

No. 768,502.

PATENTED AUG. 23, 1904.

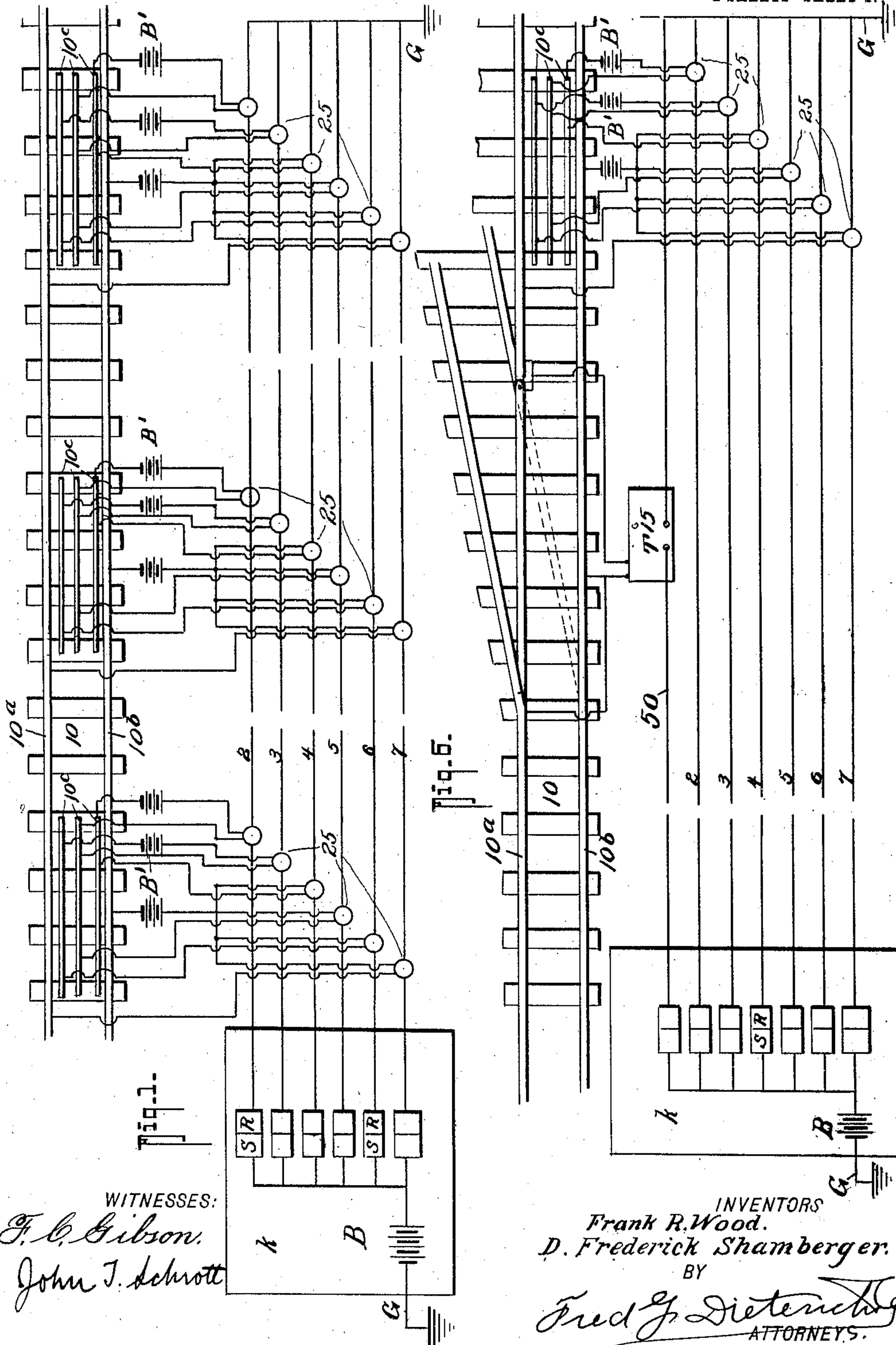
F. R. WOOD & D. F. SHAMBERGER.

AUTOMATIC TRAIN SIGNALING AND RECORDING SYSTEM.

APPLICATION FILED AUG. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

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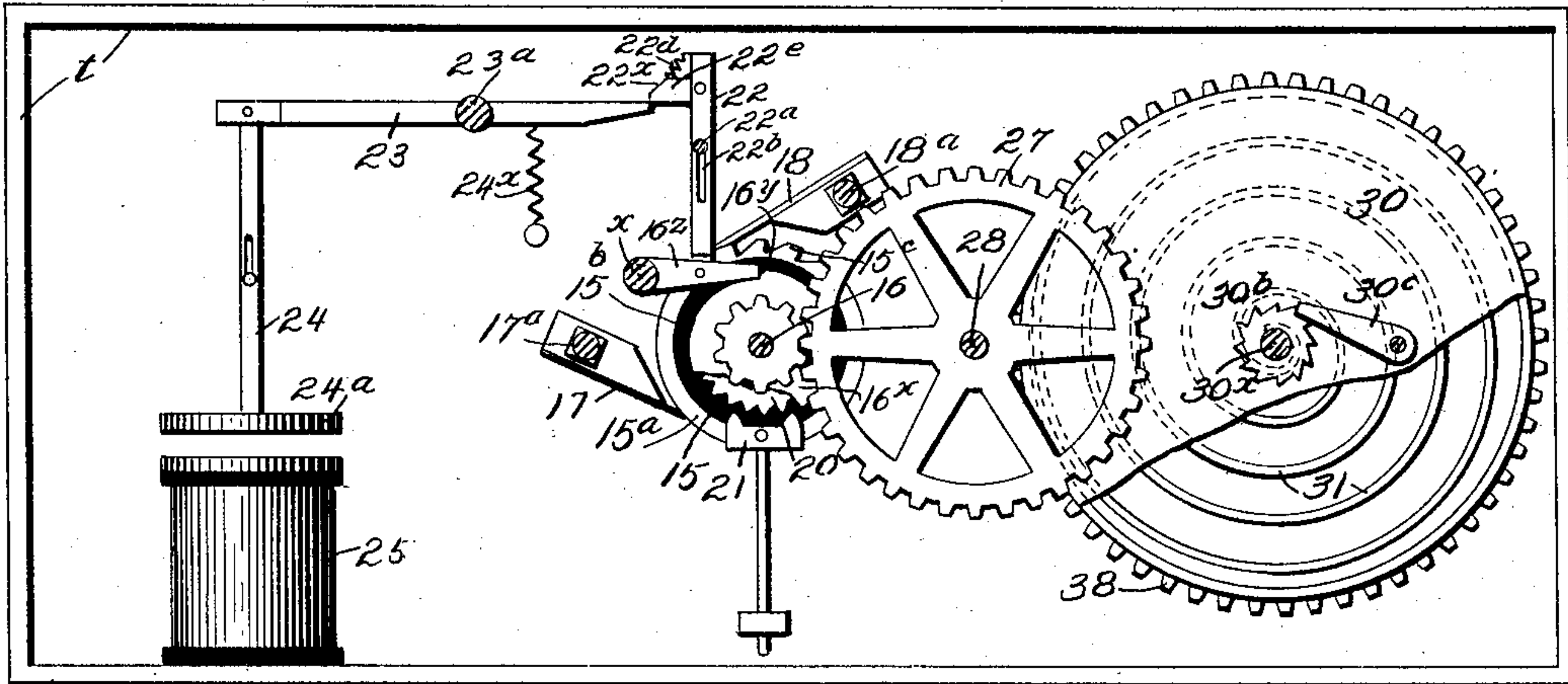


Fig. 2.

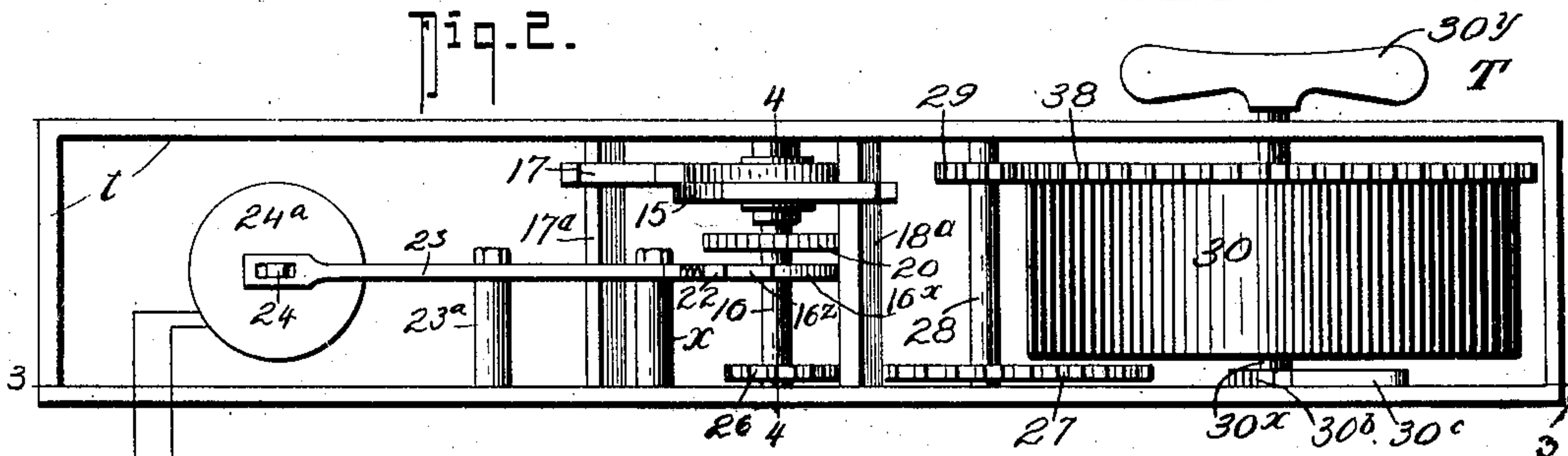


Fig. 4.

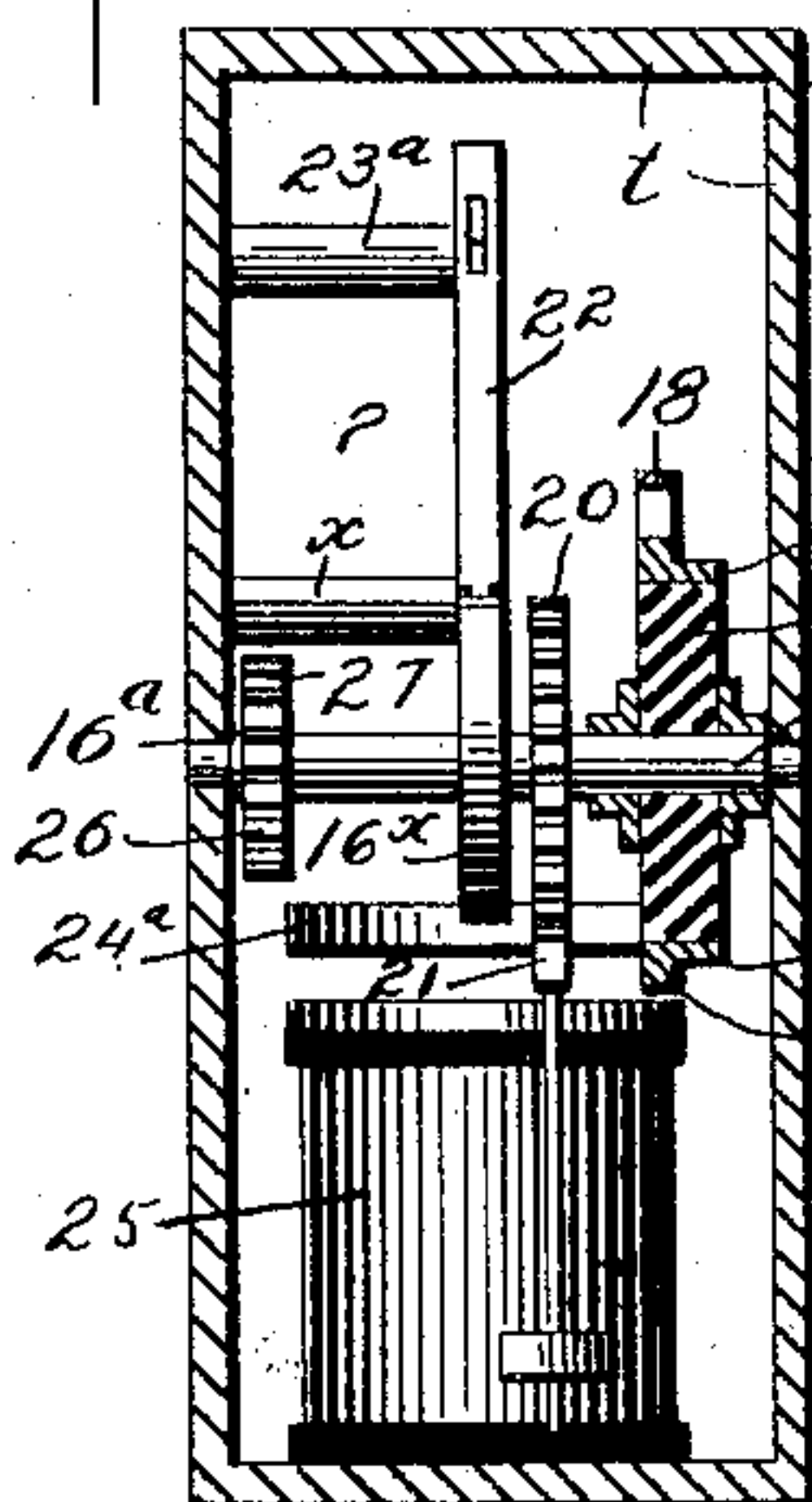
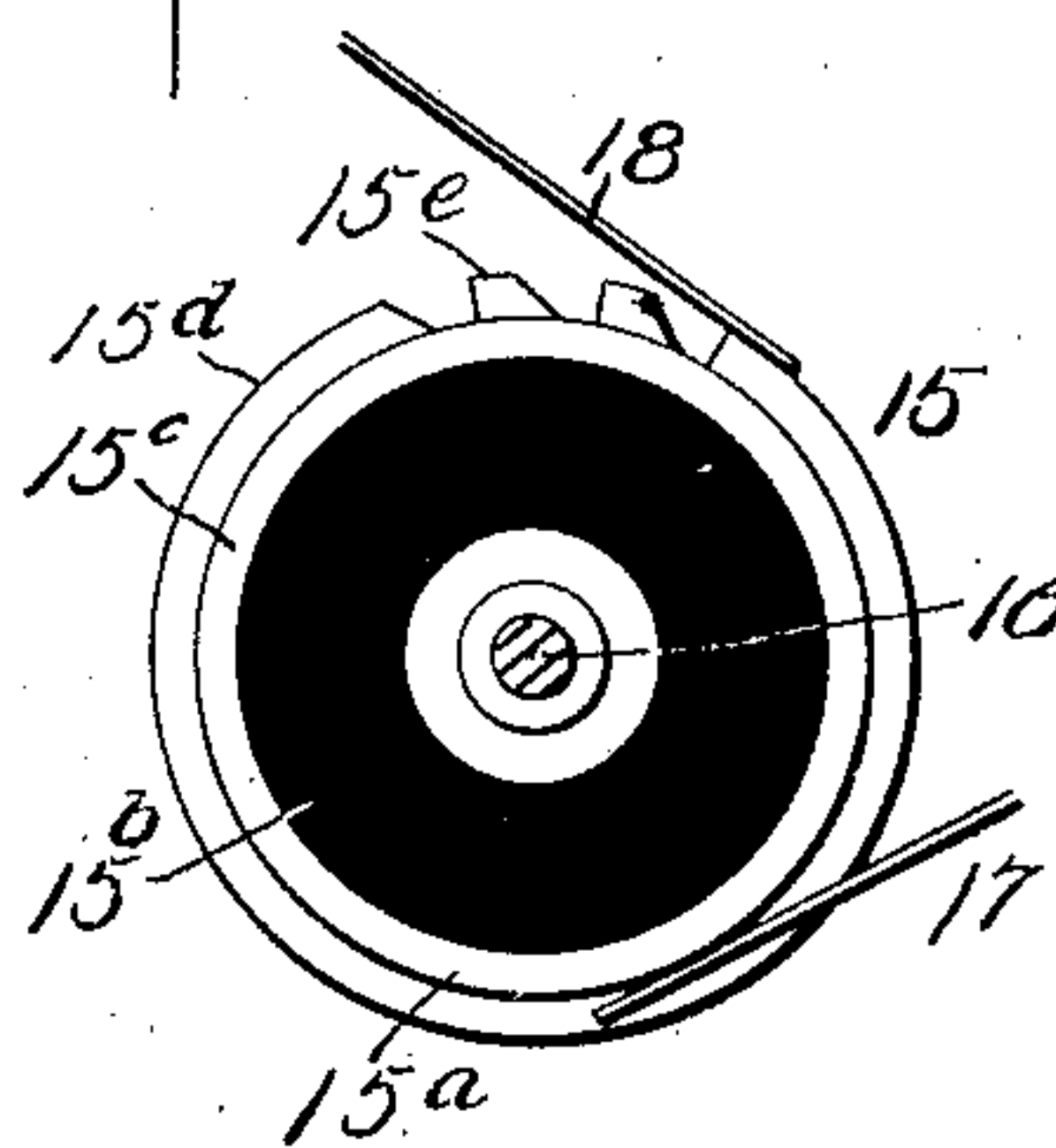


Fig. 5.



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AUTOMATIC TRAIN SIGNALING AND RECORDING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 768,502, dated August 23, 1904.

Application filed August 24, 1903. Serial No. 170,597. (No model.)

To all whom it may concern:

Be it known that we, FRANK R. WOOD and DANIEL FREDERICK SHAMBERGER, residing at Sparrows Point, in the county of Baltimore and State of Maryland, have invented a new and Improved Automatic Train Signaling and Recording System, of which the following is a specification.

Our invention relates to the class of railroad signaling mechanisms in which the exact time a certain train passes a given point or station will be recorded at a central station, together with the train-number and the number of the station passed by the train.

The invention includes a transmitter-box having a plurality of number-wheels corresponding to the given number of trains and located at a predetermined point or station along the line, and the corresponding number-wheels of each transmitter are connected in series with each other and with an electrically-operated time-stamp and recording mechanism.

With other objects in view which will hereinafter be apparent the invention consists in certain novel combination and arrangement of parts, such as will be first described in detail and then specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view showing our invention as applied for use. Fig. 2 is a top plan view of the transmitter-box, the cover being removed. Fig. 3 is a vertical section taken on the line 3 3 of Fig. 2. Fig. 4 is a cross-section taken on the line 4 4 of Fig. 2. Fig. 5 is a detail view of one of the number-wheels and its cooperating contact members. Fig. 6 is a diagrammatic view hereinafter specifically referred to.

In the drawings, $\frac{1}{2}$ designates the main or central station in which are located the time-stamp devices S and the recording mechanisms R of any approved construction, and the said time-stamp and recording mechanisms are connected with the main line-wires 2, 3, 4, 5, 6, and 7, and with the ground-wires G, as clearly shown in Fig. 1.

Arranged at suitable intervals along the railroad-line 10, which includes the track-rails

10^a 10^b and the auxiliary track-rails 10^c, are transmitters T. (Shown in detail in Figs. 2, 3, and 4, by reference to which it will be seen the transmitter T includes a box or casing *t*, in which is included a number-wheel 15, arranged to turn in unison with the shaft 16, rotated in bearing 16^a in the side walls of the casing *t*, which casing may be constructed of any suitable material.) The wheel 15 consists of a metallic rim 15^a, secured to the fiber or insulating-disk 15^b, fixedly secured to the shaft, (see Fig. 4,) and the said metallic rim 15^a consists of a continuous uninterrupted contacting portion 15^c, with which the brushes 17, mounted on the cross-bar 17^a, engage, and a surface 15^d, having a series of teeth 15^e, suitably spaced to signal the train and station number and with which the brushes 18, mounted on the cross-bar 18^a, engage for the purposes presently to appear. The number-wheels 15 are arranged with a series of signaling-teeth adapted to send in one signal for each revolution of the number-wheel in the manner presently explained.

Mounted and secured to rotate with the shaft 16 is an escapement-wheel 20, adapted to cooperate with the escapement-pendulum 21 to regulate the speed of rotation of the shaft 16, and the said shaft 16 also carries a ratchet-wheel 16^x, having ratchet-teeth 16^y, with which the pawl 16^z, pivoted on the stud π on the side wall of the casing *t*, engages.

22 designates a vertically-movable rod or bar mounted for vertical movement on the stud 22^a on the side wall of the casing *t* by means of a slotway 22^b, and the said rod 22 is connected at its lower end to the pawl 16^z, while it carries a pivot-finger 22^c, spring-held by a coil-spring 22^d or otherwise to its normal position at right angles to the rod 22, and the said finger has a bevel 22^x for a purpose presently explained.

Pivoted on the stud 23^a for cooperating with the finger 22^c is a lever 23, to one end of which is pivoted and pendently secured a rod 24, having a keeper 24^a at its lower end to cooperate with the electromagnet 25, connected with the track-rails 10^a 10^b and the auxiliary rail-sections 10^c, as shown, and the said lever

23 is normally held to the position shown in Fig. 2 by a coil-spring 24^x.

Meshing with the pinion 26 on the shaft 16 is a gear 27, mounted at one end of the counter-shaft 28, which shaft 28 carries a pinion 29 at its other end for meshing with the gear portion 38 of the motor 30, mounted on the shaft 30^x, which has a ratchet-wheel 30^b engaged by the pawl 30^c and to which the shaft 30^x and spring 31 within the motor-casing 30 are secured, the said spring 31 being also secured to the motor-casing to cause the said motor-casing to rotate. The shaft 30^x is prevented from normally turning by the ratchet-and-pawl devices 30^b and 30^c, and the said shaft carries a key 30^y, by means of which the motor-spring may be wound up in the usual manner.

From practical experience we have found that resistance between the rails of the railroad having a stone road-bed as now generally constructed is sufficiently high to avoid the necessity of insulating the rails to which the terminals from the magnet 35 connect. However, whenever it may be necessary we may insulate the rails in any approved manner.

The train is equipped with suitable levers, &c., which when the train passes over the auxiliary rails will contact therewith to short-circuit one of the electric circuits for one of the magnets 25, it being understood that different trains may operate to close any of the circuits desired through the auxiliary rails and the main rails.

So far as described the manner in which our invention operates may be best explained as follows: Assuming the trains to be running from the left to the right in Fig. 1, as the first train draws near the first station having the transmitter the resistance between the rails will become sufficiently reduced by short circuit to permit the current from battery B' to flow through magnet 25, causing it to draw down the armature 24^a and rock the lever 23 until it raises the bar or rod 22 and has its portion 23^a disengaged from the finger 22^a. This momentarily withdraws the pawl from the ratchet-wheel, which as soon as the finger 22^a and lever 23 become disengaged will again engage the surface of the ratchet-wheel to prevent its rotating more than the predetermined distance. As soon as the pawl is disengaged from the ratchet-teeth the shaft 16 will rotate one-sixth of a revolution and permit the signaling-teeth on the first number-wheel to pass under their respective contact-arm to break and make the circuit. The breaking of the circuit (normally closed) serves to start the time-stamp and the recording mechanism. The said recording mechanism will then register the number of breaks and makes of its respective circuit by the said number-wheel and record the station and train number which is in operation. As soon as the

first train leaves the vicinity of the first station, the resistance between the track-rails becoming again great, the current will cease to flow through the magnet 25 to allow the lever 23 to again assume its normal position, and by reason of the length of the portion 23 of the lever and the finger 22^a the said lever will pass said finger and engage the under side of said finger on its return movement. As the second train arrives at the first station the same cycle of operations will take place, except the second number-wheel sends in the station-signal through the second circuit and operates its respective time-stamp and recording mechanism. The train number is registered by the recording mechanism, it always being the same for each operation of the recording mechanism—that is, first train records on the time-stamp and recording mechanism S' R', the second train on the mechanism S² R², and so on. As the second train arrives at each successive station along the line it will operate its respective number-wheel in each transmitting-station and its respective time-stamp and recording mechanism in the main or central station in the same manner as for the first train, and so on for each train. It should be understood that the first train will have its lever so arranged as to short-circuit the magnet 25 in the signal-box in the circuit No. 2 through the auxiliary rails 10^c 10^d, while the second train will operate the circuit No. 3 by short-circuiting the main track-rail 10^b and the auxiliary rail 10^e. Train No. 3 operates circuit No. 4 by short-circuiting the auxiliary circuit through the track-rail 10^b and the auxiliary rail 10^d. The fourth train operates through the circuit No. 5 and short-circuits the main rail 10^b and the auxiliary rail 10^e. The fifth train operates through the circuit No. 6 and short-circuits through track-rail 10^b and auxiliary rail 10^e, whereas train No. 6 operates by short-circuiting both track-rails. Train No. 7 operates through No. 2 circuit again, and so on.

In Fig. 6 we have shown a slightly-modified form of our invention adapted for use to record the position of the switches along the railroad-line, as well as recording the train-number, &c. It will be seen we provide an additional transmitter T¹⁵ for each switch along the line, which transmitter is preferably in circuit with the auxiliary wire 50, although they may be connected to one of the main line-wires, if desirable, and in the said auxiliary transmitters T¹⁵ we may use a single number-wheel 15, having two sets of signaling-teeth and arranged to send in one signal when the switch is turned to open the main line and the other to signal when the switch is open to the siding, in the manner readily understood by reference to Fig. 5, from which it will be seen the magnet 25 has one terminal connected to the switch to set the transmit-

ters T¹⁵ in operation when the switch makes contact with either rail. In this form the ratchet-wheel 16^x has two ratchet-teeth at diametrically opposite points to permit of the signal-wheel making but one half-revolution for each operation.

From the foregoing it will be seen that we provide a simple and effective system of train recording and signaling means which will record the train-number, the station passed, and the time when the train passes the station, as well as the position of the switches along the line and the time when they were turned, it being understood that any approved time-stamp mechanism and Morse or other recorder may be used as they *per se* form no part of our present invention.

From the foregoing it will also be seen that the speed and direction in which the train is going may be readily calculated by observing the differences of time between the records of the train at each succeeding station and by knowing the distances between each succeeding station. For instance, assuming the first train to operate at the first station to the left of Fig. 1 to stamp the time—say 2.55—and when it reaches the second station the time stamped is 2.57, and the distance between the first and second station is one mile, then the train will have made the distance between the two stations in two minutes, or running at the speed of thirty miles an hour. The direction in which the train is going may be told by the way in which the station signals or numbers are recorded. For instance, if the first station to the left of Fig. 1 is recorded first and then the second station, and so on, the train is running from left to right, whereas if the third station from the left in Fig. 1 is recorded first, then the second station, and then the first station the train will be running from right to left.

While we have shown but one central station $\frac{1}{2}$, yet we desire it understood that there may be any number of main stations located at different points along the line, if found desirable.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the advantages and complete operation of our invention will be readily apparent to those skilled in the art to which it appertains.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a train recording system, a plurality of main line-wires, a time-stamp and recording mechanism for each line-wire, said time-stamp and recording mechanisms being located at a common place, transmitter mechanisms for said main line-wires, adapted to be set in motion by the passing train, and including a rotatable shaft and a signaling-wheel carried

by the said shaft for each line-wire, for the purposes specified.

2. In a train-recording system, a plurality of main line-wires, a time-stamp and recording mechanism for each line-wire located at a common place, suitably-placed transmitter mechanisms for said main line-wires, each adapted to be set in operation by the passing train and each including a signaling-wheel for its respective main line-wire, the corresponding signaling-wheels of each transmitter being electrically connected with each other and with the time-stamp and recording mechanisms, for the purposes specified.

3. In a train recording system, a plurality of main line-wires, a time-stamp and recording mechanism for each line-wire located at a common place, suitably-placed transmitter mechanisms for said main line-wires, each adapted to be set in operation by the passing train and each including signaling-wheels one for each main line-wire, the corresponding signaling-wheels of each transmitter being electrically connected in series with each other and with the time-stamp and recording mechanism, for the purposes specified.

4. In a train recording and signaling system, comprising in combination with the main line-wires and the recording instruments, of transmitter mechanisms placed at suitable distances along the rail-line, said transmitter mechanisms each including a signaling-wheel for each main line-wire, means for causing said signaling-wheels to rotate, electromagnetically-operated devices for releasing said wheel-driving mechanism at predetermined times, said electromagnetically-operated releasing mechanism being electrically connected to the track-rails and being adapted to be short-circuited by the passing train to cause said electromagnetically-operated mechanism to release said signaling-wheel-driving mechanism, for the purposes specified.

5. In a signaling and recording system for railroads, comprising in combination with the track-rails, the main line-wires and the recording mechanisms, of transmitter mechanisms, comprising a rotatable shaft and signaling-wheel carried thereby, a drive-motor for said shaft, a ratchet having teeth equal in number to the signaling-wheels, a magnetically-controlled pawl for cooperating with said ratchet adapted to be released from said ratchet by the passing train, as specified.

6. In a signaling system for railroads and the like, comprising in combination with the main track-rails, of auxiliary rails arranged parallel to and between said track-rails, of a plurality of main line-circuits including recording mechanisms, transmitter mechanisms one for each main line-circuit, auxiliary circuits connecting each of said transmitter mechanisms with the track-rails, auxiliary rails or both, so that said auxiliary circuits may be

closed by the passing train to operate said transmitter mechanisms.

7. In a signaling mechanism, comprising in combination with the track-rails, of auxiliary conductor-rails, of a plurality of auxiliary circuits connected with said track-rails, said supplemental rails or both, said auxiliary circuits including transmitter mechanisms, a

main circuit for said transmitter mechanisms, including recording devices, all being arranged as shown and described.

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