No. 762,812. PATENTED JUNE 14, 1904.

J. DIANOVSZKY.

ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED JULY 18, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

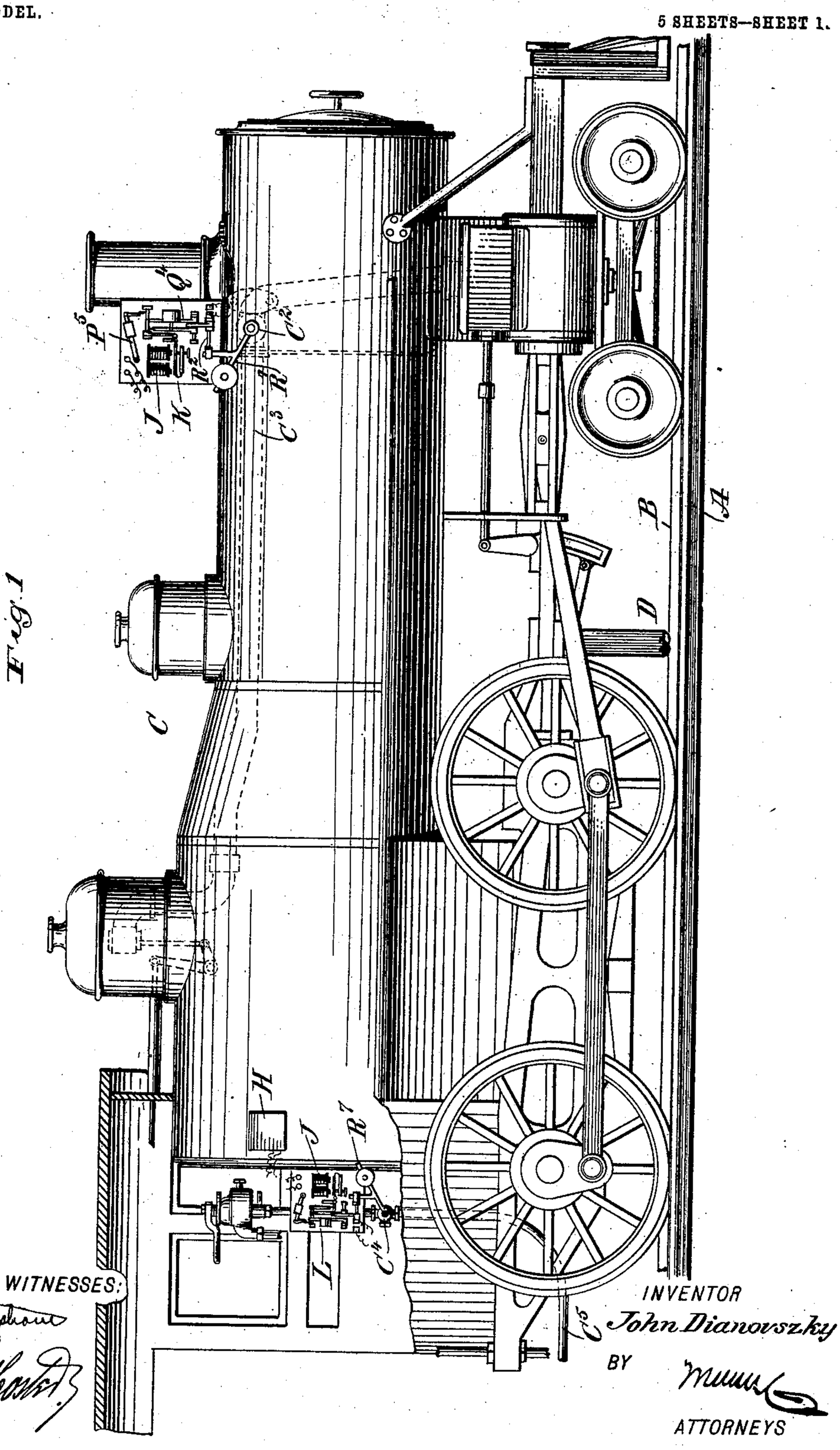

Fig. 1

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NO MODEL. 5 SHEETS—SHEET 2.

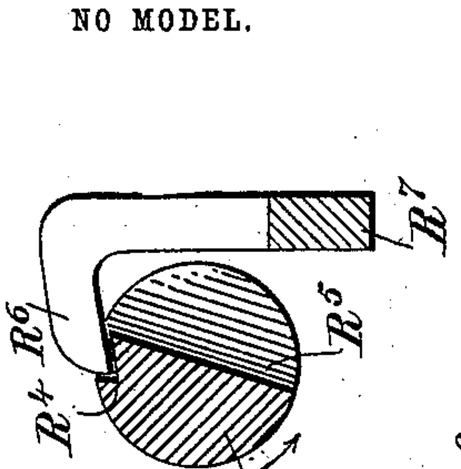

Fig. 6

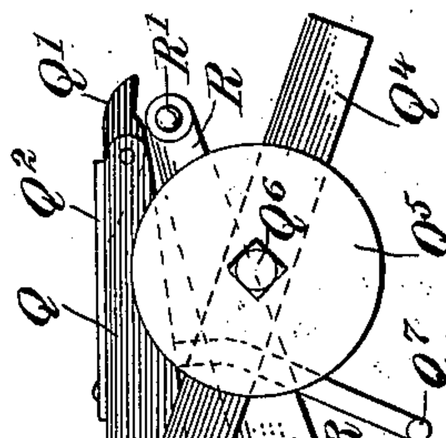

Fig. 4

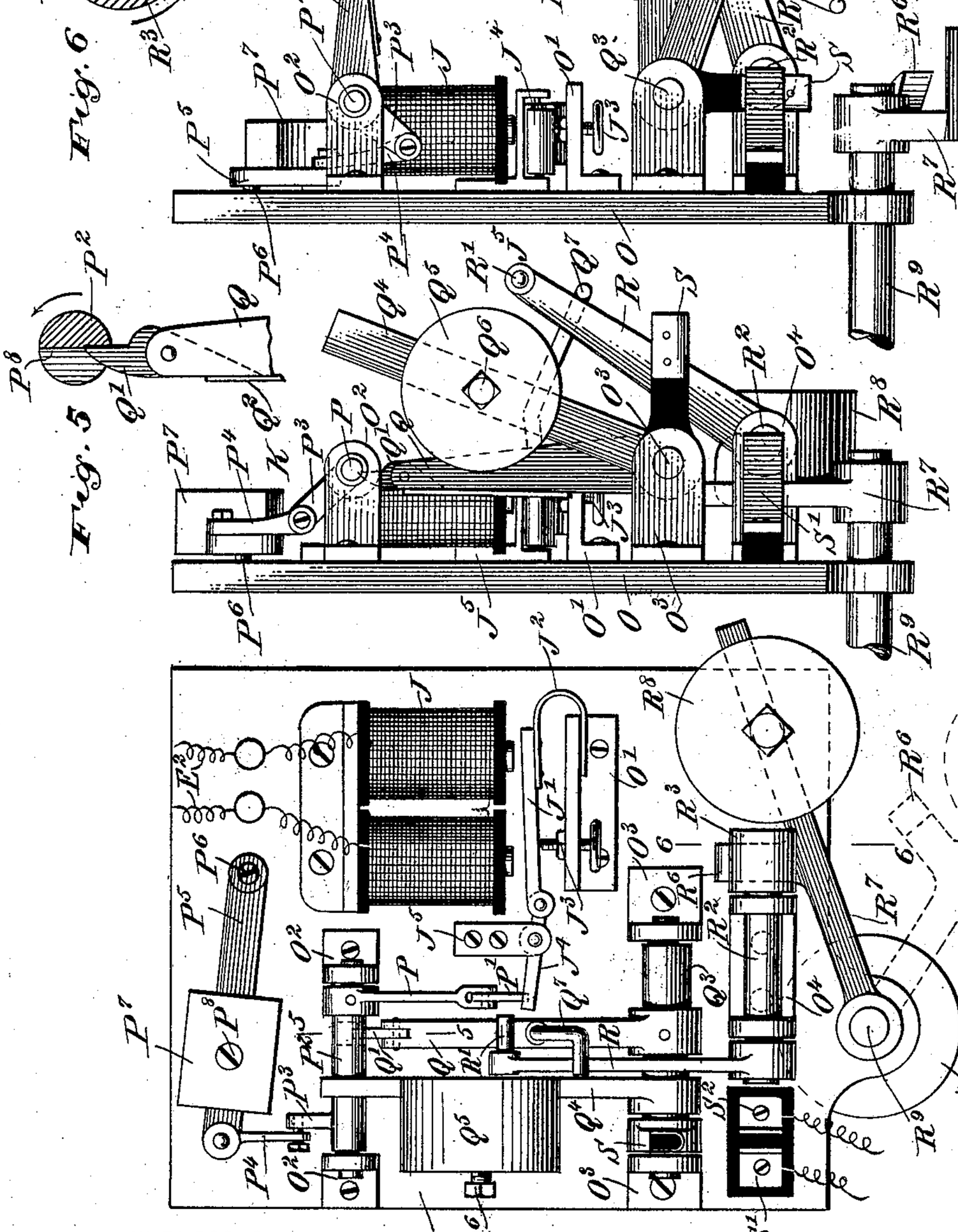

Fig. 5

Fig. 3

Fig. 2

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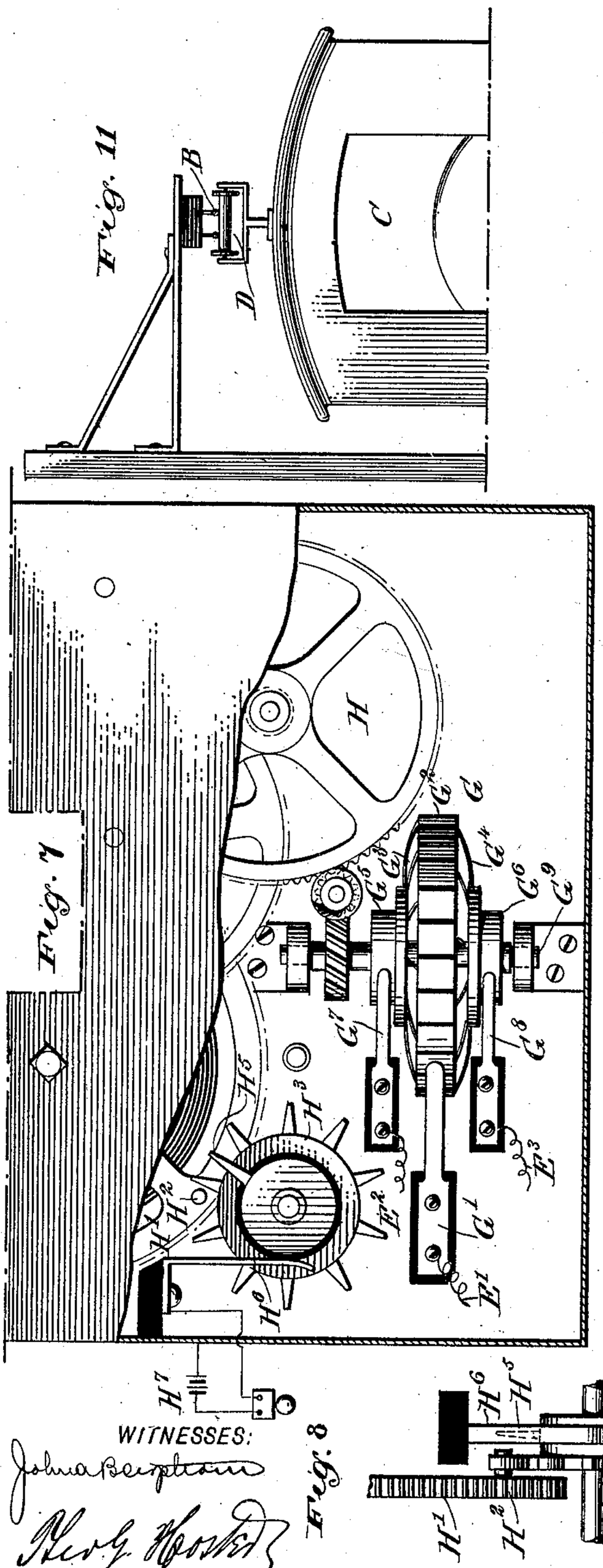

Fig. 7

Fig. 11

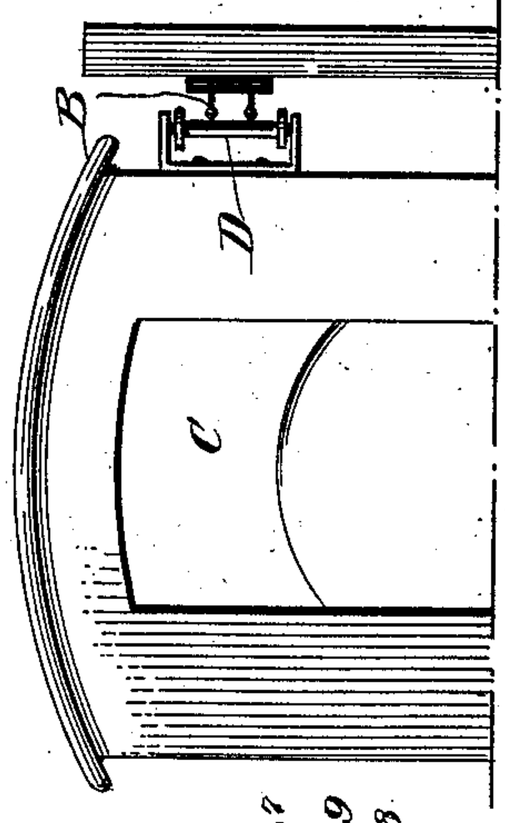

Fig. 12

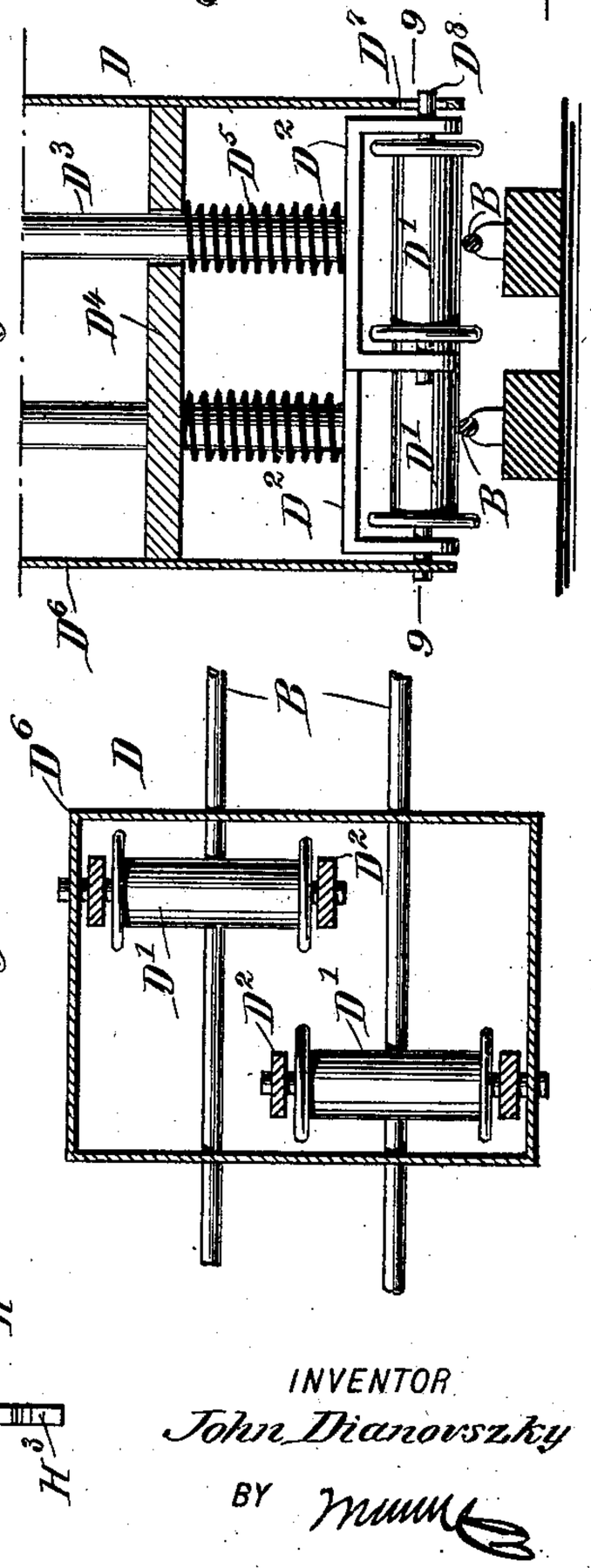

Fig. 10

Fig. 9

Fig. 8

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No. 762,812. PATENTED JUNE 14, 1904.

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ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED JULY 18, 1903.

NO MODEL. 6 SHEETS—SHEET 4.

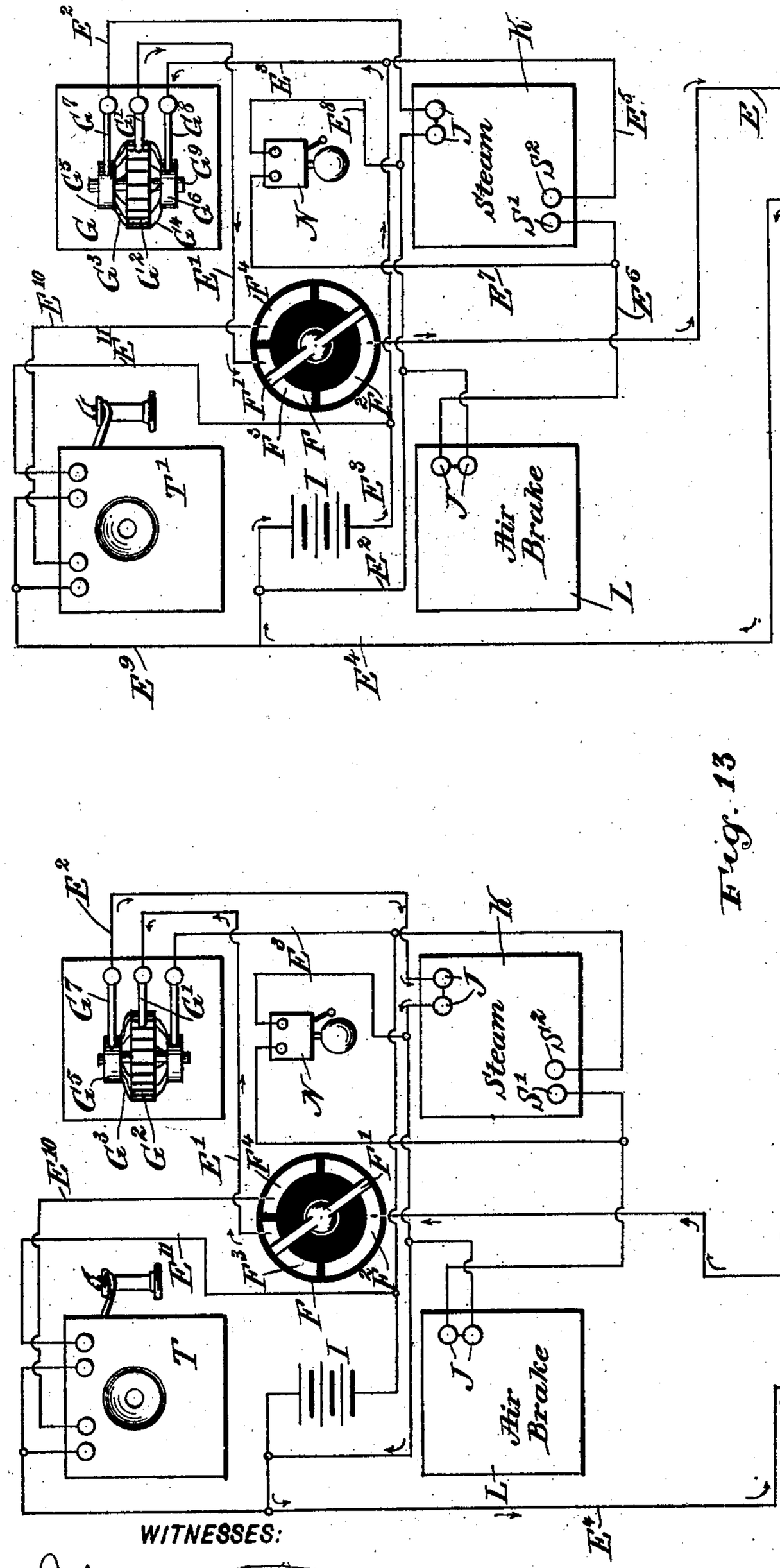
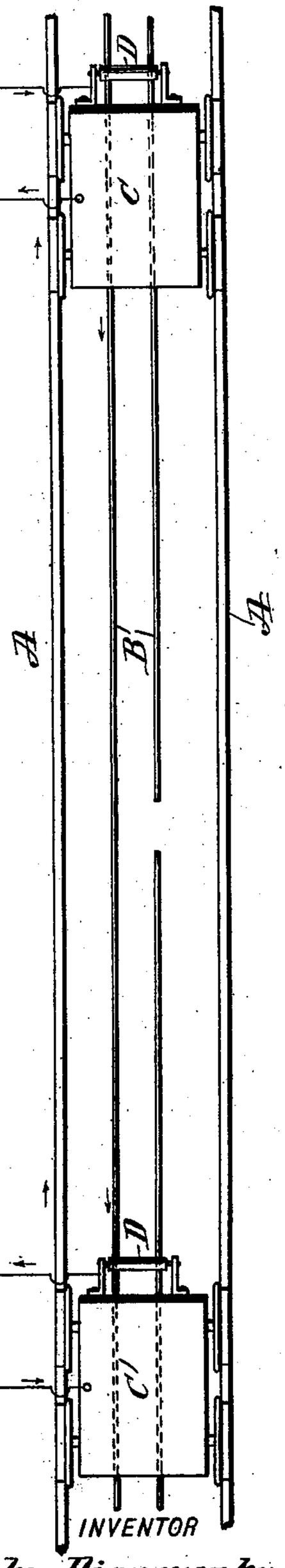


Fig. 13.



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No. 762,812. PATENTED JUNE 14, 1904.

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ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED JULY 18, 1903.

NO MODEL. 5 SHEETS—SHEET 5.

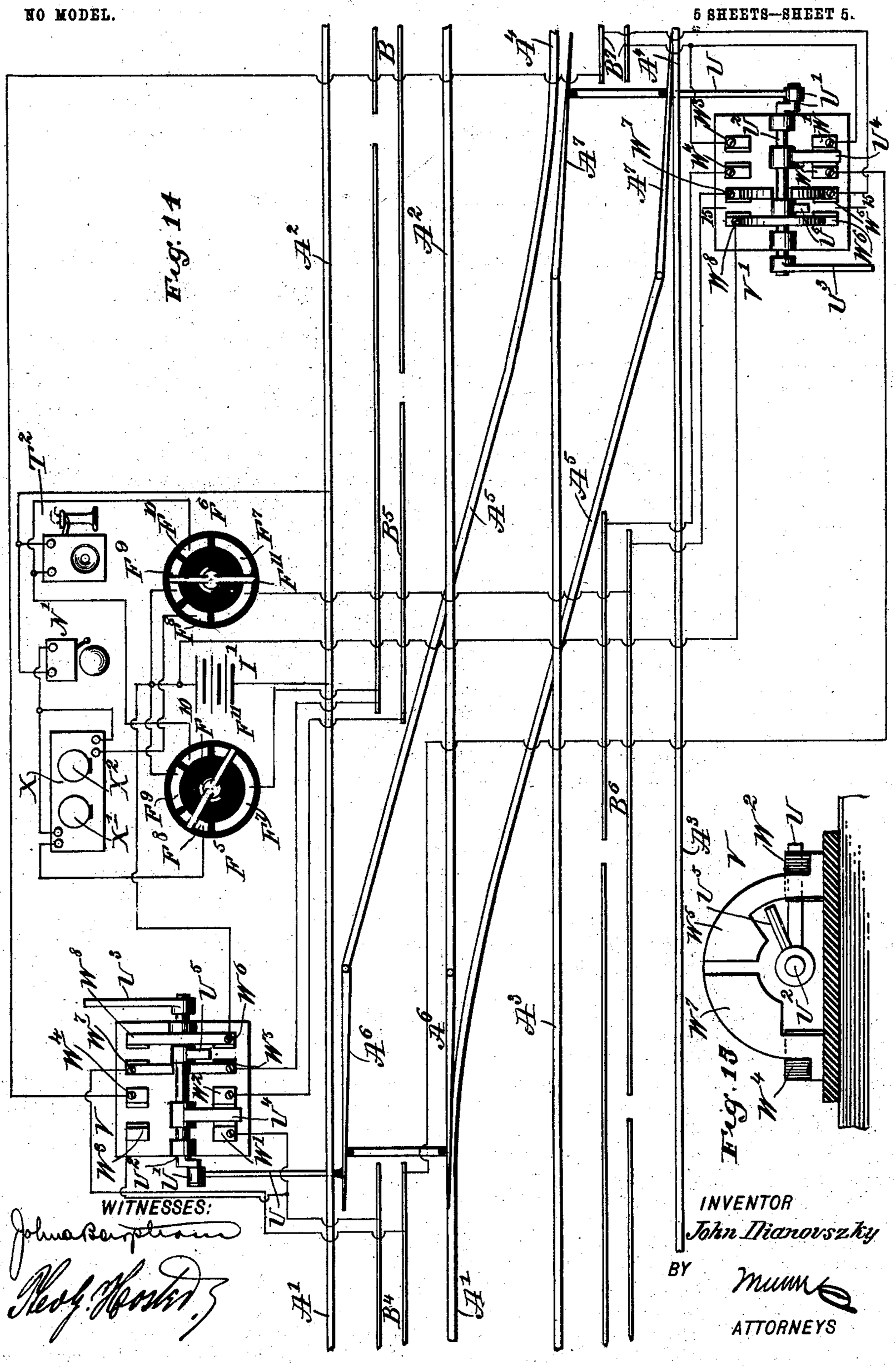

Fig. 14

Fig. 15

WITNESSES:

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Geo. F. Hoster

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No. 762,812. Patented June 14, 1904.

UNITED STATES PATENT OFFICE.

JOHN DIANOVSZKY, OF PASSAIC, NEW JERSEY, ASSIGNOR OF ONE-HALF TO MICHAEL LUJANOVITZ, OF PASSAIC, NEW JERSEY.

ELECTRIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 762,812, dated June 14, 1904.

Application filed July 18, 1903. Serial No. 166,083. (No model.)

To all whom it may concern:

Be it known that I, JOHN DIANOVSZKY, a subject of the Emperor of Austria-Hungary, and a resident of Passaic, in the county of Passaic and State of New Jersey, have invented a new and Improved Electric Signaling System, of which the following is a full, clear, and exact description.

The invention relates to railroad signaling; and its object is to provide a new and improved electric signaling system, more especially designed for preventing collisions of trains and arranged to automatically bring a train to a stop when it passes into a section occupied by the train ahead to allow the engineer of the last train to put himself in telephonic communication with the engineer of the train ahead, or vice versa, and to allow proper despatch of the trains from a terminal station without danger of derailing or collision by imperfectly or wrongly set switches.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a locomotive provided with the equipment. Fig. 2 is an enlarged side elevation of the device located in the cab of a locomotive. Fig. 3 is an edge view of the same. Fig. 4 is a like view of the same, showing the parts in a released position. Fig. 5 is a transverse section of part of the tripping device, the section being on the line 5 5 of Fig. 2. Fig. 6 is a transverse section of part of the improvement on the line 6 6 of Fig. 2. Fig. 7 is a side elevation of the block-controlled commutator. Fig. 8 is an edge view of the electric alarm device for the clock when the latter is run down. Fig. 9 is an enlarged sectional plan view of the conductor-contact on the locomotive, the section being on the line 9 9 of Fig. 10. Fig. 10 is a transverse section of the same. Fig. 11 is a transverse section of the conductors as arranged overhead and in engagement with a contact carried on top of the locomotive-cab. Fig. 12 is a like view of the same, showing the contact arranged on the side of the locomotive. Fig. 13 is a diagrammatic view of the improvement, showing two locomotives on the same block. Fig. 14 is a diagrammatic view of the improvement as arranged in the railroad-yard of a terminal or switch station; and Fig. 15 is a cross-section of the switch device, the section being on the line 15 15 of Fig. 14.

Along the track-rails A of the railroad-track is arranged a conductor B, made in sections of the length of a block—say one or two miles—and each section is formed of a continuous wire or rail and a sectional one, as plainly shown in Fig. 13, to allow of establishing electric communication between, say, the locomotives C and C′ of two trains on the same block to allow of automatically stopping the second train as soon as it passes onto the block and to allow telephonic communication between the two trains.

Each locomotive has the same equipment, which is arranged as follows: A contact D, held insulated on the locomotive C or C′, engages the conductor B, and the said contact D forms the terminal of a circuit-wire E, leading to a manually-controlled switch F, connected by a wire E′ with the spring contact-plate G^7 of a commutator G, run continually by a suitable clock H of any approved construction and carried on the cab of the locomotive within convenient reach of the engineer to allow the latter to wind up the clock whenever it is run down.

The commutator G is provided with a rim G^2, engaged by the contact-plate G′ and formed of insulated sections alternately connected by arms G^3 and G^4 with wheels G^5 G^6, rotating with the rim G^2 and peripherally engaged by flexible contact-plates G^7 G^8, respectively connected with wires E^2 and E^3, of which the wire E^3 leads to a battery I, connected by a wire E^4 with the frame of a locomotive C, so as to establish connection with the rails of the track. It is understood that the rim G^2 and the wheels G^5 G^6 are held in-

sulated on the shaft G^9 of the commutator, and this shaft G^9 is geared with the clock H, so that the latter rotates the commutator for the plate G′ to successively engage the insulated sections of the rim G^2 to alternately send a current through the arms G^3 and wheel G^5 to the plate G^7 or by the arms G^4 and wheel G^6 to the plate G^8.

The wire E^2, previously mentioned, connects with the wire E^4, as plainly indicated in Fig. 13, and it contains the electromagnet J of a mechanism K for automatically closing a valve C^2 in a steam-admission pipe C^3 for the cylinders of the locomotive, as indicated in Fig. 1, and the said mechanism K controls a mechanism L for opening a valve C^4 in a train-pipe C^5 to exhaust air from the latter to apply the brakes automatically, as hereinafter more fully described, the said mechanism K also controlling an alarm N in the cab of the locomotive to ring the alarm after the mechanism K is actuated—that is, the mechanism L and the alarm N are actuated at the same time and immediately after the mechanism K is set in motion.

The detail construction of the mechanisms K and L is the same, and hence it suffices to describe but one in detail.

Each mechanism K and L is provided with the electromagnet J, the armature J′ of which is hung at one end on a spring J^2, (see Fig. 2,) carried on a bracket O′, attached to the frame O of the mechanism K or L, and the said armature J′ normally rests on a stop-screw J^3, screwing on the bracket O′. The free end of the armature J′ is pivotally connected with a lever J^4, fulcrumed on a bracket J^5, attached to the frame O, and the said lever J^4 normally stands in front of a pivot-catch P′ on the free end of an arm P, secured on a shaft P^2, journaled in suitable bearings O^2, attached to the frame O. On the shaft P^2 is held an arm P^3, pivotally connected by a link P^4 with a lever P^5, fulcrumed at P^6 on the frame O and carrying a weight P^7, held adjustable on the lever by a set-screw P^8. Now the pressure of this weighted lever P^5 on the shaft P^2 normally holds the spring-catch P′ against the lever J^4; but when the electromagnet J is energized by a current passing through the wire E^2 then the armature J′ is attracted and the lever J^4 is swung out of the path of the catch P′, so as to release the arm P and the shaft P^2 for the latter to turn or rock in its bearings O^2 by the action of the weighted lever P^5.

The rock-shaft P^2 is provided with a flattened portion P^8, (see Fig. 5,) engaged by a catch Q′ on the free end of an arm Q and pressed on by a spring Q^2, the said arm Q being attached to a shaft Q^3, journaled in suitable bearings O^3, attached to the frame O. On the shaft Q^3 is secured an arm Q^4, carrying a weight Q^5, adjustable on the arm Q^4 and adapted to be fastened thereon by a set-screw Q^6. The weighted arm Q^4 normally stands in the inclined position, (shown in Figs. 2 and 3,) so that when the arm Q is released on the turning of the shaft P^2 then the weighted lever Q^4 causes a turning of the shaft Q^3.

On the arm Q is secured an angular extension Q^7, engaged by an arm R, provided at its free end with a handle R′, adapted to be taken hold of by the operator for swinging the arm R into proper position, as hereinafter more fully explained. The arm R is secured on a shaft R^2, journaled in suitable bearings O^4, attached to the frame O, and on the said shaft R^2 is secured a head R^3, provided with a shoulder R^4 and a cut-out portion R^5, adjacent to the said shoulder, as plainly indicated in Fig. 6. The shoulder R^4 is engaged by a hook R^6 on an arm R^7, carrying an adjustable weight R^8 and secured on the valve-stem R^9 of the valve C^2 or C^4, so that when the weighted arm R^7 swings downward into the position shown in dotted lines in Fig. 2 then the valve C^2 is closed to cut off the steam from the engine, while the valve C^4 is opened to exhaust air from the train-pipe C^5 to apply the brakes.

On the shaft Q^3 of the mechanism K is fastened an insulated contact-arm S, adapted to swing into contact with flexible contact-plates S′ and S^2, held insulated on the frame O. The contact-plate S^2 is connected by a wire E^5 with the wire E^3, (see Fig. 13,) and from the contact-plate S′ leads a wire E^6, containing the armature J′ for the mechanism L, the said wire E^6 leading to the wire E^2. From the wire E^6 also leads a wire E^7 to the alarm N, the return-wire E^8 of which is connected with the wire E^2. Now when both devices K and L are set as illustrated in Figs. 2 and 3 and a current passes by the wire E^2 through the electromagnet J of the mechanism K, then this electromagnet J is energized and attracts its armature J′, so that the arm P is released and the shaft P^2 is caused to turn by the action of the weighted lever P^5. The shaft P^2 in turning releases the arm Q, which by the weighted arm Q^4 is swung downward, whereby the pin R′ is engaged by the said arm Q to impart a swinging motion to the arm R to turn the shaft R^2 to release the hook R^6, and consequently to free the weighted arm R^7 for the latter to turn the stem R^9 to close the valve C^2 in the steam-pipe C^3. Now when the shaft Q^3 is turned by the action of the weighted arm Q^4, as above described, then the contact-arm S makes contact with the plates S′ S^2, so as to electrically connect the same and allow the current to pass from the wire E^3 by way of the wire E^5 from one contact-plate S^2 to the other contact-plate S′, to the wire E^6, and to the armature J′ of the mechanism L to energize this armature J′ and to consequently actuate the mechanism L in the same manner as above described relative to the mechanism K, so that the stem R^9 of the valve C^4 is turned to open the valve, and thereby allow air to exhaust from the

train-pipe C^5 to automatically apply the brakes. At the same time that this takes place the current from the wire E^6 passes through the alarm N, so as to sound the same. Now when the locomotive C is at a standstill or moves in its block and the locomotive C′ of the next following train enters the block then an electric circuit is established between the two locomotives in such a manner that the mechanisms K and L and the alarm N on the locomotive C′ are first actuated, and immediately after this the mechanisms K and L and the alarm N on the locomotive C are actuated and the power is supplied from the batteries I of the locomotives C and C′.

Now by reference to Fig. 13 it will be seen that when the locomotive C′ passes into the block then the conductor B is engaged by the contact D of the locomotive C′ and the electric circuit is as follows: from the contact D by wire E to the switch F of the locomotive C′ and by the wire E′ to the contact-plate G′ and rim G^2, then by the arm G^3 to the wheel G^5, contact-plate G^7, and wire E^2 to energize the electromagnet J of the mechanism K, and then by wire E^4 to the locomotive C′ and by way of the track-rails A to the locomotive C and by wire E^4 from the locomotive to the battery I, and then by wire E^3 to the contact-plate G^8, wheel G^6, and arms G^4 to the rim G^2, which by the contact-plate G′ sends the current to the wire E′ and by way of the switch F to the wire E and the contact D on the locomotive C, and as this contact D is in engagement with the conductor B the circuit is completed by way of the uninterrupted member of this conductor—that is, the said uninterrupted member is engaged by both contacts D on the locomotives C and C′.

It is understood that when the electromagnet J of the mechanism K on the locomotive C′ is actuated then the steam is shut off, and as the mechanism K controls the mechanism L, as described, the latter is actuated shortly after the mechanism K is set in motion, so that the brakes are applied immediately after the steam is shut off from the engine, so that the locomotive C′ is brought to a standstill. Immediately after this takes place a second circuit is closed on the locomotive C, with the battery I on the locomotive C′ as the supplying power, and this second circuit passes from the commutator G on locomotive C by way of rim G^2, arms G^3, wheel G^5, contact-plate G^7, and wire E^2 to energize the electromagnets J of the mechanism K to actuate the latter and subsequently the mechanism L, so that the locomotive C also comes to a standstill. As the alarms N on the locomotives C C′ are rung the attention of the engineers is called to the fact that two trains are on the same section. As soon as an engineer is aware of this fact he turns the switch F to throw the telephone T into action and to ring the call-bell of the telephone T′ in the cab of, say, the locomotive C, and as soon as the engineer of this locomotive C hears the call-bell of his telephone he turns his switch F to telephone connection and answers the call-bell, so that the two engineers are in telephonic connection with each other. For the purpose described each telephone T and T′ is connected by a wire E^9 with the wire E^4, by a wire E^{10} with the switch F, and by a wire E^{11} with the wire E^3.

Now when the engineer of the locomotive C′ turns his switch to connect the wire E with the wire E^{10} then the call-bell on the telephone T′ is actuated and the engineer of the locomotive C can turn his switch F to connect the wire E with the wire E^{10} on the locomotive C. The circuit is completed as soon as the receivers are removed to allow the engineers to talk to each other. It is understood that one end of the switch-lever F′ of each switch F connects at all times with the contact F^2, engaged by the wire E, while the other end of the switch-lever F′ connects with either the contact F^3 for the wire E′ or with the contact F^4 for the telephone-wire E^{10}, according to the position the lever F′ is moved into by the engineer. As soon as the engineer in the locomotive C has learned from the engineer in charge of locomotive C′ the fact that he has the right of way he resets the mechanisms K and L and proceeds on the journey. From the foregoing it will be seen that if two trains move toward each other on the same track both trains will be brought to a standstill as soon as they enter on the same sections, and hence a head-on collision is prevented.

Now when the locomotive C moves out of the block then the alarm N in the locomotive C′ ceases to ring, and the engineer of this locomotive can now reset the mechanisms K and L to bring the several parts back to the position shown in Figs. 2 and 3. When this is done, the valve C^2 is opened, so that the steam-admission pipe C^3 is again completely under the control of the throttle-valve, and the valve C^4 is closed to the atmosphere, so that the train-pipe C^5 is likewise under the control of the engineer manipulating the engineer's valve in the cab of the locomotive.

It is understood that when the locomotives C and C′ are in ordinary running position each switch-lever F′ is in the position shown in Fig. 13—that is, the switch-lever connects the contacts F^2 and F^3 with each other—and the switch-lever is only shifted when one engineer is called up on the telephone by the engineer of the other train. It is understood that two trains following one the other are stalled in the block by automatically shutting off the steam and applying the brakes as soon as one train passes into the block occupied by a preceding train or when two trains moving toward each other pass out the same section.

The contact D, previously mentioned, is pref-

erably of the construction shown in detail in Figs. 9 and 10—that is, the contact is provided with two friction-rollers D′, each in engagement with a section or member of the conductor B, and each of the rollers is journaled in a frame D^2, having a stem D^3 mounted to slide vertically in a guideway D^4, and each frame is pressed on by a spring D^5, so as to hold the roller D′ in firm contact with the corresponding member of the conductor B. The guideway D^4 is arranged in a housing or frame D^6, attached to the locomotive, but insulated therefrom, as previously mentioned, and the up-and-down sliding motion of each frame D^2 is limited by the shaft D^8 of the roller engaging an elongated slot D^7 in the housing D^6. The contact D may be arranged on the bottom of the locomotive, as illustrated in Fig. 1, to engage the conductor B, arranged between the track-rails A; but, if desired, the conductor B may be arranged overhead on suitable brackets, as shown in Fig. 11, and engaged by the contact D, carried on top of the locomotive C or C′. As indicated in Fig. 12, the contact D is arranged on the side of the locomotive C or C′ and engages the conductor B, supported on posts arranged alongside the track.

When the clock H is nearly run down, then the alarm is sounded in the cab of the locomotive to indicate to the engineer that the clock needs rewinding. For this purpose one of the wheels H′ of the clock H (see Figs. 7 and 8) is provided with a tooth or pin H^2, engaging a gear-wheel H^3, journaled in the clock-casing and carrying an insulated contact-wheel H^4, provided with a contact-pin H^5, adapted to engage a flexible contact-plate H^6, electrically connected with an electric alarm H^7 of any approved construction, so that when the clock is nearly run down the pin H^5 makes contact with the plate H^6 to sound the alarm H^7, thus notifying the engineer that the clock needs rewinding.

In the arrangement shown in Fig. 14 the sections A′ and A^2 of one track and the sections A^3 A^4 of another track are connected with each other by a crossing A^5, having switch-points A^6 and A^7, connected by links U with the crank-arms U′ of the shafts U^2 of two switches V and V′, arranged alongside the two tracks. The switches V and V′ are under the control of the switchman manipulating handles or levers U^3, secured on the shafts U^2. Now when the switch-points A^6 are closed, as shown in Fig. 14, then they render the track-sections A′ and A^2 continuous; but when the switch-points A^6 are open then the track-section A′ is connected with the crossing A^5, and the latter is connected by the switch-points A^7, then in an open position, with the sections A^4 of the other track. When the switch-points A^7 are shifted into a closed position, then the track-sections A^3 and A^4 are rendered continuous. Now each of the shafts U^2 of the switches V and V′ is provided with an arm U^4, adapted to make contact with either of the sets of contact-plates W′ W^2 or W^3 W^4, according to the position of the switch-lever U^3. On each of the shafts U^2 of the two switches V and V′ is also secured a short arm U^5, adapted to remain in contact with sets of contact-points W^5 W^6 and W^7 W^8 in case the switch-lever is not thrown fully over in either direction by the operator and the arms U^4 do not make proper contact with the sets of contact-plates W′ W^2 or W^3 W^4.

The station at the crossing described, and shown in Fig. 14, is provided with two electric switches F^5 and F^6 under the control of the station-master or other person in charge, and on this station is also erected a telephone T^2 and alarm N′ and an annunciator X, together with a battery I′. Each of the electric switches F^5 and F^6 is provided with contacts F^7 F^8 and F^9 F^{10}, of which the contact F^7 is at all times engaged by one end of a switch-lever F^{11}, while the other end of the said switch-lever may be in contact with either of the remaining contacts F^8, F^9, or F^{10}. Now when the switch-lever F^{11} connects the contacts F^7 and F^8 with each other then the switch stands in normal position; but when the switch-lever F^{11} connects the contact F^7 with the contact F^9 then the switch is in a stop position for bringing a locomotive to a stop in case it enters a dangerous track-section. When the switch-lever F^{11} is moved to connect the contacts F^7 and F^{10} with each other, then the telephone T^2 is thrown into the circuit. Now the track-sections A′ A^2 and A^3 A^4 are provided with conductors B^4 B^5 and B^6 B^7, and the switch F^5 has its contact F^7 connected with the conductor B^5, while the switch F^6 has its contact connected with the conductor B^6 of the track-section A^3.

By reference to Fig. 14 it will be seen that an electric connection exists between the conductors B^4 B^5 by way of the arm U^4 and its contact-points W′ W^2 on the switch V, so that a train entering a section A′ or A^2 while the other section A^2 or A′ is occupied is brought automatically to a standstill, as above described in reference to Fig. 13. The same condition exists for the track-sections A^3 A^4, which have their conductors B^6 B^7 electrically connected with each other by the switch V at the arm U^4, engaging the contacts W′ W^2. Thus from the foregoing it will be seen that the trains are brought automatically to a standstill when approaching an open switch, or when the switches are not properly set, or when two trains approach each other on the same track. At a station the approaching trains are automatically regulated by the annunciators X′ X^2, and in case of an obstruction at or near the station an approaching train can be brought automatically to a standstill, and the station-master can place himself telephonically in communication with the engineer of the stopped train to tell the engineer why his train has been stopped, &c. When

a train enters the track-section A′ or A², the annunciator X at the station indicates this event at X′, and when a train enters either section A³ or A⁴ then the event is indicated at X² of the annunciator. For instance, if a train passes onto the section A² near the station, then an electric current passes from the locomotive-battery I by way of the commutator G, contact-spring G′, switch F, contact-plate F³, switch-lever F′, contact-plate F², wire E, contact D, conductor B⁵, and wire connection to the switch F⁵, by which the current is directed to the annunciator X at X′ to actuate the latter, and thus indicate to the official in charge the location of the train. The alarm N′ is also sounded when the annunciator is actuated, and the return-circuit is from the alarm N′ by wire connection to the rail in the track-section A² and by the locomotive-frame to the battery I in the cab. Normally the switch-levers F¹¹ of the switches F⁵ and F⁶ are in the normal position, as shown on the switch F⁵—that is, the lever F¹¹ connects the contacts F⁷ and F⁸ with each other—but when the person in charge of the station desires to stop a train automatically on the sections A′ A² use is made of the switch-lever F¹¹ of the switch F⁵—that is, the switch-lever is turned to connect the contact F⁷ with the contact F⁹—and when a train is to be stopped on the sections A³ A⁴ the lever F¹¹ of the switch F⁶ is turned to connect the contact F⁷ with the contact F⁹. When the lever F¹¹ of the switch F⁵ or F⁶ connects the contacts F⁷ and F⁹ with each other, then the battery I′ furnishes the electric current, which passes to the corresponding track-conductor B⁴, B⁵, B⁶, or B⁷ and by the locomotive-contact D to the switch I and mechanisms K and L to actuate the same for stopping the train, as previously explained. In case the train is traveling on the track-section A², for instance, and approaches the station and the track is blocked by cars or other obstructions unknown to the engineer of the train, then the station-master simply moves the lever F¹¹ of the switch F⁵ to connect the contacts F⁷ and F⁹ with each other, whereby a current is sent to the cab of the locomotive to actuate the mechanisms K and L for stopping the train. The complete circuit in this case is switch F⁵, battery I′, track-section A², locomotive-frame commutator G, mechanisms K and L, switch F, contact D, conductor A², and back to the switch F⁵. After the train is stopped the person in charge of the station can make telephonic connection with the engineer of the stopped train by turning the switch-lever F¹¹ of the switch F⁵ or F⁶ to connect the contact F⁷ with the telephone-contact F¹⁰ to sound the call-bell of the telephone T or T′ of the locomotive C′ or C.

Thus by the arrangement described a train cannot pass over the crossing when the other track connected with the crossing contains a train, and a train cannot pass onto the crossing when the switch is not properly set, and a train can be stopped before reaching the crossing by the operator in charge of the station.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An electric signaling system for railroad-trains, comprising a sectional conductor along the track, a contact on the locomotive, in engagement with the said conductor, a clock-controlled commutator, an alarm controlled by one current from the commutator, a steam-shutting-off mechanism controlled by the other current from the clock-controlled commutator, for shutting off the steam, and a brake-applying mechanism for applying the brakes, controlled from the said steam-shutting-off mechanism, as set forth.

2. An electric signaling system for railroad-trains, comprising a sectional conductor along the track, a contact on the locomotive, in engagement with the said conductor, a clock-controlled commutator, an alarm controlled by one current from the commutator, a steam-shutting-off mechanism controlled by the other current from the clock-controlled commutator, for shutting off the steam, a brake-applying mechanism for applying the brakes, controlled from the said steam-shutting-off mechanism, a manually-controlled switch in the circuit, between the said contact and the said clock-controlled commutator, and a telephone connected with the switch, as set forth.

3. An electric signaling system for railroad-trains, comprising a sectional track-conductor, a contact carried on the locomotive, for engaging the said conductor, a clock-controlled commutator on the locomotive, controlling two partial cab-circuits, a switch for looping the said cab-circuits into the track-circuit by way of the contact and the frame of the locomotive, and a steam-shutting-off mechanism in one of the said cab-circuits, as set forth.

4. An electric signaling system for railroad-trains, comprising a sectional track-conductor, a contact carried on the locomotive, for engaging the said conductor, a clock-controlled commutator on the locomotive, controlling two partial cab-circuits, a switch for looping the said cab-circuits into the track-circuit by way of the contact and the frame of the locomotive, a steam-shutting-off mechanism in one of the said cab-circuits, and a brake-applying mechanism, controlled by a relay from the said steam-shutting-off mechanism, as set forth.

5. An electric signaling system for railroads, comprising a sectional track-conductor, a contact carried on the locomotive, for engaging the said conductor, a clock-controlled commutator on the locomotive, two partial cab-circuits on the locomotive, controlled by the said commutator, a switch for looping the said cab-circuits into the track-circuit by way of the said contact and the locomotive-frame, and a telephone having one terminal in the said

switch and the other in one of the said cab-circuits, as set forth.

6. An electric signaling system for railroad-trains, comprising a sectional track-conductor, a contact carried on the locomotive, for engaging the said conductor, a clock-controlled commutator on the locomotive, controlling two partial cab-circuits, a switch for looping the said cab-circuits into the track-circuit by way of the contact and the frame of the locomotive, a steam-shutting-off mechanism in one of the said cab-circuits, a brake-applying mechanism, controlled by a relay from the said steam-shutting-off mechanism, and a telephone having one terminal in the said switch and the other in one of the said cab-circuits, as set forth.

7. A signaling system for railroad-trains, provided with an operating mechanism for a valve in a motive-agent-conducting pipe, the said mechanism comprising a weighted lever on the valve-stem and having a hook, a retaining-shaft for the said hook, provided with an arm, a tripping device for the said arm, and an electromagnet having its armature connected with a part of the said tripping device, as set forth.

8. A signaling device for railroad-trains, provided with an operating mechanism for a valve in a motive-agent-conducting pipe, the said mechanism comprising a weighted lever on the valve-stem and having a hook, a retaining-shaft for the said hook, provided with an arm, a tripping device for the said arm, and an electromagnet having its armature connected with a part of the said tripping device, the latter consisting of a rock-shaft, a trip for the retaining-shaft arm, having a pivoted trip-catch engaging the rock-shaft, and a weighted lever connected with the rock-shaft, as set forth.

9. A signaling system for railroad-trains, provided with an operating mechanism for a valve in a motive-agent-conducting pipe, the said mechanism comprising a weighted lever on the valve-stem and having a hook, a retaining-shaft for the said hook, provided with an arm, a tripping device for the said arm, and an electromagnet having its armature connected with a part of the said tripping device, the latter consisting of a rock weight-controlled shaft, a releasing device for the rock-shaft, connected with the said armature-lever, and a weighted lever normally locked in position by the said rock-shaft, the weighted lever controlling the arm of the said retaining-shaft, as set forth.

10. A signaling system for railroad-trains, provided with an operating mechanism for a valve in a motive-agent-conducting pipe, the said mechanism comprising a weighted lever on the valve-stem and having a hook, a retaining-shaft for the said hook, provided with an arm, a tripping device for the said arm, and an electromagnet having its armature connected with a part of the said tripping device, the latter consisting of a rock weight-controlled shaft, a releasing device for the rock-shaft, connected with the said armature-lever, a weighted lever normally locked in position by the said rock-shaft, the weighted lever controlling the arm of the said retaining-shaft, a fixed contact, terminals of a circuit, and a contact carried by the weighted lever and adapted to engage the said terminals, to close the circuit, as set forth.

11. A signaling system for railroad-trains, provided with section-conductors and a contact having a fixed frame, spring-pressed carriers held to slide in the frame, and contact-rollers journaled in the said carriers and engaging the said conductor-sections, the rollers extending transverse of the conductor-sections and spaced apart longitudinally, as set forth.

12. A signaling system for railroad-trains, provided with a clock-driven commutator, having a rim formed of spaced contacts, insulated one from the other, insulated wheels on opposite sides of the rim, connected with alternate contacts on the rim, and contact-plates for the rim and wheels, as set forth.

13. A signaling system for railroad-trains, provided with a switch-setting device, having a switch-shaft connected with the switch-point, an arm on the said shaft, and contact-plates on opposite sides of the shaft and adapted to be engaged by the said arm, as set forth.

14. A signaling system for railroad-trains, provided with conductors in the tracks, for connection with stopping devices in the cabs of locomotives, switch-setting devices, each having a switch-shaft connected with the switch-point, an arm on the shaft, contact-plates on opposite sides of the shaft, adapted to be engaged by the said arm, and electric connections between the contact-plates and the track-conductors, as set forth.

15. A signaling system for railroads, comprising conductors in the track-sections, a circuit on each train, provided with a contact engaging the corresponding conductor, a steam-shutting-off mechanism, controlled by a current from the said circuit, switch-setting devices, each having a switch-shaft connected with the switch-point, an arm on the shaft, contact-plates on opposite sides of the shaft, adapted to be engaged by the said arm, and an electric connection between the contact-plates and the said track-conductors, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN DIANOVSZKY.

Witnesses:
THEO. G. HOSTER,
EVERARD BOLTON MARSHALL.