

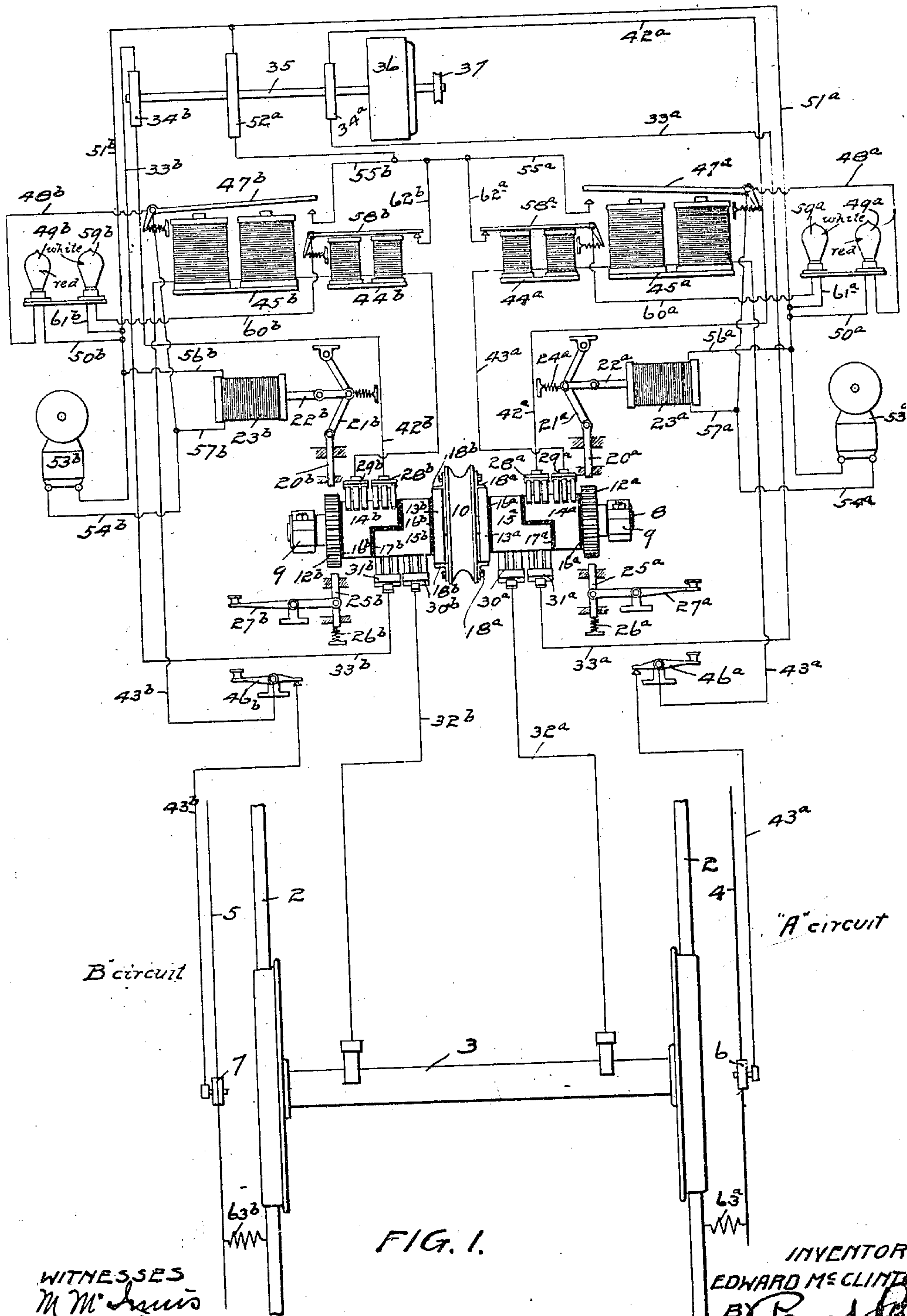
No. 831,025

PATENTED SEPT. 11, 1906.

E. McCLINTOCK.  
LOCOMOTIVE ENGINEER'S ALARM.

APPLICATION FILED MAY 16, 1904.

2 SHEETS—SHEET 1.



WITNESSES  
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EDWARD McCLINTOCK  
BY *Paul Paul*  
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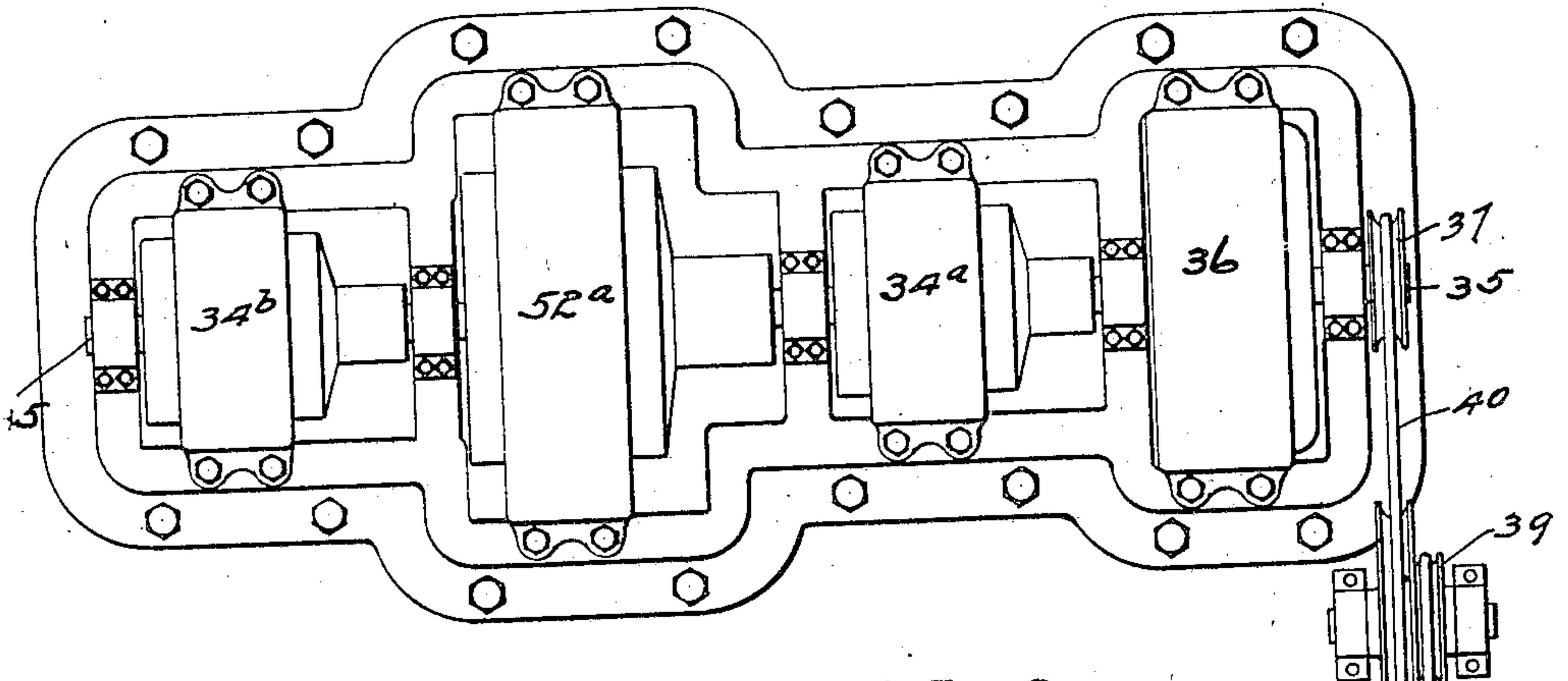


FIG. 2

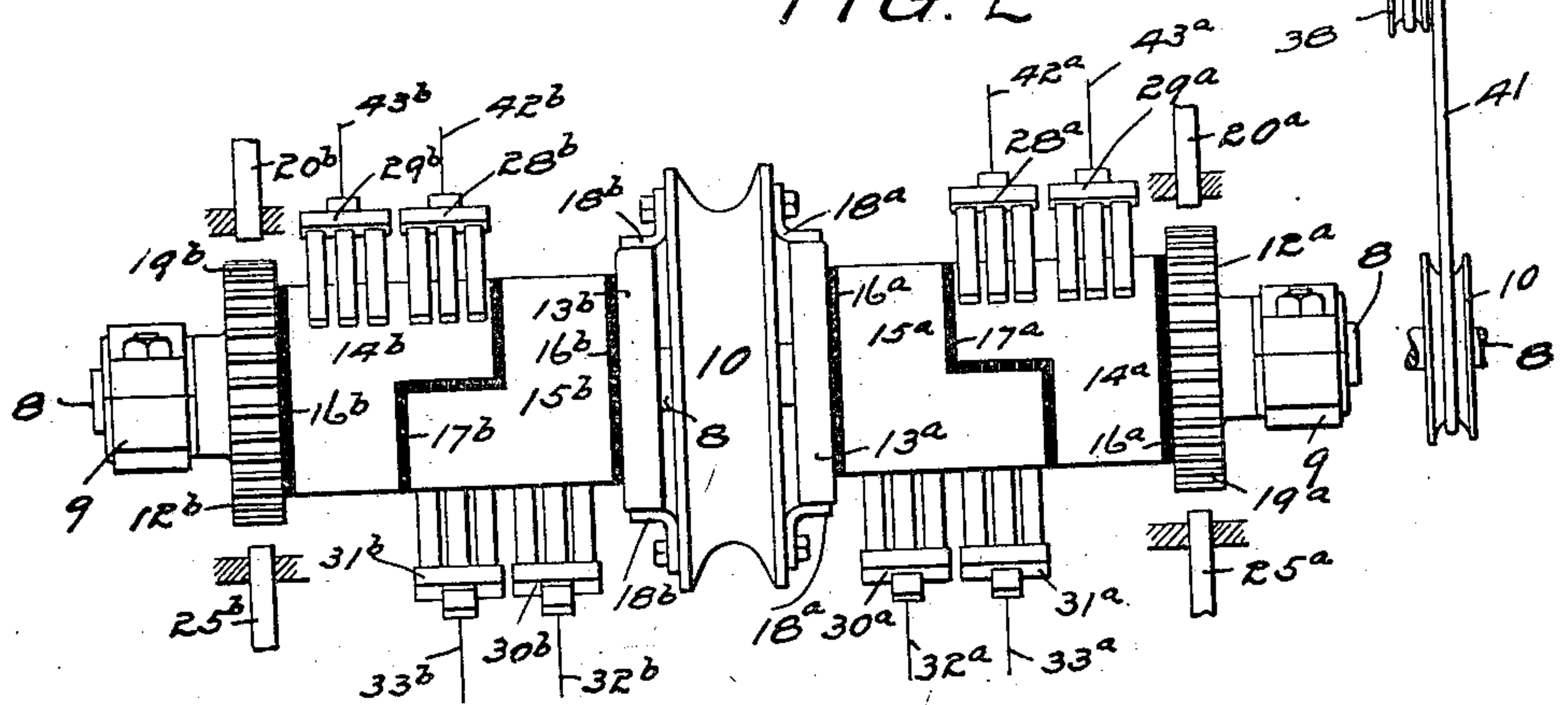


FIG. 3

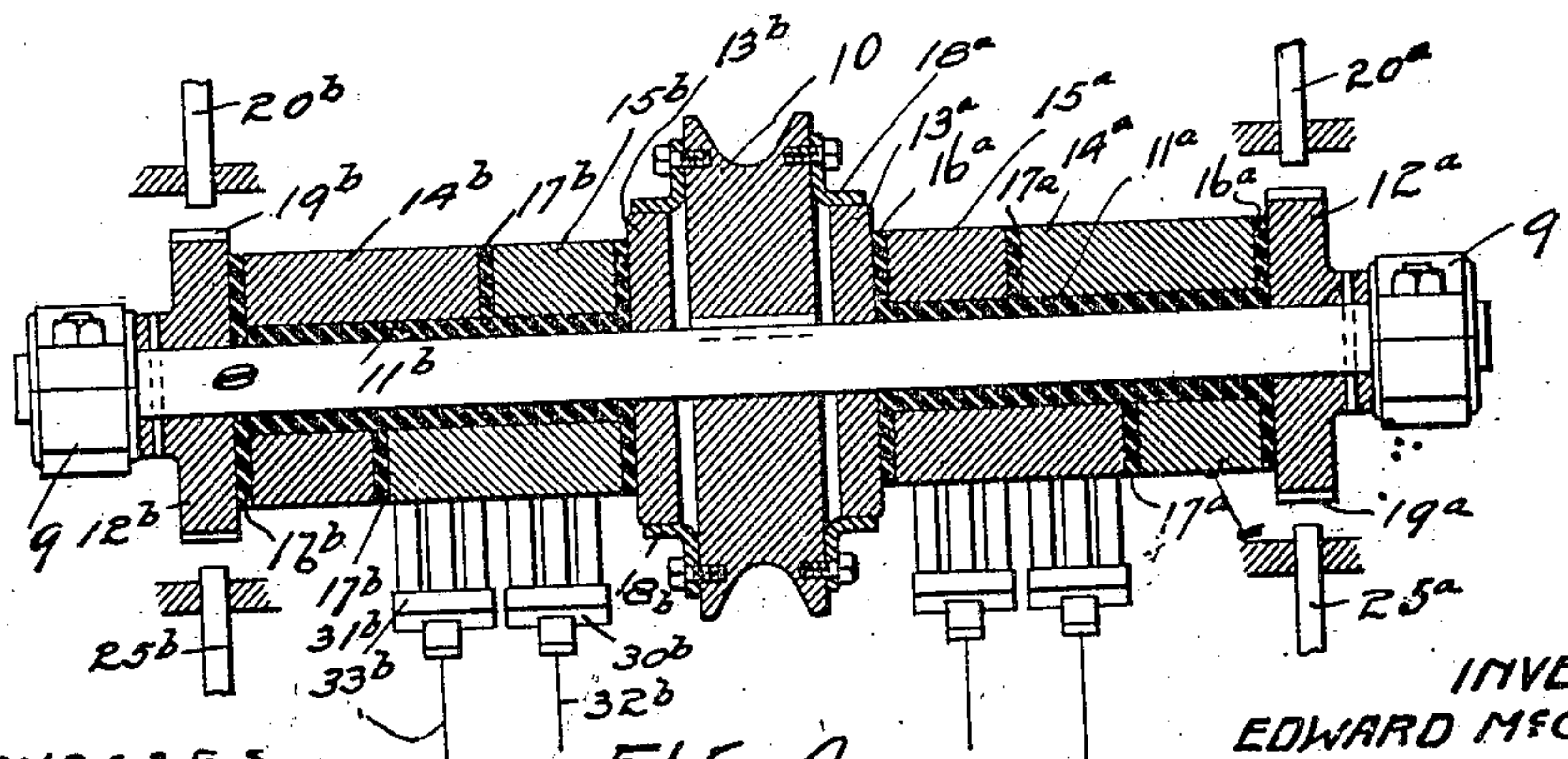


FIG. 4.

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# UNITED STATES PATENT OFFICE.

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## LOCOMOTIVE-ENGINEER'S ALARM.

No. 831,025.

Specification of Letters Patent.

Patented Sept. 11, 1906.

Application filed May 16, 1904. Serial No. 203,178.

*To all whom it may concern:*

Be it known that I, EDWARD McCLINTOCK, of Merriam Park, Ramsey county, Minnesota, have invented certain new and useful  
5 Improvements in Locomotive - Engineers' Alarms, of which the following is a specification.

My invention relates to alarm mechanisms; and the object I have in view is to simplify and improve a mechanism shown and described in Letters Patent of the United States issued to me September 8, 1903, No. 738,468.

The invention consists generally in providing an indicating device in connection with each circuit by means of which the engineer can determine at a glance whether the system is in working order or not.

Further, the invention consists in providing an improved pole-changing device; and, further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a diagrammatic view of an alarm system embodying my invention. Fig. 2 is a plan view of the electrical generators. Fig. 3 is a plan view of the pole-changing mechanism. Fig. 4 is a longitudinal sectional view of the same.

In the drawings I have shown two independent pole-changing circuits, which I will designate as A and B, one connected with the main and auxiliary rails on one side of the track and the other with the corresponding rails on the other side, and as each circuit is a duplicate of the other it will be sufficient in this case to describe one of them only, the operation of both being substantially the same. The importance of providing two independent circuits has been fully described in my patent above referred to.

In Fig. 1, 2 represents the track-rails, and 3 the wheels of a truck thereon. 4 and 5 are auxiliary rails arranged parallel with the main rails and insulated from them and from each other. These auxiliary rails are divided into sections or blocks with alternating joints, as described in my former patent, the rails on one side being in the A circuit and the corresponding rails on the other side in the B circuit. Trucks 6 and 7 are ar-

ranged on these auxiliary rails, one for each circuit. A pole-changing device is provided in any suitable place on the locomotive, and consists of a shaft 8, mounted in bearings 9 and provided at a point intermediate to its ends with a sheave 10. The shaft is provided on each side of the sheave with a pole-changing device, one for each circuit, and as these devices are similar in construction and operation I will describe the one used in the circuit A, indicating the parts by reference-figures with the exponent "a," and the corresponding parts in the other pole-changing device with the addition of the exponent "b."

In Fig. 4, 11<sup>a</sup> is an insulating-core loosely mounted on the shaft 8 and having heads 12<sup>a</sup> and 13<sup>a</sup> secured to said core and separated from commutator-plates 14<sup>a</sup> and 15<sup>a</sup> by insulating-disks 16<sup>a</sup>. The abutting ends of the plates 14<sup>a</sup> and 15<sup>a</sup> are recessed and coincide with each other and are separated by an insulating-strip 17<sup>a</sup>. Springs 18<sup>a</sup> are secured on the sheave 10 and bear upon the spool-head 13<sup>a</sup> with sufficient pressure to drive the spool when the shaft and sheave are revolved. The head 12<sup>a</sup> is provided in its periphery with a series of teeth 19<sup>a</sup>, that are adapted to receive a pin 20<sup>a</sup>, which locks the spool against revolution. A toggle-link mechanism 21<sup>a</sup> is connected with the pin 20<sup>a</sup> and to the armature 22<sup>a</sup> of a solenoid 23<sup>a</sup>. A spring 24<sup>a</sup> normally holds the armature withdrawn from the solenoid. On the opposite side of the pole-changer I provide a pin 25<sup>a</sup>, normally held in a retracted position by a spring 26<sup>a</sup> and pivotally connected to a key 27<sup>a</sup>. By pressing this key the engineer can move the pin 25<sup>a</sup> into engagement with the teeth of the head 12<sup>a</sup> and lock it and the pole-changer against revolution.

The plates 14<sup>a</sup> and 15<sup>a</sup> are each provided with a pair of brushes 28<sup>a</sup> and 29<sup>a</sup> and 30<sup>a</sup> and 31<sup>a</sup>. The brushes 29<sup>a</sup> and 30<sup>a</sup> are arranged to bear, respectively, at all times upon the plates 14<sup>a</sup> and 15<sup>a</sup>, while the brushes 28<sup>a</sup> and 31<sup>a</sup> alternate in contacting with said plates, and thus effect a reversal in the direction of travel in the current to render the system effective regardless of the direction of movement of the locomotives.

A wire 32<sup>a</sup> connects the brush 30<sup>a</sup> with the truck 3, and a similar wire 33<sup>a</sup> leads from the brush 31<sup>a</sup> to one pole of a generator 34<sup>a</sup>,



mounted on a shaft 35, that is driven, preferably, by a steam-turbine 36 and is provided with a pulley 37, with which the sheave 10 is connected by a suitable belt. (Not shown in Fig. 1.)

I prefer to provide a speed-reducing device consisting of pulleys 38 and 39, connected by belts 40 and 41 with the pulley 37 and the sheave 10, and the other pole of the generator 34<sup>a</sup> is connected by a wire 42<sup>a</sup> with the brush 28<sup>a</sup>. A similar generator is provided on the other end of the shaft 35, which is located in the other circuit and is designated by reference-numeral 34<sup>b</sup>.

The brush 29<sup>a</sup> is connected by a wire 43<sup>a</sup> with electromagnets 44<sup>a</sup> and 45<sup>a</sup> and from thence passes to a telegraph-key 46<sup>a</sup> and to the truck 6. The magnet 45<sup>a</sup> is provided with an armature 47<sup>a</sup>, connected by a wire 48<sup>a</sup> with a red lamp 49<sup>a</sup>. A wire 50<sup>a</sup> leads from the lamps to a wire 51<sup>a</sup>, that is connected to one pole of a generator 52<sup>a</sup> on the shaft 35. The wire 51<sup>a</sup> is also connected to one post of a bell 53<sup>a</sup>, and the other post is connected by a wire 54<sup>a</sup> with the armature 47<sup>a</sup>. A wire 55<sup>a</sup> leads from the other pole of the generator 52<sup>a</sup> to a contact-point in the path of the armature 47<sup>a</sup>.

When the magnets 45<sup>a</sup> are energized, the armature will be attracted and close the circuit through the red light 49<sup>a</sup> and the alarm-bell 53<sup>a</sup>. The solenoid 23<sup>a</sup> is connected by wires 56<sup>a</sup> and 57<sup>a</sup> with the wires 51<sup>a</sup> and 54<sup>a</sup>, and consequently when the circuit is closed through the magnets 45<sup>a</sup> the solenoid will be energized to attract its armature, project the pin 25<sup>a</sup>, and lock the pole-changer of the circuit A against further revolution. The magnets 44<sup>a</sup> have an armature 58<sup>a</sup> connected with a white light 59<sup>a</sup> by a wire 60<sup>a</sup>, and a wire 61<sup>a</sup> leads from the said light to the wire 51<sup>a</sup>. A wire 62<sup>a</sup> leads from the wire 55<sup>a</sup> to a contact-point in the path of the armature 58<sup>a</sup>, and a resistance-coil 63<sup>a</sup> is provided between the auxiliary rail 4 and the contiguous main-track rail 2. This resistance-coil closes the circuit between the rails and establishes a continuous current through the magnets 44<sup>a</sup> and 45<sup>a</sup> and the conductors connected therewith. I have shown the resistance-coil located between the main and auxiliary rails; but it may be placed at any other suitable point in the circuit. The magnets have a differential winding, and while the current passing from one rail to the other through the resistance-coil is sufficient to energize the magnets 44<sup>a</sup> and attract their armature and close the circuit through the white light 59<sup>a</sup> it is not sufficiently strong to energize the magnets 45<sup>a</sup> and attract their armature. One of these resistance-coils is placed in each block, and it follows that as the magnets 44<sup>a</sup> will be energized continuously and the circuit be closed through them at all times the white light 59<sup>a</sup> will burn all the time, whether

the train is in motion or not, and will indicate to the engineer that the system is in working order. In this specification I designate the white light as the "good-order" circuit and the red light as the "alarm-circuit."

The pole-changer circuit is connected with the rails and through the closers 44<sup>a</sup> and 45<sup>a</sup> with an independent source of electrical energy. The good-order and alarm circuits are connected, respectively, with the closers 44<sup>a</sup> and 45<sup>a</sup> and with a source of electrical energy. The alarm-circuit through the closer 45<sup>a</sup> will be normally broken, owing to the fact, as above noted, that the current normally passing through the resistance is insufficient to energize the magnets of the said closer, and consequently the red light will remain dark. As soon, however, as another locomotive enters the block moving in the same or opposite direction the pole-changer circuits in the two locomotives will be connected in series through the resistance or the resistance being shunted or cut out temporarily through the locomotive from the main to the auxiliary rails. This temporary uniting of the two pole-changer circuits will produce a sufficient increase in the electrical energy to energize the magnets in one of the alarm-circuits and attract one of the armatures 47<sup>a</sup> or 47<sup>b</sup>, according to whether the locomotives are moving in the same or opposite direction, and closing the alarm-circuit.

The white light burning continuously will indicate to the engineer whether the system is in working order or not as the train passes over the track from block to block, and whenever the red light flashes and the alarm-bell rings he will know that another train is in the same block, and the engineer of that train will receive a similar warning. The closing of the red-light circuit will cause the pole-changer to be locked automatically, and while the engineer is using the telegraph-key and signaling the engineer of the other train he can prevent the pole-changer from revolving by operating the key provided for that purpose.

I prefer in this mechanism to provide means for continuously operating the pole-changer, and in that respect this mechanism differs from my former patent above referred to and also in providing the white light or good-order signal, which does not appear in said patent.

I have shown and described my invention as used in connection with a railway-locomotive; but it obviously may be employed with any style or type of motor operating on a track and driven by any suitable power.

I claim as my invention—

1. The combination, with the main-track rails, of auxiliary rails divided into blocks or sections, a suitable resistance interposed between the main and auxiliary rails, good-order and alarm circuits having suitable clos-



ers, one circuit having a greater resistance than the other and being normally open while the other is normally closed, signal devices provided in said circuits, a pole-changer circuit, and a source of electrical energy connected with said circuits.

2. The combination, with the main-track rails, of auxiliary rails, a suitable resistance interposed between said main and auxiliary rails, a white-light or "good-order" circuit, a red-light or alarm circuit, the latter circuit having a greater resistance than the former and being normally open while said white-light circuit is normally closed, a pole-changer circuit, and sources of electrical energy for said circuits.

3. The combination, with the main-track rails, of auxiliary rails divided into insulated blocks or sections, a suitable resistance in circuit with the main and auxiliary rails, a white-light or "good-order" circuit and a red-light or alarm circuit, said white-light circuit being normally closed while the red-light circuit is normally open, a pole-changer, and a source of electrical energy connected with said circuits.

4. The combination, with the main-track rails, of auxiliary rails divided into insulated blocks or sections, a suitable resistance interposed between the main and auxiliary rails of each section, a white-light or "good-order" circuit having suitable closers, a red-light or alarm circuit also having circuit-closers, the former circuit being normally closed by the passage of the current through said resistance, while the latter circuit is normally open, a revolving pole-changer, and a source of electrical energy connected with said circuits.

5. The combination, with the main-track rails, of auxiliary rails divided into insulated blocks whose rails on one side lap by or break joints with the corresponding rails on the other side, a suitable resistance interposed between the main-track rails and the contiguous auxiliary rails of each section, white-light or "good-order" circuits, red-light or alarm circuits having a greater resistance than said white-light circuits, a pole-changer, and a source of electrical energy connected with said circuits.

6. The combination, with the main-track rails, of a conductor contiguous thereto and divided into insulated sections or blocks, a resistance connecting said main-track rails and the blocks of said conductor, a white-light circuit normally closed, a red-light or alarm circuit normally open, a source of electrical energy for said circuits, and means for closing said alarm-circuit upon the approach of another motor moving in the same or opposite direction.

7. The combination, with the main-track rails, of conductors divided into insulated blocks or sections that lap by or break joints with each other, a suitable resistance in cir-

cuit with said main-track rails and the blocks of said conductors, white-light or "good-order" circuits normally closed, red-light or alarm circuits normally open, and a source of electrical energy for said circuits.

8. In a device of the class described, the combination, with a revolving shaft, of a sheave secured thereon, spools loosely mounted on said shaft upon each side of said sheave, springs secured on said sheave and arranged to bear upon the contiguous heads of said spools, commutator-plates provided on said spools and insulated from each other and from said heads, brushes for said plates, and means for temporarily locking said spools against revolution.

9. The combination, with the main-track rails, of conductors, a suitable resistance in circuit with said track-rails and the contiguous conductor, white-light or "good-order" circuits normally closed, red-light or alarm circuits having a circuit-closer and normally open, a continuously-operating pole-changer, mechanism for temporarily locking said pole-changer when the circuit is closed through either of said alarm-circuits, and a source of electrical energy for said circuits.

10. The combination, with the main-track rails, of a conductor, a resistance connecting said main-track rails and said conductor, a continuously-burning white-light or good-order circuit, a red-light or alarm circuit normally open and having a suitable circuit-closing device, a pole-changer in circuit with the rails, said conductor and said circuit-closing device, and sources of electrical energy for said circuits.

11. The combination, with the main-track rails, of conductors, a suitable resistance in circuit with the rails and said conductors on each side of the track, white-light or "good-order" circuits normally closed, red-light or alarm circuits normally open and having suitable closers, means in circuit with said rails and said alarm-circuit closers for closing said alarm-circuits upon the approach of another motor moving in the same or opposite direction, and sources of electrical energy for said circuits.

12. A train-alarm comprising a "good-order" circuit having a signal, an alarm-circuit also having a signal and a circuit-closer, the former circuit being normally closed and the latter normally open, a pole-changer in circuit with the rails and said closer, a source of electrical energy for said circuits, the current normally passing through said alarm-circuit being insufficient to operate said closer and close said circuit until connected with a similar circuit on a train that has approached within a certain predetermined distance moving in the same or opposite direction, substantially as described.

13. A train-alarm comprising a track-circuit having a train-carried pole-reversing



means, good-order and alarm circuits having signals, the former being normally closed and the latter being normally open, and sources of electrical energy for said circuits, the alarm-circuit current being insufficient normally to close said alarm-circuit until augmented by a similar current on an approaching train.

14. The combination, with a track-circuit having a pole-changer, of good-order and alarm circuits having signals, said good-order circuit being normally closed and said alarm circuit normally open, a suitable resistance in said track-circuit, and sources of electrical energy for said circuits, substantially as described.

15. The combination, with the track-circuits having a pole-changer, of good-order and alarm circuits arranged in pairs, said good-order circuits being normally closed, and said alarm-circuits being normally open, a suitable resistance provided in said track-

circuits, and sources of electrical energy for said circuits, substantially as described.

16. The combination, with the track-circuits having a pole-reversing means, of good-order and alarm circuits arranged in pairs upon each side of the track, said good-order circuits being normally closed and said alarm-circuits normally open, and sources of electrical energy for said circuits.

17. The combination, with a track-circuit having a train-carried pole-reversing means, of good-order and alarm circuits having signals, said good-order circuit being normally closed and said alarm-circuit normally open, and sources of electrical energy for said circuits.

In witness whereof I have hereunto set my hand this 9th day of May, 1904.

EDWARD McCLINTOCK.

In presence of—

RICHARD PAUL,  
M. HAGERTY.