit.

Having now described the various parts of my system, its working will be set forth. Consider the locomotive having the wheels N to be moving toward the right in block A and to have reached a point that causes the brushes 1 and 3 to touch the contacts I and III. Now if at this time another train be present on block C, as represented by the parts N', O', P', and 17^a, the electric current constantly flowing in the circuit-conductor 10 has an opportunity to be divided in the well-known way, owing to a new and better conductor being shunted into parallel therewith, and hence the greater part of the current will pass over the new route provided. If we regard for the sake of convenience that it flows in the circuit-conductor from the right, it will leave said conductor and pass over the branch conductor 14 to the rail-section 13 in block C and pass thence through the axle O' of the locomotive to the long rail-section 12 in the same block. It will then pass to the contact IV, joined to said block, over the conductor 15 to contact I, therefrom through the brush 1 and conductor 1^a to signal-box 18 to actuate or release the corresponding signal in said box. After passing through the signal-box of the locomotive on block A the current travels over the conductor 6 to the axle O of said locomotive and therefrom through a locomotive-wheel N to the short rail-section 13 of block A, from which it goes to the circuit-conductor 10 over the branch conductor 14, connecting said short rail-section to said circuit-conductor. As the current passes through the signal-box it causes a signal-bar corresponding to the contact I to drop across the engineer's window in the manner hereinafter set forth, affording him information that the second block in front of his train is occupied, so that he may act with caution. Now if the

wheels of the locomotive shown on block C should instead of being on said block be on the block B, touching either of the short rail-sections 13 or 13^a, a similarly-shunted current
 5 would pass by the way of the corresponding branch conductors 14 or 14^a of said block, thence through the locomotive wheels and axle to the long rail-section 12 of the block B and to brush 3, and in like manner, as before
 10 described, to the signal-box, notifying the engineer on block A that the next block is occupied, notification being given by the dropping of the corresponding signal-bar across his line of sight. Regarding the wheels N' of
 15 their locomotive as at rest on the block C and the wheels N of their locomotive as proceeding onto block B, it may be readily seen that at the contacts I, II, III, and IV of said block B the last-named locomotive will receive sig-
 20 nals that block C is occupied, the bar corresponding to the contact IV finally indicating by its fall that the block which the last-named locomotive is about to enter is occupied and that the engineer can receive no other signal
 25 before a collision. Considering the locomotive on the block C to be in like manner provided with brushes and other apparatus as illustrated in connection with the locomotive on block A, the engineer on said locomotive if moving toward the left will have
 30 been notified similarly at contact I' of the block C that block A is occupied, or if the other locomotive has not yet moved onto the block A, but moves thereonto subsequently, the first named has yet the con-
 35 tact II' of block C and contacts III' and IV' of block B in position to be touched by the brushes corresponding thereto carried by his locomotive to warn him that block A is occu-
 40 pied. If the wheels N of their locomotive occupy the block B at the time that the approaching locomotive is passing from the block C to block B, then the engineer of the latter will receive a signal at contact IV' of
 45 block C so advising him. There are no conditions under which two engines fitted with the apparatus shown in my system or traveling over a track equipped with my system can collide without getting at least one sig-
 50 nal of the other's position, and in many cases the signals impart information as to the direction in which the second locomotive is running. Contacts I and I' and the signals adapted to be operated by the flow of current from
 55 said contacts are provided more for the convenience of one train following another, as when running in sections, or for trains that are running backward. In this latter case the signal corresponding to contact IV has to be
 60 switched out of action or disregarded, owing to the fact that the cars of the same train on passing onto the next section before the locomotive reaches the contact IV or IV' will cause a shunting and give a false signal.

65 The return side of the circuit-conductor 10

does not form any part of a single-track system except its utility as a return-conductor for the circuit to the dynamo or battery from which it is supplied; but in a double-track road it may supply current to a second system
 70 for the second track.

The contacts V and V' are provided in order that an engineer may know when he passes from one block to another. To illustrate, when a locomotive on block A is about
 75 to enter block B the brush 5 passes onto the contact V, causing a shunt from the circuit-conductor to the short rail-section 13, over the conductor 16 to the contact V, thence through the brush 5 and conductor 5^a to the signal-
 80 box, from which it returns to the circuit-conductor through the running-gear of the locomotive to track-rail section and branch conductor. No invention is herein claimed for any particular form of brush adapted to
 85 touch either of the contacts; but in Fig. III, I have shown a brush of elliptical form such as may be used. The brushes may, however, be in the form of rollers or strips.

In Figs. II, IV, and V, I have shown my
 90 signal-box containing the signal apparatus which form a part of my invention as to structure, use, and position upon the locomotive, as well as in combination with the track system hereinbefore described. 19 designates
 95 a window of the locomotive-cab in which the signal-box 18 is fitted. Mounted in the signal-box on pivots 20 are series of signal-bars or semaphores I^a, II^a, III^a, and IV^a, that correspond to the contacts I, II, III, and IV and
 100 the conductors 1, 2, 3, and 4, the latter of which lead to the signal-box. In Fig. II one of the signal-bars is illustrated as freed and dropped into position to furnish a signal imparted through the contact I. It will be un-
 105 derstood that the conductors 1^a, 2^a, &c., are represented in said figure merely diagrammatically. Each signal-bar in the box 18 is provided with a weight 21, that serves to assist the bar in falling when it is freed from
 110 resistance, as hereinafter set forth. Each bar is also notched at its upper end to provide a tongue 22. The mechanism by which the signal-bars or semaphores are controlled is similar as applied to all of the bars, and
 115 therefore a description of one of such mechanisms will be considered as applying to the remainder. 23 designates a detent-bar mounted upon a pivot 24. This detent-bar is yieldingly held in lowered position by a light
 120 spring 25, that is provided with an arm 26, in which is journaled a roller 27, adapted to engage the tongue at the upper end of the corresponding signal-bar, such as I^a. (See Fig. IV.) Adjustably mounted at the rear
 125 end of the detent-bar 23 is a counterbalance-weight 28. 29 is an upright arm extending vertically from the pivot 24 of the detent-bar 23 and provided with an inclined cam 30. 31 is an armature-plate carried by the detent-
 130

bar 23. 32 is a trip-bar swingingly mounted upon a pivot 33 and provided with an armature-plate 34. In the trip-bar 32 is journaled a roller 35, that is adapted to bear against the cam 30 of the upright arm 29 of the detent-bar when moved thereto. Upon the rear end of the trip-bar 32 is an adjustable counter-balance 36. 37 is an electromagnet the poles of which are mounted above the armature-plate 31 on the detent-bar 23 and which is connected by a wire 38 to a battery illustrated at 39. (See Fig. IV.) Leading from the battery is a wire 40, that is connected to the pivot 24 of the detent-bar 23. 41 is a wire leading from the electromagnet 37 to the pivot 33 of the trip-bar 32. 42 is an electromagnet the poles of which are opposed to the armature-plate 34, carried by the trip-bar 32. This last-named magnet receives the connection of a conductor leading from one of the brushes carried by the cross-bar 17, which has a wire 1 and a second wire 6', over which the electric current passes, on leaving the electromagnet, to the wire 6, that conveys the current to the running-gear of the locomotive. 43 is a third electromagnet that receives the connection of the wire 5^a, leading from the brush 5 on the cross-bar 17. Leading from the magnet 43 is a wire 6'', that connects with the wire 6, previously referred to. 44 is an index-bar that is pivoted at 45 and the upturned end of which constitutes an armature adapted to be attracted by the pole of the magnet 43. This index-bar is of service in affording information to the engineer of the apparatus being in working order and of the fact that a block of railroad-track, such as A or B, is being entered. When a block is being entered, the electric current passes from one of the contacts V or V' through the brush 5 and conductor 5^a to the electromagnet 43 and energizes said magnet, causing it to flip the index-bar up and down in a manner to attract the engineer's attention.

45 In the operation of releasing the signal-bars or semaphores in the signal-box to permit them to fall into the engineer's view the current conveyed to the signal-box from the contacts corresponding to the signal-bars passes over the corresponding conductors from the contact-brushes and enters the corresponding electromagnet 42. On the energization of the magnet the trip-bar 32 is drawn downwardly, and its roller 35 by bearing against the cam 30 rocks the upright bar 29 rearwardly, thereby lifting the detent-bar 23. On the raising of the detent-bar into the position seen in dotted lines, Fig. IV, the roller 27 carried thereby is moved out of engagement with the signal-bar, thereby permitting the bar to swing into the signaling position shown by dotted lines. The battery 39 being connected to the electromagnet 37 by the wire 38 and to the detent-bar 23 by the wire 40, the electromagnet being connected to the trip-

bar 32 by the wire 41, when the trip-bar is lowered to the cam 30, carried by the upright arm 29, the circuit is completed from the battery over said parts to energize the electromagnet 37, with the result that the detent-bar is lifted thereby due to the attraction of the armature-plate 31 thereon by the poles of said magnet. This actuation of the detent-bar likewise releases the signal-bar and permits it to fall into the signaling position. In some instances in the event of the current received by the electromagnet 42 from the track system the trip-bar 32 may be moved with sufficient force to actuate the detent-bar 23 by bearing against the cam 30 without the assistance of the electromagnet 37.

I claim as my invention—

1. In an electric signaling system, the combination of a railway-track divided into blocks insulated from each other, each block consisting of rails on one side bonded together the entire length of the block, and of rails on the other side bonded into shorter sections equaling combinedly the length of the long section; a closed circuit extending along the track having connection with the short rail-sections in each block; and contact means connected to the long rail-sections of each block and adapted to be touched by means carried by a railroad-train to appreciate an electric current passed through the block-rails to a signal apparatus carried by the train.

2. In an electric signaling system, the combination of a track divided into blocks insulated from each other; a closed circuit extending along the track; connections leading from said closed circuit to rails of said blocks and over which the electric current is shunted to said rails; contacts having connection with other block-rails to receive a current passed from said last-mentioned rails, said contacts being adapted to receive means carried by a train and through which the electric current is transmitted to a signal apparatus on the train.

3. In an electric signaling system, the combination of a track divided into blocks insulated from each other; a closed circuit extending along the track and having connection with rails of said blocks; contacts connected with other rails of said blocks and located alongside of a block separated from the one to which they are connected, said contacts being adapted to receive means carried by a train passing over said tracks, through the medium of which an electric current is transmitted from said contacts to a signal apparatus carried by said train.

4. In an electric signaling system, the combination of a track divided into blocks insulated from each other; a closed circuit extending along the track connected to rails in said blocks; contacts connected to other block-rails of a succeeding block, brushes

carried by a train, adapted to touch said contacts, and conductors leading from said brushes to a signal apparatus carried by the train.

- 5 5. In an electric railroad signaling system, the combination of a track divided into blocks insulated from each other, and consisting of long rail-sections in one line, and short rail-sections in the other line of each
10 block; a closed circuit extending along the track; connections leading from said closed

circuit to said long rail-sections, contacts V and V' connected separately to short rail-sections in adjacent blocks; and a brush carried by a train passing over said track 15 whereby a shunt-circuit is caused through adjacent short rail-sections of contiguous blocks.

JAMES N. BASKETT.

In presence of—

J. F. LEWELLYN,

E. R. LOCKE.