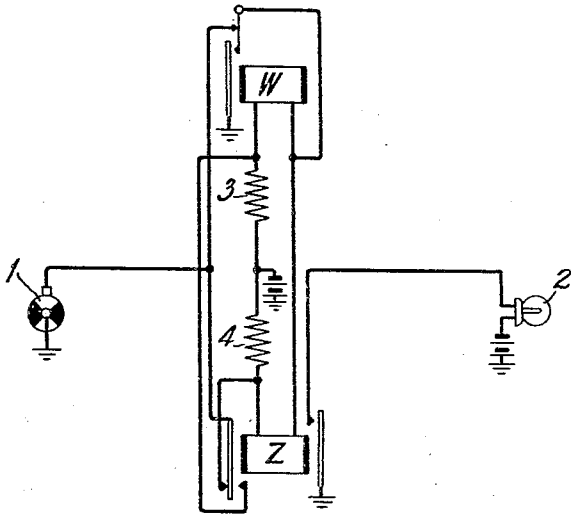
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ELECTRICAL SWITCHING SYSTEM

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ELECTRICAL SWITCHING SYSTEM

Application filed April 30, 1927. Serial No. 187,971.

This invention relates to electrical switching systems, and particularly to interrupting means.

Heretofore a need has arisen for a means responsive to impulses transmitted at one rate for retransmitting impulses at a different rate. Such a means is shown in Patent No. 1,438,743, granted to E. H. Clark on December 12, 1922, comprising his relays 209 and 207. Clark's relay combination involved a marginal operation and a double wound relay and thereby imposed certain commercial limitations which prohibited a wider use of his circuit. The present invention is an improvement on Clark's circuit, wherein the marginal operation is eliminated and a pair of ordinary relays are used.

The embodiment of the invention which has been herein chosen for the purpose of illustration is a circuit arrangement in which a pair of ordinary non-marginal relays are employed with an interrupter running at one rate to cause a signal lamp to operate at just one-half that rate. The drawing consists of a diagrammatic representation of this circuit.

The interrupter 1 may be assumed to transmit a series of periodically recurring impulses. Upon the first closure of the circuit through the interrupter a circuit is closed from ground through the normal contact of relay W, winding of relay W, resistance 3 to battery. Relay W operates and locks through its alternate contacts. At the same time relay Z is short circuited first from the left hand terminal of relay Z, the normal contacts of relay Z, the normal contacts of relay W to the right hand terminal of relay Z, and after relay W has operated from the left hand terminal of relay Z, the normal contacts of relay Z, interrupter 1 to ground, and from ground, the alternate contacts of relay W to the right hand terminal of relay Z.

When the circuit through interrupter 1 is opened, ground is removed from the left hand terminal of relay Z and this relay now operates in series with resistance 4 and battery. At this time a circuit is closed through signal lamp 2.

When the circuit through interrupter 1 is again closed, relay W is short circuited first from the left hand terminal of relay W, through the alternate contacts of the left hand armature of relay Z, interrupter 1 to ground and from ground, alternate contacts of relay W to the right hand terminal of relay W, and after relay W has returned to normal from the left hand terminal of relay W, the alternate contacts of the left hand armature of relay Z, the normal contacts of relay W to the right hand terminal of relay W. After relay W has returned to normal relay Z is maintained energized in a circuit from ground, interrupter 1, normal contacts of relay W, winding of relay Z, resistance 4 to battery.

When the circuit through interrupter 1 is again opened the last described circuit is opened and relay Z returns to normal and the circuit for signal lamp 2 is opened.

Thus there is provided an arrangement of two relays and a circuit including a contact point whereby two successive closures and openings of said contact point will cause said relays to be successively actuated in all possible combinations and in so doing will close and open a secondary contact point once. This cycle of operations will be repeated as the interrupter operates.

What is claimed is:

1. Two relays each having an armature and a set of contact points, a protective resistance for each relay, an external contact point and a source of current, said elements being interconnected in a circuit arrangement whereby in response to the first closure of said external contact point one of said relays will be energized and the other of said relays will be short circuited, whereby in response to a subsequent opening of said external contact point said one of said relays will remain energized and said other of said relays will become energized, whereby in response to a second closure of said external contact point said one of said relays will become deenergized and said other of said relays will remain energized and whereby in response to a second subsequent opening of said external contact point said one of said relays will remain deenergized and said other of said relays will become deenergized.

2. A relay having an armature and a make-before-break contact point arrangement, a relay having an armature, a front and a back contact point arrangement, a protective resistance for each of said relays, an external contact point and a circuit arrangement interconnecting said relays, said resistances and said contact points, whereby in response to a cycle consisting of two successive closures and openings of said external contact point said relays will operate in a cycle consisting of first an energization of said first relay, second an energization of said second relay, third a deenergization of said first relay and fourth a deenergization of said second relay.

3. A relay (W) having an armature and a make-before-break contact point arrangement, a relay (Z) having an armature, a front and a back contact point arrangement, a protective resistance for each of said relays, an external contact point and a circuit arrangement interconnecting said relays, said resistances and said contact points whereby in response to a cycle consisting of two successive closures and openings of said external contact point said relays will operate in a cycle consisting of first an energization of relay (W), second an energization of relay (Z), third a deenergization of relay (W) and fourth a deenergization of relay (Z).

4. A relay arrangement for translating a series of electrical impulses received at one rate into a series of electrical impulses at another rate comprising a control relay having an armature and a make-before-break contact point arrangement, a signal relay having an armature, a front and a back contact point arrangement, a protective resistance for each of said relays, a means for producing a series of electrical impulses at one rate and a circuit arrangement interconnecting said relays, said resistances, said contact points and said impulse producing means whereby in response to two complete cycles of said impulse producing means said relays will operate in a cycle consisting of first an energization of said control relay, second an energization of said signal relay, third a deenergization of said control relay and fourth a deenergization of said signal relay, and a signal circuit contact point controlled by said signal relay.

5. Two relays each having but a single winding, a protective resistance for each of said relays, a contact point, and circuit means including said elements responsive to two successive closures and openings of said contact point to cause said relays to be successively actuated in a particular permutation of all possible combinations.

6. Two non-marginal relays each having but a single winding, a protective resistance for each of said relays, a contact point and circuit means including said elements responsive to two successive closures and openings of said contact point to cause said relays to be successively actuated in a particular permutation of all possible combinations.

In witness whereof, I hereunto subscribe my name this 28th day of April, A. D. 1927.

ORFEO CESAREO.