

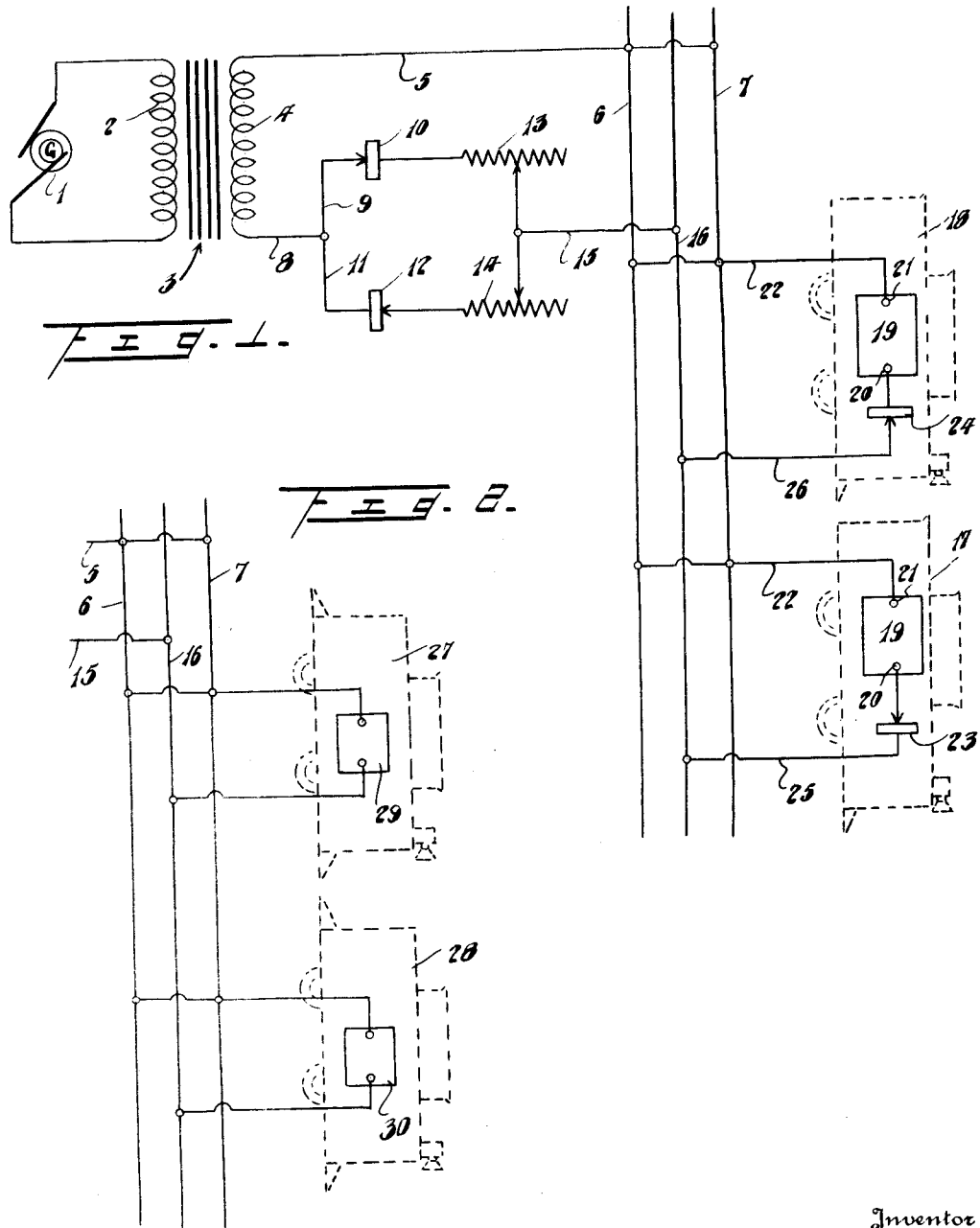
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ELECTRICAL DISTRIBUTION

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ELECTRICAL DISTRIBUTION

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This invention relates, from a generic aspect, to electrical distribution; more specifically, it is directed to a system of control for miniature electric railways and similar appliances utilized for amusement purposes.

An object of the invention is to provide a system of the character indicated in which a plurality of translating devices respond to and are independently controlled by different current characteristics of the input to a common distributing circuit.

Another object is to afford a system of the character indicated including means for independently controlling the input of each current characteristic of the distributing circuit.

Another object is to afford a system of control that may be embodied in existing types of miniature electric railways and similar amusement appliances by the use of easily obtainable and comparatively inexpensive standard electrical apparatus.

A further object of the invention, as specifically applied to miniature electric railways, is to utilize different current characteristics of the input to a distributing circuit, such as the track system, to effect independent energization and control of two locomotives or other appurtenances such as signals, train lights, switches, etc.

Briefly stated the invention comprises a distributing circuit, a supply circuit through the medium of which currents of different characteristics are impressed on the distributing circuit, said supply circuit including means for separately controlling the input of each current characteristic, a plurality of translating devices served by the distributing circuit and means rendering each translating device responsive solely to a particular current characteristic of the distributing circuit. In applying the principles of the invention to the control of a miniature electric railway, as herein disclosed, the rails of the track system are utilized as the distributing circuit while the supply circuit includes a source of alternating current and oppositely functioning rectifiers serving to rectify both phase characteristics of the alternating input to the track system. Variable resistances connected in series with the rectifiers enable the

input of the different phase characteristics to be independently controlled. The different phase characteristics of the input to the track system are utilized to independently control different translating devices.

In the preferred embodiment of the invention the different phase characteristics of the input to the track system are utilized to independently energize two locomotives but it is manifest that other appurtenances of the railway such as signals, train lights, switches, etc. may be controlled in the same way.

Other objects, advantages and characteristic features of the invention will be more readily understood from the following detailed description and accompanying drawings, in which,

Figure 1 is a diagrammatic view of a preferred embodiment and,

Figure 2 is a fragmentary diagrammatic view of a modification.

The invention is illustrated in the drawings as applied to the control of a miniature electric railway or, to be more specific, to the control of two locomotives operating on and receiving energizing current from the same track system.

The embodiment shown in Figure 1 includes an alternating current supply in the nature of an alternator 1 connected to the primary coil 2 of a low wattage 3. One end of the secondary coil 4 of the transformer is connected by a conductor 5 to the electrically interconnected outer rails 6 and 7 of a three rail track system hereinafter referred to. The other end of coil 4 is connected to a conductor 8 having a branch connection 9 to the input of a rectifier 10 and a second branch connection 11 to the output of a rectifier 12. The output of rectifier 10 and the input of rectifier 12 are respectively connected, through variable resistances 13 and 14, to a conductor 15 which, in turn, is connected to the intermediate insulated rail 16 of the track system.

The two locomotives operating on and energized by the track system are indicated at 17 and 18. Each is equipped with a power plant or operating motor 19 having terminals 20 and 21; the latter terminals being connected by conductors 22 to the interconnected

outer rails 6 and 7 of the track system. The motor terminal 20 of locomotive 17 is connected to the input of a rectifier 23 while the motor terminal 20 of locomotive 18 is connected to the output of a rectifier 24. The output of rectifier 23 and the input of rectifier 24 are respectively connected by conductors 25 and 26 to the intermediate track rail 16.

In actual practice the connections diagrammatically represented by conductors 22 will be effected by grounding the motor terminals 21, through the metal and wheels of the locomotive, to the outer track rails 6 and 7; while the connections diagrammatically represented by conductors 25 and 26 will include suitable brushes carried by the locomotives and riding the intermediate insulated track rail 16. These particular species of connections are deemed to be too well known in the art to require specific illustration.

From the preceding description it will be manifest that rectifiers 10 and 12 function oppositely to effect rectification of both phases of the alternating input generated by the alternator 1 and to thereby cause direct oppositely pulsating currents to be impressed on the rails of the track system which constitutes and is hereinafter referred to as a distributing circuit feeding the two locomotives traveling thereover. The rectifiers 23 and 24 also function oppositely so that the motor 19 of locomotive 17 will be energized only by current pulsations in one direction while the motor 19 of locomotive 18 will be energized only by the opposite current pulsations. The variable resistances 13 and 14 enable the oppositely pulsating currents to be separately controlled so that either locomotive may be independently started, stopped and operated at various speeds or entirely removed from the track rails without in any way affecting the energization and control of the other locomotive.

The alternator 1 and transformer 3 may be omitted where there is available a suitable source of alternating current to which the rectifiers 10 and 12 and the track system may be directly connected. It is also possible to substitute a source of direct current for the alternator 1 provided that a suitable pole changing switch is placed in series with the primary coil 2 of the transformer 3 in order to convert the direct current into a current of alternating polarity.

In the modification illustrated in Figure 2 the rectifiers 23 and 24 are omitted and the locomotives 27 and 28 are provided with polarized motors 29 and 30 so that motor 29 will be energized only by current pulsations in one direction while motor 30 will be energized only by the opposite current pulsations.

Heretofore it has been found impractical to simultaneously operate two toy locomotives on the same track system, principally

because of the impossibility of delivering the current equally to all portions of the track. With prevailing systems, when one of the locomotives reaches a part of the track where the conduction is poor it slows down or stops with the result that the motor of the second locomotive is overloaded and consequently operated at such an increased speed as to cause the second locomotive to jump the track. The use of an expensive transformer with an exceptionally high wattage capacity would lessen this tendency but even with this expedient there is no way to prevent one locomotive from catching up to the other because the operating motors of no two locomotives will require exactly the same amount of operating current. Furthermore, in the absence of the present invention an elaborate block and safety cut-out system is required to prevent the two locomotives meeting on a switch or colliding at other points along the track system.

With the present invention the input to the operating motor of each locomotive may be independently increased or decreased by means of the variable resistances 13 and 14. For example, if one locomotive is traveling over a section of relatively poor conductivity the amount of current supplied to the operating motor may be increased to cause the locomotive to continue to travel at a speed adequate to prevent the following locomotive colliding therewith or, inversely, the amount of current supplied to the operating motor of the following locomotive may be decreased to accomplish the same purpose. Also, when two locomotives threaten to meet at a cross track or at a switch the respective currents energizing the locomotives may be independently regulated to slow down or stop one of the locomotives to prevent the threatened collision.

Another important advantage of the invention is that it enables each locomotive to be independently controlled by an operator at a remote central station thus enabling many exciting and thrilling situations to be brought about such as a race between the two locomotives toward a switch or crossing. The possibilities of the foregoing and other exciting situations, based on independent control of the two locomotives, has the effect of elevating the status of a miniature electric railway from that of a child's toy to that of an indoor pastime equally amusing to adults.

While in the present instance the invention has been specifically disclosed as applied to the control of a miniature electric railway it will be manifest that the principles involved may also be applied to the control of other electrically energizable translating devices such as conveyors, mine tramways, organ stops and pipes, bells, signals, train lights, etc. It will also be apparent that

various forms of energizing or supply circuits may be employed for impressing currents of different characteristics on the distributing circuit provided that the translating devices energized by the distributing circuit are equipped with means rendering each device responsive solely to one of the particular current characteristics impressed on the distributing circuit.

10 What I claim is:

1. A miniature electric railway comprising a track system, means for energizing said track system with currents of different characteristics, a plurality of locomotives operating on said track system, each locomotive being equipped with an electric propelling motor and means rendering said motor responsive solely to one current characteristic of the track system whereby said locomotives are independently energized.

2. A miniature electric railway comprising a track system, means for energizing said track system with currents of different characteristics, means for independently controlling the input of each current characteristic, a pair of locomotives operating on said track system and equipped with electric propelling motors, means rendering the propelling motor of one locomotive responsive solely to one current characteristic of the track system and means rendering the propelling motor of the other locomotive responsive solely to another characteristic of the track system.

3. A miniature electric railway comprising a track system, means for energizing the track system with currents of different characteristics, said means including variable resistances through the medium of which the input of each current characteristic is independently controlled, a pair of locomotives operating on said track system and equipped with electric propelling motors, means rendering the motor of one locomotive automatically responsive solely to one current characteristic of the track system and means rendering the propelling motor of the other locomotive automatically responsive solely to another current characteristic of the track system.

4. A miniature electric railway comprising a track system, two locomotives operating thereon, means for impressing the two phase characteristics of an alternating current on said track system means rendering the motive plant of one locomotive responsive solely to one phase characteristic of said alternating current and means rendering the motive plant of the other locomotive responsive solely to the other phase characteristic of said alternating current.

5. A miniature electric railway comprising a track system, two locomotives operating thereon, means for impressing currents of different characteristics on said track system, means remote from the track system for

independently controlling the input of each current characteristic, means rendering the motive plant of one locomotive responsive solely to one current characteristic of the track system and means rendering the motive plant of the other locomotive responsive solely to another current characteristic of the track system.

6. A miniature electric railway comprising a track system, a supply circuit for energizing the track system with currents of different characteristics, variable resistances included in the supply circuit to permit independent control of the input of each current characteristic, two locomotives operating on and adapted to be energized by the track system, means rendering the motive plant of one locomotive responsive solely to one current characteristic of the track system and means rendering the motive plant of the other locomotive responsive solely to another current characteristic of the track system.

7. A miniature electric railway comprising a track system, a source of alternating current for energizing the track system and means for rectifying both phase characteristics of the alternating input to the track system, said means being confined to a single one of the conductors leading from the source of alternating current to the track system.

8. A miniature electric railway comprising a track system, a source of alternating current for energizing the track system, means for rectifying both phase characteristics of the alternating input to the track system and means for independently controlling the input of each phase characteristic.

9. A miniature electric railway comprising a track system, a supply circuit for energizing the track system, said supply circuit including a source of alternating current, oppositely functioning rectifiers serving to rectify both phase characteristics of the alternating input to the track system and variable resistances affording independent control of the input of each phase characteristic, a plurality of translating devices, and means rendering each translating device responsive solely to a particular phase characteristic of the input to the track system.

10. A miniature electric railway comprising a track system, a supply circuit for energizing the track system with currents of different characteristics and variable resistances included in the supply system to afford independent control of the input of each current characteristic.

11. A miniature electric railway comprising a track system, a supply circuit for energizing the track system with currents of different characteristics, and means remote from the track system for independently controlling the input of each current char-

acteristic, said means imparting variable resistances included in said supply circuit and capable of independent adjustment.

12. A miniature electric railway comprising a track system, a plurality of locomotives operating thereon, means for impressing currents of different characteristics on said track system, means remote from the track system for independently controlling the input of each current characteristic and means rendering the propelling motor of each locomotive responsive solely to a particular current characteristic of the track system.

In testimony whereof I hereunto affix my signature.

BRYCE KENNETH OZANNE.

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