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RELAY RING CIRCUIT

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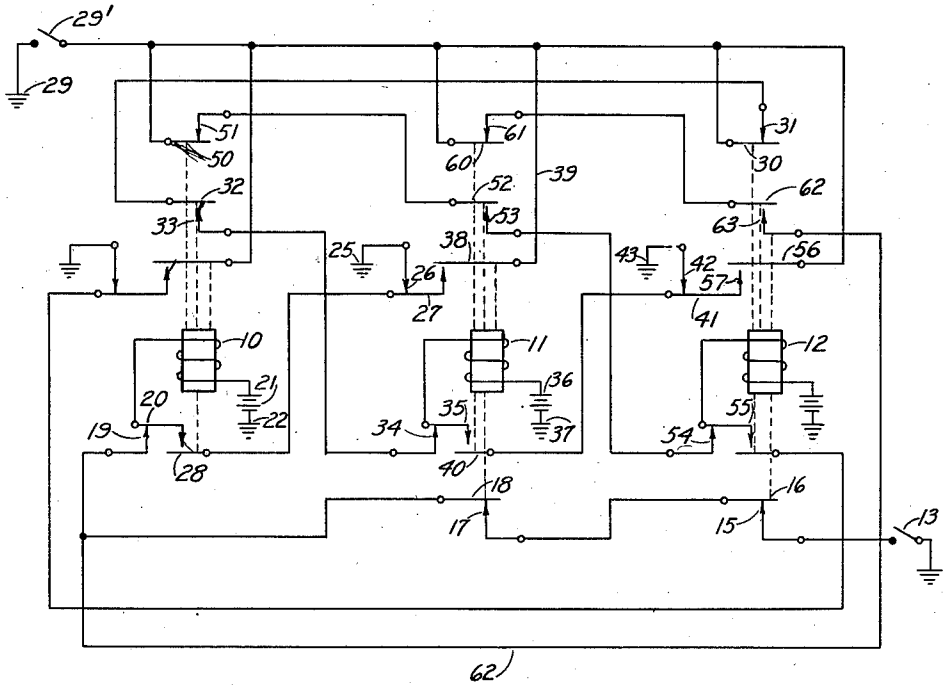

RODERICK K McALPINE
INVENTOR
William D. Hall.
ATTORNEY

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RELAY RING CIRCUIT

Roderick K. McAlpine, United States Army, Arlington, Va.

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4 Claims. (Cl. 175—320)

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1

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention is in electrical apparatus and particularly is a relay ring circuit, that is, a circuit including a plurality of relays which will operate in a prearranged endless succession under the control of an input signal.

One object of the present invention is to provide a novel relay ring circuit which will step once for each applied control pulse.

A further object is to provide a relay ring circuit which will step once only even though a long pulse or a continuous signal be applied thereto.

Another object is to provide in a ring circuit novel means for providing automatic consecutive release of the relays.

A further object is to provide a relay ring circuit wherein but one relay is required for each stage of the ring.

Additional objects will be apparent from a reading of the following specification and claims.

The single drawing is a diagram of a three-stage relay ring according to my invention. The ring is shown as a timing device or counter in order to simplify the drawing and description. For switching purposes, any desired number of additional contacts may be associated with one or more of the ring stages.

It is believed that no elaborate description of the circuit will be necessary as its features will be apparent from the drawing and from the description of the operation of the ring.

With reference to the drawing, the ring circuit can be seen to comprise three windings, 10, 11, and 12, each with a plurality of contacts operated thereby. It should be understood that only those contacts vertically aligned (in the drawing) with a magnet are operated thereby, and that of these only those shown without arrowheads are electromagnetically moved; certain others may be mechanically moved, as 20, under the influence of 28 to break an already-made contact, as with 19. It should be further understood that this description assumes that an energized winding attracts all of its movable contacts so that they are drawn toward the magnet, and that upon deenergization all movable contacts return to the positions shown.

Operation of the ring is started by closing switch 13. This closes a circuit to energize winding 10 through a circuit which includes contacts 15—16, 17—18, and 19—20, winding 10 and battery 21 to ground at 22. As soon as the relay

2

operates, it is locked closed through a circuit from ground at 25, through contacts 26—27, and 28—20, and winding 10. The pulling up of contact 28 first makes the locking circuit for winding 10, and then breaks pulse circuit at contacts 19 and 20.

Control pulses, as distinguished from start pulses, are fed into the ring from ground at 29; any desired switching means can be used for determining the length and spacing of the control pulses. A manually operable switch, 29', is shown.

Assuming switch 29' to be closed, the first control pulse follows a circuit from ground at 29 through contacts 30—31, 32—33 (the latter being closed due to the energization of winding 10), 34—35, winding 11, battery 36, and ground at 37. The energization of winding 11 closes contact 38 upon contact 27, opening the original locking circuit for winding 10, and transferring this locking function to the first control pulse, through line 39 and contacts 38—27 so that winding 10 will be de-energized upon the expiration of the first control pulse. Winding 11 is locked up just as was 10, through a circuit which includes contacts 35—40 and 41—42 and ground at 43.

The second control pulse energizes winding 12 through a circuit which includes contacts 50—51 and 52—53 (the latter closed by winding 11) and contacts 54—55. The energization of this winding transfers the locking circuit of winding 11 to the second pulse through contacts 56—57, so that winding 11 opens at the expiration of the pulse.

The third control pulse traverses a circuit which includes contacts 60—61 and 62—63 (closed by winding 12), line 62, and contacts 19 and 20, and thereby energizes winding 10 to re-enter upon the cycle of events above described.

The operation may continue for as long as desired. Each control pulse, it will be understood, serves first to energize the winding of a relay and secondly, to take over the control of the locking circuit of the preceding relay of the ring so that upon expiration of the pulse the preceding relay will be de-energized.

The foregoing description is in specific terms. It will be understood, however, that many modifications are possible within the spirit of the invention for the true scope of which, therefore, reference should be had to the appended claims.

I claim:

1. A ring circuit including a plurality of relays each having an operated condition and an unop-

erated condition, means for supplying energy to operate said relays, a closed circuit between an energy supplying means and one of said relays causing said one relay to assume its operated condition, means depending upon the operation of said one relay for first making a locking circuit therefor and second for breaking said closed circuit, another circuit between an energy supply means and another relay closed by the operation of said first mentioned relay to operate said other relay first to complete an additional locking circuit depending upon energy from said energy supply means for said first mentioned relay and to make a locking circuit for said other relay and then to open said other closed circuit.

2. A ring circuit including a plurality of switching devices each having an operated condition and an unoperated condition, means for supplying energy to operate said switching devices, a closed circuit between an energy supplying means and one of said switching devices causing said one device to assume its operated condition, means depending upon the operation of said one switching device for first making a locking circuit therefor and second for breaking said closed circuit, another circuit between an energy supply means and another switching device closed by the operation of said first mentioned switching device to operate said other switching device first to complete an additional locking circuit depending upon energy from said energy means for said first mentioned switching device and to make a locking circuit for said other switching device and then to open said other closed circuit.

3. A ring circuit including a plurality of relays each having an operated condition and an unoperated condition, means for supplying electrical pulses, means for delivering a pulse to one relay to operate and lock the same, means depending upon said operated relay for closing a circuit between a pulse supply means and another relay whereby a pulse may operate said other relay thereby to make another locking circuit for said one relay and to break said operating circuit, and

a further circuit between a pulse supplying means and a further relay closed by the operation of said other relay whereby another pulse may operate said further relay thereby first to complete an additional locking circuit depending upon said other pulse for said other relay and a locking circuit for said further relay and then to open said other closed circuit.

4. A ring circuit including a plurality of relays each having an operated condition and an unoperated condition, means for supplying energy to operate said relays, a circuit closed in operation between an energy supplying means and one of said relays, means depending upon the operation of said one relay first for making a locking circuit between the same and a source of locking energy and second for breaking said closed circuit, another circuit closed by said one relay between an energy supplying means and another relay to operate the same thereby first to complete an additional locking circuit depending upon said energy supplying means for said first mentioned relay and to make a locking circuit between a source of locking energy and said other relay and then to open said other closed circuit.

RODERICK K. McALPINE.

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