

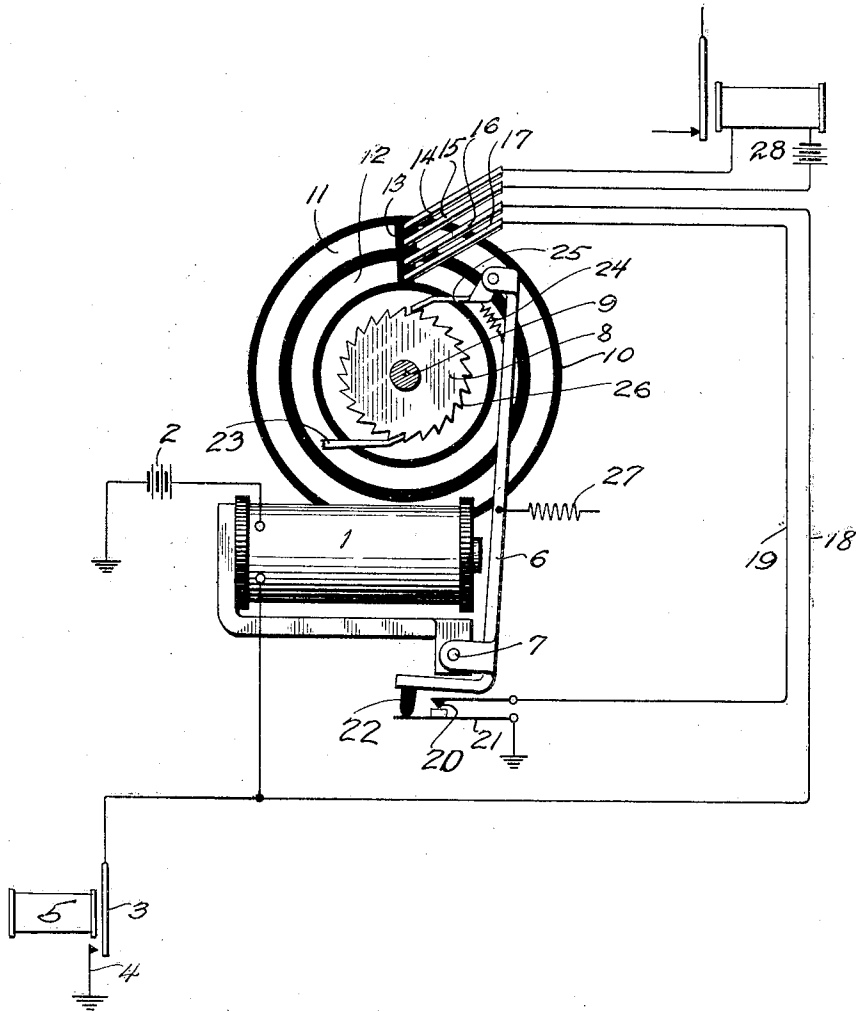
Dec. 16, 1924.

1,519,568

T. VAN AMSTEL

SLOW ACTING RELAY

Filed Dec. 2, 1920



Inventor:
Tudor Van Amstel
by *Joel C. Palmer*
Attv.

UNITED STATES PATENT OFFICE.

TUDOR VAN AMSTEL, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SLOW-ACTING RELAY.

Application filed December 2, 1920. Serial No. 427,769.

To all whom it may concern:

Be it known that I, TUDOR VAN AMSTEL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Slow-Acting Relays, of which the following is full, clear, concise, and exact description.

This invention relates to a slow acting relay.

The object of the invention is to produce a compact, efficient and cheap relay, the operation of which may be prolonged for a predetermined time.

To attain this object, a relay coil is connected in a main energizing circuit and operates an armature which rotates a commutator step-by-step. The commutator carries two contact strips which cooperate with contact brushes, one serving to close a local relay circuit and the other to complete a work circuit on the first step of the commutator due to energization by the main circuit. When the local circuit is closed, it operates the armature and completes the revolution or any predetermined part thereof of the commutator. Thus the work circuit is closed for a predetermined time. The invention will be more clearly understood by reference to the following specification and accompanying drawing, which discloses a plan of the device.

A relay coil 1 is introduced into a main energizing circuit which includes battery 2 and contact members 3 and 4. These contact members are operated by any means such as a relay coil 5. Relay coil 1 operates an armature 6 which is pivoted at 7 and serves to rotate step by step, by means of a pawl 25, a ratchet wheel 8 which is mounted on a shaft 9. Attached to the ratchet wheel 8 is a disc or drum 10 made of any insulation material. Two contact strips 11 and 12 are carried by this disc 10 and their ends are separated as at 13. Contact brushes 16 and 17 which rest on the disc 10 at 13 when the device is in its normal position cooperate with contact strip 12 and form a local relay circuit when the ratchet wheel is rotated one step. This local circuit includes battery 2, relay coil 1, line 18, contact brush 16, contact strip 12, brush 17, line 19, contact point 20 and the spring contact member 21 which is grounded. The stud 22 made of insulation material and carried by armature 6 serves to operate spring contact

21. Brushes 14 and 15 are terminals of a work circuit 28 that may be closed when contact strip 11 comes into contact with them.

A dog 23 is mounted to engage with the teeth 26 of the ratchet wheel 8 and hold the wheel in any position to which it is rotated by means of armature 6. A spring 24 serves to hold the pawl 25 in engagement with the teeth 26 of the ratchet wheel 8. 27 is a spring which returns armature 6 to its normal position when relay coil 1 is deenergized.

Relay coil 1 is energized by the battery 2 on the closing of contact members 3 and 4. This first energization causes coil 1 to operate armature 6 and move the ratchet wheel 8, which drives the commutator forward one step. On the completion of this initial movement the brushes 16 and 17 make contact with the contact strip 12. At the same time, the stud 22 carried by the armature 6 separates the contact members 20 and 21. When the circuit comprising battery 2, relay coil 1 and contact members 3 and 4 is broken, the armature 6 is returned to its normal position by spring 27. This allows contact members 20 and 21 to engage and make the local circuit including battery 2, relay coil 1, line 18, brush 16, contact strip 12, brush 17, line 19, and contact members 20 and 21.

The relay coil 1 is again energized and operates the armature 6 which breaks the circuit and is returned to its normal position. Thus, a self-interrupting circuit is established and the armature 6 is vibrated until the commutator makes one revolution or a portion thereof depending on the length of the contact strip 12, and the brushes 16 and 17 rest on the insulation as at 13 and break the local circuit. At the same time as the local circuit is completed, the work circuit 28 is closed by the brushes 14 and 15 coming in contact with contact strip 11 and remains closed for a predetermined time.

The length of time the work circuit remains closed can be varied by changing the length of the contact strips 11 and 12 or by changing the speed of the commutator or by altering both speed and length of contact strips.

What is claimed is:

1. A slow acting relay comprising a coil, an energizing circuit therefor, an armature operated by said coil, a ratchet wheel rotated step-by-step by said armature, a commutator driven by said ratchet wheel, a

- local circuit for said coil closed by the first step of said commutator, contacts in said local circuit operated by said armature whereby the armature after the first step
 5 is vibrated and rotates said commutator step-by-step, means carried by said commutator for closing a work circuit and retaining it closed for any predetermined part of the rotation of said commutator.
- 10 2. A slow acting relay comprising an electromagnet, an armature therefor, a ratchet wheel arranged for step-by-step rotation by said armature, a commutator rotatable with said ratchet wheel and driven
 15 thereby, a contact strip on said commutator and brushes cooperating therewith to close a local circuit for said electromagnet after an initial energization thereof, contacts in said local circuit under the control of said
 20 armature whereby said electromagnet automatically advances said ratchet wheel step-by-step after said initial energization, a second contact strip for said commutator, contact brushes cooperating therewith and a
 25 work circuit closed by said brushes and contact strip for a predetermined degree of rotation of said commutator.
3. In combination with a main energizing circuit, a slow acting relay comprising a
 30 coil energized by said circuit, a pivoted armature operated by said coil, a ratchet wheel designed for step-by-step rotation by said armature, a commutator fixed to said ratchet wheel and rotatable therewith, con-
 35 tact strips carried by said commutator and brushes to engage therewith to make a local circuit on the completion of the first step due to the first energization, contacts in said local circuit and operated by said
 40 armature whereby said coil operates said armature which rotates the ratchet wheel step-by-step after the closing of the said local circuit, and a second set of contact brushes engaging with said contact strips
 45 and serving to close a work circuit for a predetermined time.
4. A slow acting relay comprising a coil and an energizing circuit therefor, an armature operated by said coil, a ratchet wheel
 50 arranged for step-by-step rotation by said armature, a commutator rotated by said ratchet wheel, two contact strips or two sets of contact strips carried by said commu-
 55 tator, contact brushes to engage with one of said contact strips or one of said set of contact strips and close an auxiliary circuit on first step of said ratchet wheel caused by first energization, contacts in said auxiliary
 60 circuit operated by said armature whereby said armature is vibrated and rotates said commutator step-by-step after the first closing of the auxiliary circuit, and contact brushes which cooperate with the other con-
 65 tact strip or one of the set of contact strips and close a work circuit for a predetermined time.
- In witness whereof, I hereunto subscribe my name this 30th day of November A. D. 1920.

TUDOR VAN AMSTEL.