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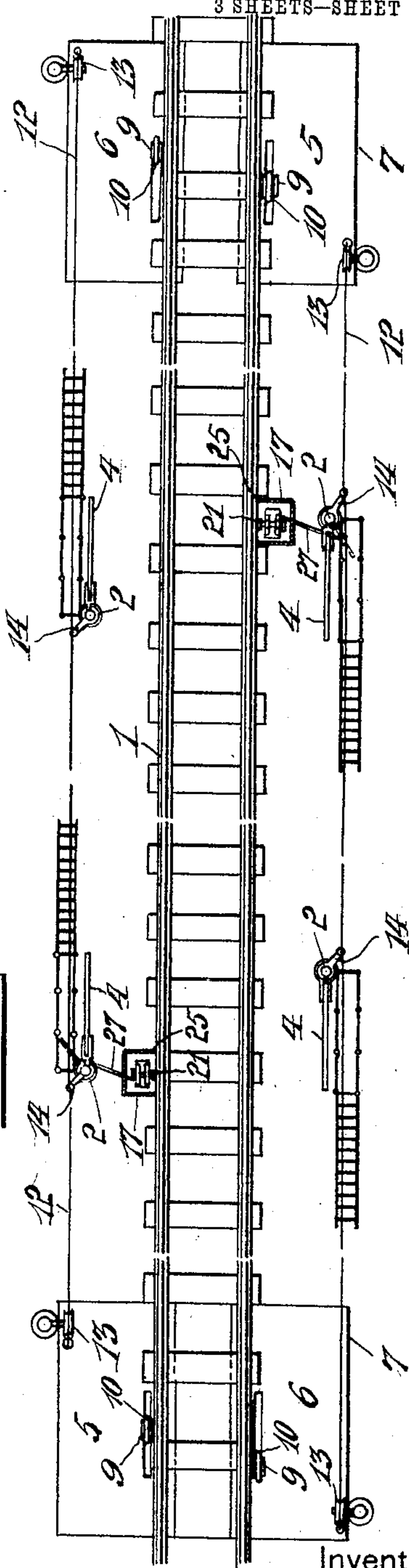
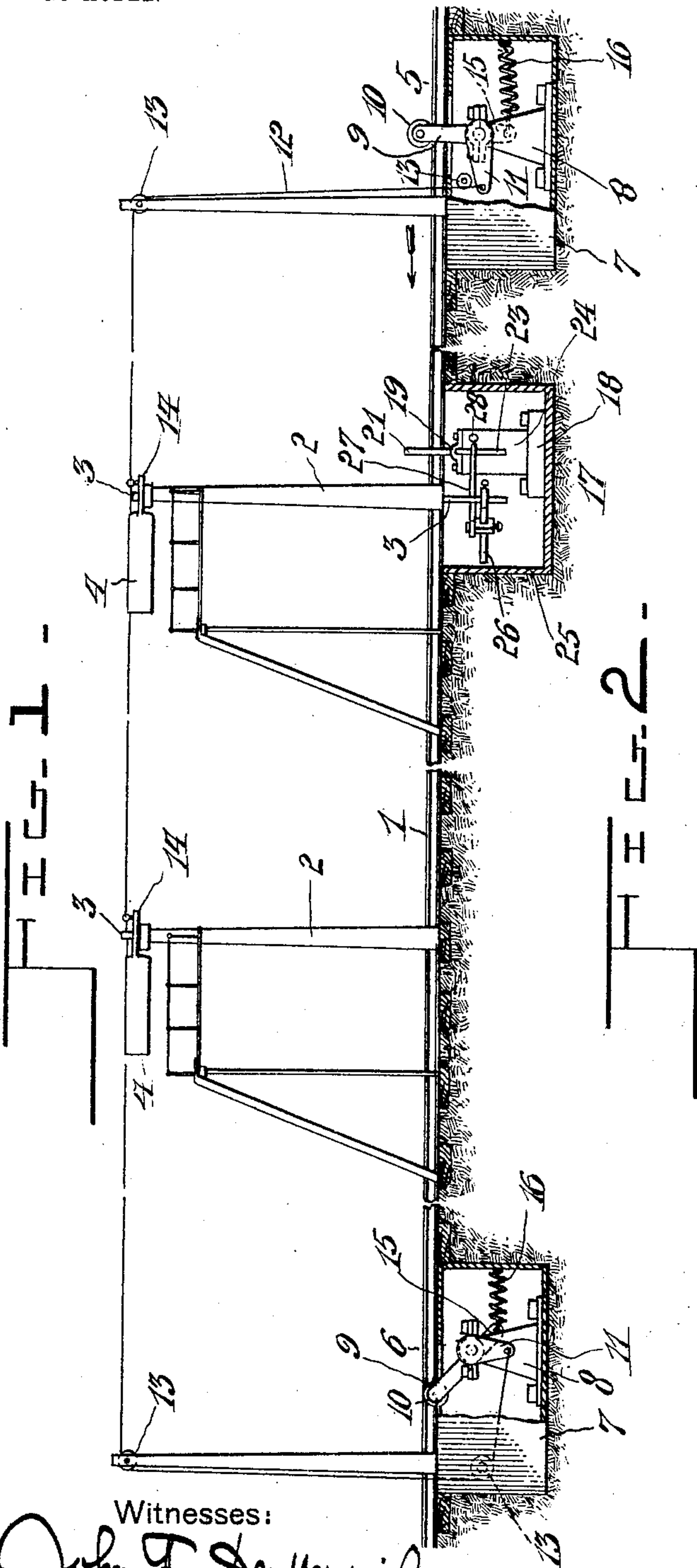
PATENTED OCT. 4, 1904.

E. RENAUD.
RAILWAY SIGNAL SYSTEM.

APPLICATION FILED JULY 17, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

John F. Deufferwil
H. D. Ammer

By

Ernest Renard
Marion Marion

Attorneys

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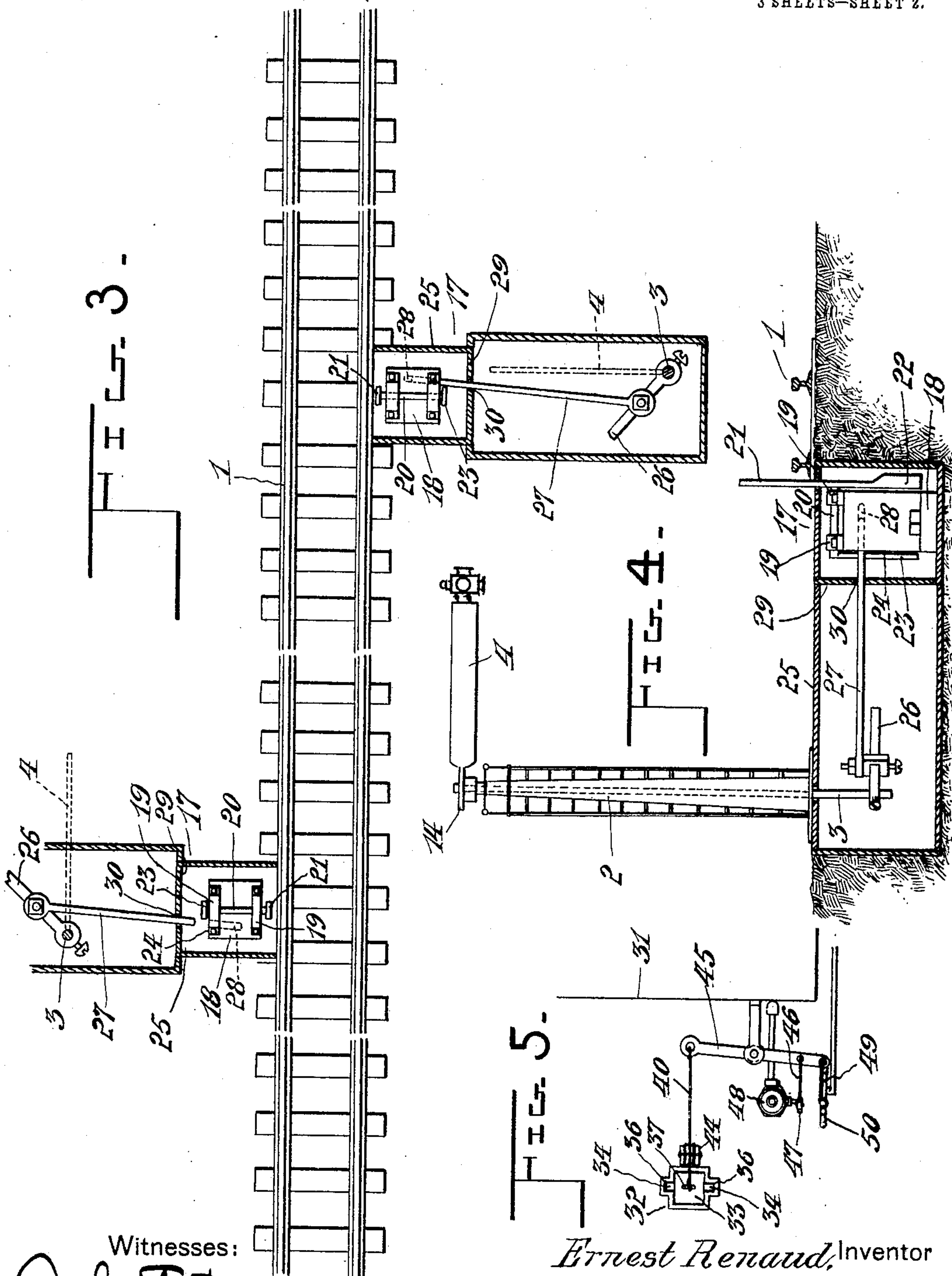
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3 SHEETS—SHEET 2.



Witnesses:

Witnesses:
John T. Deufferwiel
J. G. Bruner

Ernest Renaud, Inventor

By

Marion Marion

Attorneys

No. 771,270.

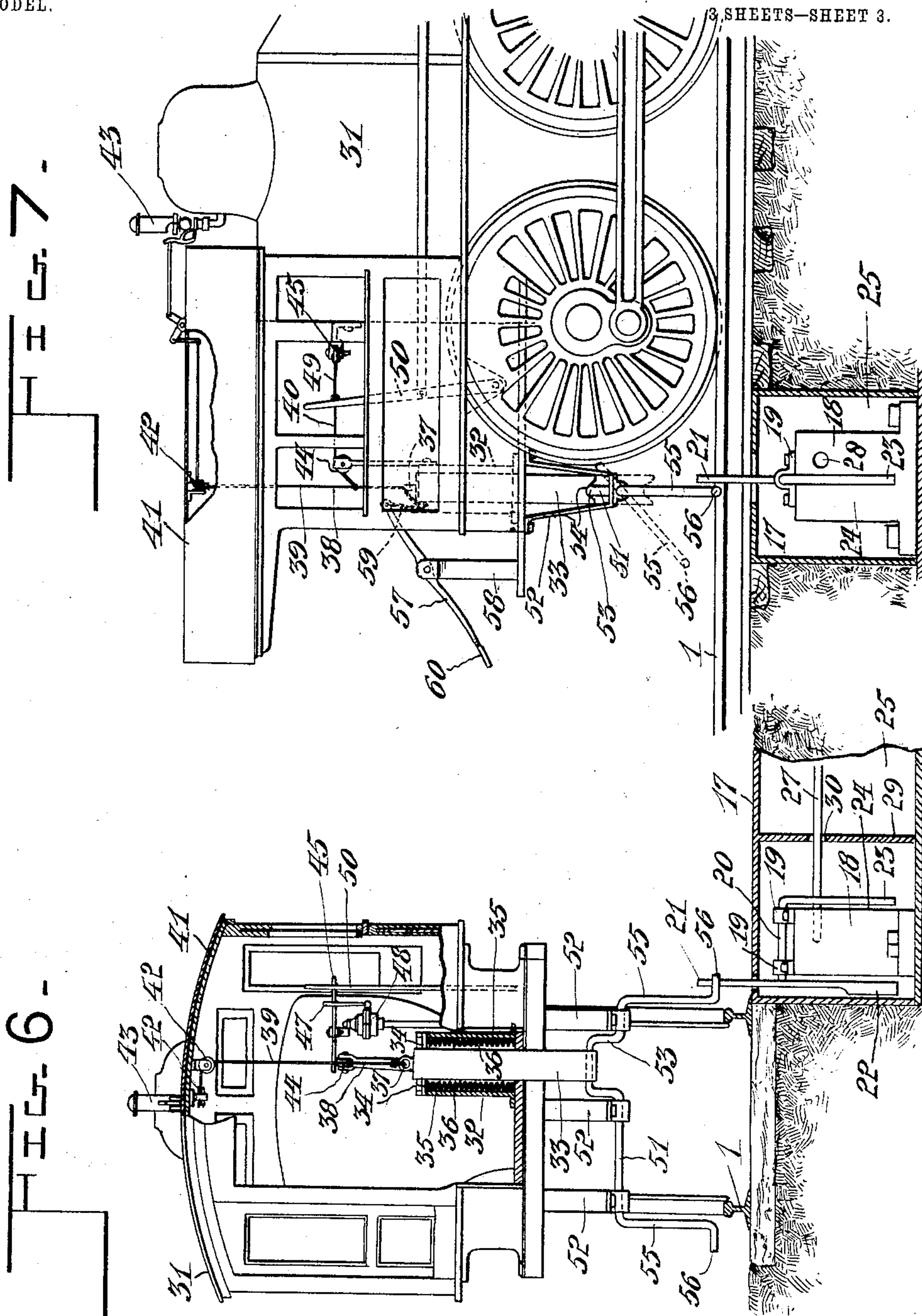
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13 SHEETS—SHEET 3.



Witnesses:

Witnesses:
John F. Deffenwiel
J. D. Ammer

Ernest Renaud, Inventor

By

Marion & Marion

Attorneys

UNITED STATES PATENT OFFICE.

ERNEST RENAUD, OF MONTREAL, CANADA, ASSIGNOR OF ONE-HALF TO CHARLES HENRI BEAUCHEMIN, OF ST. JEAN, CANADA, AND CHARLES FREDERIC BEAUCHEMIN, OF FARNHAM, CANADA.

RAILWAY SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 771,270, dated October 4, 1904.

Application filed July 17, 1903. Serial No. 166,051. (No model.)

To all whom it may concern:

Be it known that I, ERNEST RENAUD, residing in the city and district of Montreal, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Railway Signal Devices; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to signals and signal systems, such as used in connection with the operation of railways.

The invention contemplates the employment of a plurality of semaphores or signals to be disposed at intervals along the railway-track, and these semaphores are operated by track devices placed in such a manner as to divide the signals into blocks or sections, all of the signals in one section lying between and being operated by two consecutive track devices.

While a signal system as simple as that just described may be depended upon to operate the semaphores so as to indicate the approach of another train, accidents still occur, due to the negligence of the engineer or engine-driver who passes the signal unobserved.

It is the object of this invention to provide an arrangement in connection with the semaphores, whereby when the semaphores are in their "warning" or "danger" position an automatic application of the air-brakes of the train will take place independently of the control of the negligent trainmen. To this end certain track devices are employed, preferably arranged at or near certain semaphores, and mechanism which connects these track devices with the semaphores operates in such a manner as to render the track devices operative when the signal is in its "danger" position and inoperative or idle when the semaphores are in their normal inactive position. From this arrangement trains which are passing without danger will pass the latter track devices without occasioning the application of the brakes.

The invention concerns itself also with the construction and arrangement of devices car-

ried by the train, preferably by the locomotive, which devices are actuated by the parts referred to above in such a manner as to apply the brakes throughout the train and shut off the steam and operate the whistle. In this manner the train would be quickly brought to a stop and the passengers warned of their danger.

The invention consists in the construction and combination of parts to be more fully described hereinafter, and definitely set forth in the claims.

In the drawings, which fully illustrate my invention, Figure 1 is a side elevation and section showing a portion of a railway-track to which my system has been applied. Fig. 2 is a plan of the parts shown in Fig. 1, certain portions being shown in section, as will appear. Fig. 3 is a plan showing a short portion of track, a part of this view being in section, so as to illustrate the interior construction of certain track devices constituting a part of my invention. Fig. 4 is a vertical section taken in a plane transverse with respect to the rails and representing a track device operating in conjunction with a semaphore. Fig. 5 is substantially a plan showing the parts carried by the train and which are effected by the track device to apply the brakes. Fig. 6 is a rear elevation of a locomotive, partially shown in section, so as to illustrate more fully certain parts of my invention. Fig. 7 is substantially a side elevation of a portion of the locomotive shown in Fig. 6, certain parts of this view being shown in section and broken away as indicated.

Throughout the drawings and specification the same numerals of reference denote like parts.

Referring more particularly to the parts, 1 represents a portion of a railway-track comprising a single track, as shown. At the sides of the track and at a suitable distance apart there are provided a plurality of signal posts or poles 2, in which are rotatably mounted vertical stems or spindles 3, and to the same are attached at their upper extremities the semaphores or signals 4. These signal-poles are

preferably disposed on both sides of the track, so as to enable the system to be operated with trains passing in either direction.

The signals are supposed to be divided into 5 sets or blocks, all the signals of one block being operated by the same track devices. In practice a large number of signals would be connected together in this manner, as will be readily understood; but in the drawings it has been con- 10 sidered sufficient for the purpose of illustration to show only two such signals. It should be understood that in the operation of the signal track devices are employed, which I will refer to hereinafter as "signal-actuating" de- 15 vices. There are preferably two of these devices in conjunction with each signal-block for each side of the track. These devices are represented, respectively, by the numerals 5 and 6 and are preferably disposed, as shown, in 20 suitable boxes or casings 7 set into the road-bed. Each signal-actuating device comprises a pedestal or bearing 8, supporting a lever 9, at the upper extremity of which there is attached a roller 10, as shown. These levers 25 are bell-crank levers, as indicated, and have arms 11, to which are attached a suitable signal-cable 12. The signal-cable may pass through suitable guide-pulleys 13 and connects together the rear arms 14 of the sema- 30 phores 4, as will be readily understood. It should be stated that the deflection of the lever 9 of the track device 5 by a train passing in the direction represented in Fig. 1 will operate to throw all the semaphores 35 into a position transverse with respect to the track, so that they will be a warning or danger signal to be seen from the following train, and it should be understood that the semaphores remain in this danger position till the 40 train passes from the block, at which time it operates the track device 6 in such a manner as to return all the semaphores to their normal inconspicuous position, at the same time returning the lever 9 of the device 5 to its 45 normal erect position. Evidently the erect position of one of the levers 9 corresponds to the depressed position of the corresponding lever of the other device.

The levers 9 are provided with downwardly- 50 extending arms 15, to which are attached springs 16, disposed as shown, this arrangement being adopted for the purpose of enabling trains to pass in a reverse direction without operating the signals used only in 55 connection with trains which pass in one direction. In conjunction with certain of the semaphores there are provided track devices 17, which I shall refer to as "emergency" track devices. Each of these devices consists 60 of a block or pedestal 18, constituting a support for bearings 19, in which bearings is mounted a horizontal spindle 20, the same having attached thereto a trip-arm 21. This trip-arm is provided with a counterweight 65 22, which normally operates to maintain it in

a substantially vertical position, and at the extremity remote from the said trip-arm there is rigidly attached to the spindle 20 a stop- 70 arm 23, the same depending downwardly near the rear face 24 of the block 18. It should be understood that this trip-arm 21 is intended to afford means for actuating certain parts or mechanism carried by the train or locomotive in such a manner as to apply the brakes, shut 75 off the steam, and blow the whistle. The mechanism which the trip-arm actuates will be fully described hereinafter. All this mechanism is preferably disposed in a box 25, which is depressed below the level of the rail- 80 way and at the side, as shown, and into this box projects the lower extremity of the vertical spindle 3 of a semaphore, the said extremity having attached rigidly thereto an arm 26. This arm has a rod 27 attached to 85 the same, and the outer extremity of this rod is loosely received by a bore 28, formed in the block 18 through the said rear face 24. It should be understood that the freedom of movement of the rod 27 when the arm 26 90 moves is in no way restricted, and it should be further stated that when the semaphore is in its danger position the extremity of the rod 27 lies within the bore 28, and when the semaphore is in its less conspicuous position the extremity of the rod 27 withdraws itself 95 from the bore and from the vicinity of the face 24, and it should be observed also that when projecting into the bore the rod 27 passes very close to the aforesaid depending arm 23 and at the side of the same in such a 100 manner that it would prevent the movement or deflection of the trip-arm 21. In other words, the rod 27 acts as a support to prevent the deflection of the arm 21 by a passing train, it being understood that the train would 105 tend to deflect the arm in such a direction as would force the arm 23 against the side of the rod. From this arrangement it will be evident that when the semaphore is in its danger position the trip-arm will be in operative 110 relation or condition with respect to a passing train. When the rod is removed, however, the trip-arm would offer little or no resistance to deflection and would not exert sufficient force upon the device carried on the 115 train to enable the latter to be operated. In order to guide the extremity of the rod 27 as it passes in and out through the bore, a vertical partition 29 is provided in the box 25, having an opening 30, through which the rod 120 passes, as shown.

Referring especially to Figs. 5, 6, and 7, it will appear that near the locomotive 31 and preferably upon the floor of the cab there is provided a casing 32, the same constituting a 125 vertical guide for a block or weight 33, preferably of some heavy material, such as cast-iron. Near its upper extremity this block is provided with oppositely-projecting wings 34, and springs 35 are provided beneath the same, 130

said springs being disposed in packets or recesses 36, formed in the said casing. These springs are not for the purpose of sustaining the block 33 in its elevated position, such as that shown in Fig. 6, but their sole function is to relieve the shock which might be due to the sudden descent of the weight or block which takes place in the manner which will be described fully hereinafter. At its upper extremity the block 33 is provided with an eye 37, to which a cord 38 is attached, the said cord having two branches or lines 39 and 40, respectively, the former of which passes up to the roof 41 of the cab through certain guide-pulleys 42 in such a manner that it may operate the lever of the steam-whistle 43 of the locomotive. The other cord or line, 40, passes forwardly, as shown, over a guide-pulley 44, and its extremity attaches to a lever 45. Near the extremity of the aforesaid arm of this lever a link 46 connects the same with the lever 47 of an air-valve 48, which air-valve represents the controlling-valve in the air-brake system of the train. Beyond the link 46 a similar link 49 connects the said lever with the throttle-lever 50 of the locomotive, and it should be understood that from this arrangement the descent of the block 33 would operate to actuate the lever 45, which would apply the brakes of the train and close the throttle of the locomotive, at the same time blowing the whistle 43. Under the floor of the cab of the locomotive a crank-shaft 51 is provided, the same being supported in a horizontal transverse position by means of suitable hangers or brackets 52, and the crank 53 of this crank-shaft is disposed just beneath the lower extremity of the aforesaid block or weight 33, the said weight having a transverse notch or recess 54 in the lower face thereof adapted to receive the wrist of the crank in the manner shown. The said notch is preferably formed with a wide or diverging mouth, as indicated. The said crank-shaft 51 comprises depending arms 55, formed at the extremity thereof, and these arms are formed below with lateral extensions 56, which lateral extensions are disposed in such a position that the aforesaid trip-arms 21 will lie in their path as the train passes. From this arrangement it should be understood that when the trip-arm is supported by the rod 27 in an erect position, in the manner already described, the crank-shaft 51 of a passing train would be deflected by reason of the contact of the extension 56. The crank 53, however, normally affords support for the block 33 by reason of the fact that the crank is disposed upon its dead-center, as will be readily understood, there being no moment or lever-arm for the application of the weight. When, however, the crank-shaft 51 is deflected by coming into contact with the trip-arm 21, the crank-shaft will be deflected into some such position as that indicated in dotted lines in

Fig. 7, whereupon the crank will be thrown out of the notch 4, and the weight 33 will descend with the effect already described.

Arrangement may be made for returning the block 33 to its normal elevated position. To this end I provide a lever 57, supported upon a suitable standard 58, and the extremity of this lever may have a chain 59, attached thereto, connected with the aforesaid eye 37. The extremity 60 of the lever 57 would be deflected by the foot of the fireman or engineer till the block 33 were raised sufficiently to allow the crank 53 to swing back into its normal position directly beneath the notch, and the crank would return in this manner by reason of the depending arms 55, which more than counterbalance the crank 53, as will be readily understood.

While I have shown in the accompanying drawings the preferred form of my invention, it will be readily understood that I do not limit myself to the precise form shown, for many of the details may be changed in form or position without affecting the operativeness or utility of my invention, and I therefore reserve the right to make all such modifications as are included within the scope of the following claims or of mechanical equivalents to the structures set forth.

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

1. In a railway signal system, in combination, a signal, a track device having an arm rotatably mounted in a plane disposed substantially in the same direction as the track, a spindle adapted to rotate with said signal, a rod attached to said spindle, means whereby said spindle may project said rod substantially longitudinally, the extremity of said rod lying adjacent to said arm, said extremity being adapted to project in or out of the path of said arm, and means whereby said arm may be deflected by a passing train.

2. In a railway signal system, in combination, a signal, a spindle adapted to rotate with said signal, a track device having an arm adapted to be deflected by a passing train, a second arm rigid with said first arm, and a member attached to said spindle, and which may move in the path of said second arm.

3. In a railway signal system, in combination, a signal, a spindle adapted to rotate with said signal, an arm adapted to rotate in a plane disposed substantially in the same direction as the track, said arm being adapted to be deflected by a passing train, a second arm rigid with said first arm, a rod actuated by said spindle, means for guiding the extremity of said rod adjacent to the path of said second arm, and means whereby the rotation of said spindle may project said rod in or out of the path of said second arm.

4. In a railway signal system, in combination, a semaphore, a vertical spindle carrying

the same, a pillow-block, a rotatable arm mounted in said pillow-block and adapted to be deflected by a passing train, a rod adapted to be extended by the rotation of said vertical spindle, said pillow-block having an opening which may receive the extremity of said rod when extended, and a second arm rigid with said first arm and in the path of which said rod may lie.

5. In a railway signal system, in combination, a semaphore, a vertical spindle carrying the same, a pillow-block, an arm rotatably mounted thereupon and adapted to be deflected by a passing train, a second arm rigid with said first arm and lying adjacent to the face of said pillow-block, said face having an opening therethrough, a third arm rigidly attached to said vertical spindle, and a rod attached to said last arm, the extremity whereof may project into said opening, said opening lying adjacent to said second arm whereby to limit the movement thereof.

6. In a railway signal system, in combination, a plurality of signals, track devices adapted to control the same, other track devices comprising movable members adapted to be deflected by a passing train, and mechanism connecting said last track devices with said signals, said mechanism being adapted to lock said members against deflection when said signals are in an active position.

7. In a railway signal system, in combination, a track device comprising a normally freely moving arm adapted to be deflected by a passing train, means whereby a passing train may lock said arm against deflection by a following train, and devices carried by said trains adapted to be actuated by said arm.

8. In a railway signal system, in combination, a member adapted to be carried by a train, means for guiding the same, a crank disposed in the path of said member and normally adapted to maintain the same in a fixed

position, said crank being adapted to be deflected by an object on the track, and train-controlling devices actuated by the movement of said member.

9. In a railway system, in combination, a member adapted to be carried by a train, means for guiding the same in a substantially vertical direction, a crank disposed below said member and normally adapted to support the same, said crank having an extension lying near the bed of the track, and means connecting said member with the controlling devices of said train.

10. In a railway system, in combination, a block, means for guiding the same in a substantially vertical direction, a crank therebelow normally maintained in a substantially vertical position, said crank having an extension lying adjacent to the track, said block having a notch on the under side thereof adapted to receive said crank, and means connecting said block with the controlling devices of said train.

11. In a railway system, in combination, a block, adapted to be carried by a locomotive, means for guiding said block in a substantially vertical direction, said block having a notch in the under side thereof, a crank received by said notch and having a depending arm normally maintaining said crank in a substantially vertical plane, said arm being adapted to be struck by an object on the track to throw said crank from said notch, resilient members adapted to break the force of the descent of said block, and means connecting said block with the controlling devices of the train.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ERNEST RENAUD.

Witnesses:

F. D. AMMEN,

T. MYNARD.