June 26, 1923. 1,459,730

F. C. HARRIS

OPERATING MECHANISM FOR REGISTERS

Filed Nov. 17, 1919

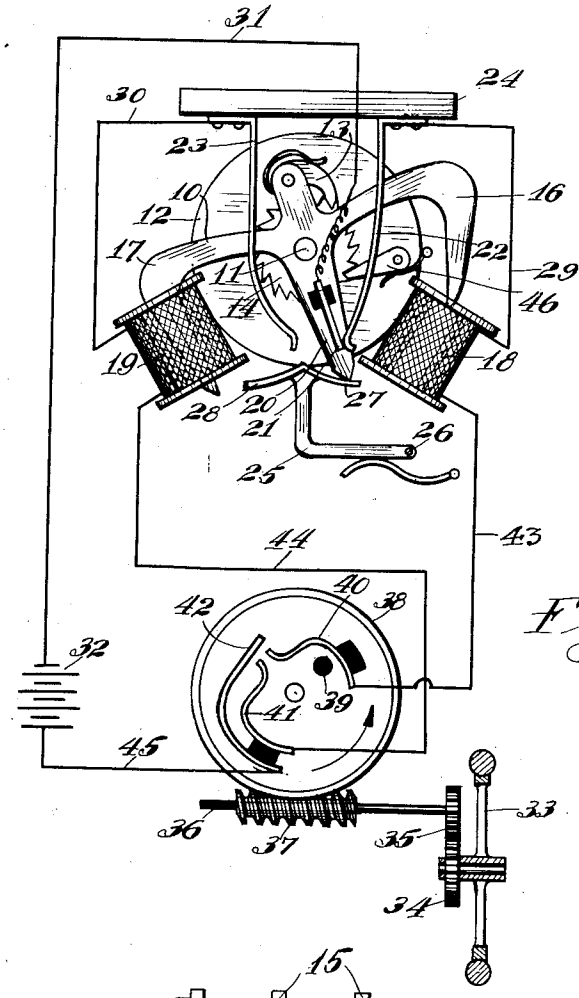


Fig 1

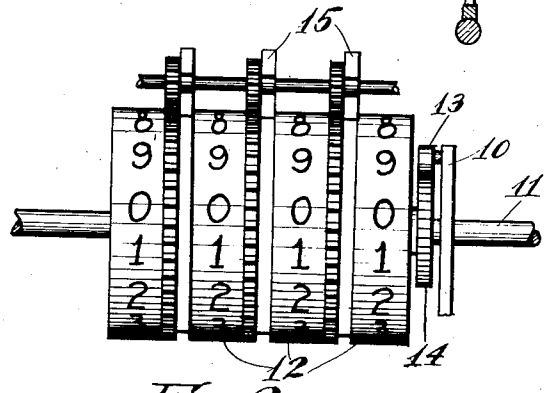


Fig 2

WITNESS:
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Patented June 26, 1923. 1,459,730

UNITED STATES PATENT OFFICE.

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OPERATING MECHANISM FOR REGISTERS.

Application filed November 17, 1919. Serial No. 338,735.

To all whom it may concern:

Be it known that I, FRANK C. HARRIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Operating Mechanisms for Registers, of which the following is a specification.

My invention relates to an improved form of operating mechanism for registers and the like in which the operating mechanism is designed for operation by electrical means such for example as suitable switching devices actuated by the mechanism the operation of which is to be indicated on the register. While my operating mechanism is particularly applicable for the operation of registers, it will be understood that it is also applicable for any similar purpose in which it is desired to operate the mechanism by a step-by-step motion so that the degree of operation of said mechanism may correspond with the number of impulses imparted to the operating mechanism by the actuating devices.

My invention is characterized by the use of a member having a step-by-step motion together with electromagnetic devices for operating said member, circuit connections extending from said devices and switching mechanism exercising control over said circuit connections at two points, by which the first control initiated by the actuating mechanism serves to operate the electromagnetic devices and the actuated member, by operating a part of the switching mechanism, serves to render inoperative the circuit connection of the operated device and establish at one point the operative condition of the circuit connection for another one of the operating devices. The latter feature is particularly important in connection with actuating mechanism that is relatively slow in movement, for the control initiated by the actuating mechanism might otherwise retain the circuit of the electromagnetic device in closed condition for a considerable period and in that manner result in an excessive current flow from the source employed to actuate the electromagnetic devices.

My invention will best be understood by reference to the accompanying drawings showing a preferred embodiment thereof, in which—

Fig. 1 is a diagrammatic view of the operating mechanism complete, and

Fig. 2 shows a form of register in side elevation that is adapted for operation by means of my improved operating mechanism.

Similar numerals refer to similar parts throughout the several views.

As shown in Fig. 1 my operating mechanism consists of a rocking member 10 which may be supported on the shaft 11 of a registering mechanism 12. The member 10 pivotally carries a pawl 13 which is spring actuated to engage a ratchet wheel 14 secured to the unit wheel of the registering mechanism 12. The registering mechanism may be of any desired type as for example a plurality of indicating wheels connected by carry-over wheels 15 of usual construction. As the register itself forms no part of my present invention I do not describe any particular form of register, for these devices are well known in the art.

The member 10 has formed on its ends downwardly extending projections or connections 16 and 17 which form cores for the solenoids 18 and 19 respectively. The member 10 has also formed thereon between the cores 16 and 17 a projecting arm 20 upon which is mounted a contact spring 21 which is insulated from said arm. The contact springs 22 and 23 are mounted upon a suitable insulating support 24 to lie in the path of the contact spring 21 so that said contact spring 21 engages the spring 22 after the rocking arm has been actuated by means of the solenoid 19 and that the contact spring 21 engages the contact spring 23 when the rocking arm has been actuated by the solenoid 18. The end of the arm 20 engages a spring detent 25 pivotally supported at 26 and having cam surfaces 27 and 28, as a result of which when the arm 20 is moved to either side of its central position, its engagement with the corresponding cam surface will serve to move the arm and the parts carried thereby to the end of their possible motion. The arrangement of the spring contacts 22 and 23 is such that they engage the spring contact 21 for either direction of motion of the rocking member 10 until the spring contact 21 has been moved a sufficient amount for the end of the arm 20 to pass the dividing point between cam surfaces 27 and 28. The spring contact 22 is connected by wire 29 with one terminal of the solenoid 18 and the spring contact 23 is connected by wire 30 with one terminal

of the solenoid 19. The spring contact 21 is connected by wire 31 with a suitable source of current 32 which may be a battery or any equivalent source.

While the switching mechanism employed to control the circuits of the solenoids 18 and 19 may be of widely different types, I show diagrammatically a construction in which the circuits are controlled by the operation of the wheel of a vehicle, as for example a taxi-cab. A vehicle wheel 33 is shown diagrammatically as having a gear 34 secured thereto which meshes with a second gear 35 carried on a shaft 36 which also carries a worm 37 meshing with a worm wheel 38. The worm wheel 38 carries an insulating stud 39 which as it moves around with the wheel 38 engages successively the spring contacts 40 and 41 to move them into engagement successively with the spring contact 42, said contacts being suitably supported and insulated from a support not shown. The contact 40 is connected by wire 43 with the other terminal of the solenoid 18, the contact 41 is connected by wire 44 with the other terminal of the solenoid 19 and the contact 42 is connected by wire 45 with the other terminal of the battery 32.

As a result of the circuit connections described it will be observed when the contact spring 40 is moved into engagement with the contact spring 42 a circuit is closed through the solenoid 18 which, by energizing the latter, attracts the core 16 thus moving the rocking member around to the right on its support 11 and that as the arm 20 passes its central position, contact between the springs 21 and 22 is broken and contact between the springs 21 and 23 is established. The cam surface 28 then serves to move the rocking member the remaining portion of its motion around to the right. This it will be observed interrupts the circuit through the solenoid 18 even though contact springs 40 and 42 may remain in engagement for a considerable interval. Continued movement of the worm wheel 38 disengages the stud 39 from the contact spring 40 which thereupon moves from engagement with the contact spring 42 and subsequently the stud 39 engages the contact spring 41 moving it into engagement with the contact spring 42 thus closing an energizing circuit through the solenoid 19, since at this time the contact springs 21 and 23 are in engagement with each other. This energization of the solenoid 19 attracts the core 17, thus moving the rocking member 10 around to the left on its support 11, which continues until the end of arm 20 has passed over the peak or point between the cam surfaces 27 and 28, from which position the arm 20 and the parts carried thereby are moved to the position indicated in the drawing by the spring detent 25. This interrupts the circuit through the solenoid 19, even though the contact springs 41 and 42 remain in engagement with each other and also establishes the circuit of the solenoid 18 in operative condition as far as the switch springs 22 and 21 are concerned. The ratchet wheel 14 of the registering mechanism may be provided with a pawl having a fixed support as indicated at 46 to prevent back rotation of the ratchet wheel as desired.

From the above it will be observed that I have shown an improved form of operating mechanism having a step-by-step movement and that a complete cycle of operation of such mechanism consists in the successive operation of the electromagnetic devices employed to control it and furthermore that the actuation of each of said devices causes the disabling or interruption of its operating circuit at the end of the movement of the member operated thereby which also places in operative condition as far as the switching mechanism controlled by said member is concerned, the actuating circuit of another of the electromagnetic devices employed to operate said member. It will also be observed that I provide a means by which the member employed to operate the register or other device is positively operated in both of its directions of motion and that this operation takes place effectively and positively regardless of the rate of operation of the actuating mechanism and also prevents excessive current flow in the event the actuating mechanism remains for a considerable time in a position closing a contact actuated by it. By the term operative position of a switching mechanism as used in the claims I mean the position of that particular switching mechanism which, when permitted by other conditions of the connected circuit, will produce an operation of the device connected with the circuit and by the term operative condition of a circuit I mean the condition of the circuit such that the device connected with it will be actuated for that condition.

While I have shown my invention in the particular embodiment above described I do not however limit myself to this exact construction in carrying out my invention as I may employ equivalents thereof known to the art at the time of the filing of this application without departing from the scope of the appended claims.

What I claim is:

1. In a device of the class described, the combination of a rocking member, a register, pawl and ratchet mechanism connecting said member and said register, a first electromagnetic device for moving said member in one direction, a second electromagnetic device for moving said member in the other direction, a source of current, an operating circuit extending from said source to each

of said devices, a first switching mechanism for successively closing said circuits, a second switching mechanism actuated by said member for opening the circuit of said first device after its operation and placing the circuit of said second device in condition for operation by said first switching mechanism, and mechanical means for moving said member through the latter part of its motion in either direction.

2. In a device of the class described, the combination of a rocking member, a register, pawl and ratchet mechanism connecting said member and said register, a first electromagnetic device for moving said member in one direction, a second electromagnetic device for moving said member in the other direction, a source of current, an operating circuit extending from said source to each of said devices, a first switching mechanism for successively closing said circuits, a second switching mechanism actuated by said member for opening the circuit of said first device after its operation, and mechanical means for moving said member through the latter part of its motion in either direction.

3. In a device of the class described, the combination of a rocking member, a register, pawl and ratchet mechanism connecting said member and said register, a first electromagnetic device for moving said member in one direction, a second electromagnetic device for moving said member in the other direction, a source of current, an operating circuit extending from said source to each of said devices, a first switching mechanism for successively closing said circuits, a second switching mechanism actuated by said member for opening either of said circuits after its operation and closing the other of said circuits at a first point to permit operation of said other circuit by its closure at a second point by said first switching mechanism, and mechanical means for moving said member through the latter part of its motion in either direction.

4. In a device of the class described, the combination of a member adapted to step-by-step movement, electromagnetic devices for moving said member, a source of current, circuits extending from said source to said devices, switching mechanism having two controlling devices for each of said circuits for rendering each of said circuits operative by one of its controlling devices and then inoperative by its second controlling device, the operation of said second controlling device moving the second controlling device of another circuit from inoperative to operative position, and mechanical means for moving said member through the latter part of each step of its movement.

5. In a device of the class described, the combination of a rocking member, a register, pawl and ratchet mechanism connecting said member and said register, a first electromagnetic device for moving said member in one direction, a second electromagnetic device for moving said member in the other direction, circuit connections extending from said devices, switching mechanism operated by said member for opening the circuit connections to said first device by its operation and closing the circuit connections to said second device and vice versa, and spring mechanism for moving said member through the latter part of its movement in either direction.

6. In a device of the class described, the combination of two electromagnets, an armature having its ends located for alternate operation by said electromagnets and provided with a pivot between its ends, an arm extending from the mid portion of said armature transversely of said pivot, a spring detent engaging the end portion of said arm, the engaging portions of said detent and arm comprising cam surfaces for moving said arm in either direction from its mid position, an insulated electric contact carried by said arm, and a fixed electric contact spring upon each side of said arm contact and in engagement therewith for the mid position of said arm contact and separated from said arm contact when said arm contact is in its position remote from said fixed contact spring.

7. In a device of the class described, the combination of two electromagnets, an armature having its ends located for alternate operation by said electromagnets and provided with a pivot between its ends, an arm extending from the mid portion of said armature transversely of said pivot, a spring detent engaging the end portion of said arm, the engaging portions of said detent and arm comprising cam surfaces for moving said arm in either direction from its mid position, and two electric contacts actuated by said arm and in closed position for the mid position of said arm, each of said contacts being in open condition for a position of said arm remote from said contact.

8. In a device of the class described, the combination of two electromagnets, an armature having its ends located for alternate operation by said electromagnets and provided with a pivot between its ends, an arm extending from the mid portion of said armature transversely of said pivot, a spring detent engaging the end portion of said arm, the engaging portions of said detent and arm comprising cam surfaces for moving said arm in either direction from its mid position, an insulated electric contact carried by said arm, a fixed electric contact spring upon each side of said arm contact and in engagement therewith for the mid position of said arm contact and separated from said arm contact when said arm contact is in its position remote from said fixed contact

spring, an energizing circuit extending through each of said electromagnets and one of said contact springs, and means for successively closing said circuits.

9. In a device of the class described, the combination of two electromagnets, an armature having its ends located for alternate operation by said electromagnets and provided with a pivot between its ends, an arm extending from the mid portion of said armature transversely of said pivot, a spring detent engaging the end portion of said arm, the engaging portions of said detent and arm comprising cam surfaces for moving said arm in either direction from its mid position, two electric contacts actuated by said arm and in closed position for the mid position of said arm, each of said contacts being in open condition for a position of said arm remote from said contact, an energizing circuit extending through each of said electromagnets and one of said contacts, and means for successively closing said circuits.

In witness whereof, I hereunto subscribe my name this 5 day of Nov., A. D. 1919.

FRANK C. HARRIS.