

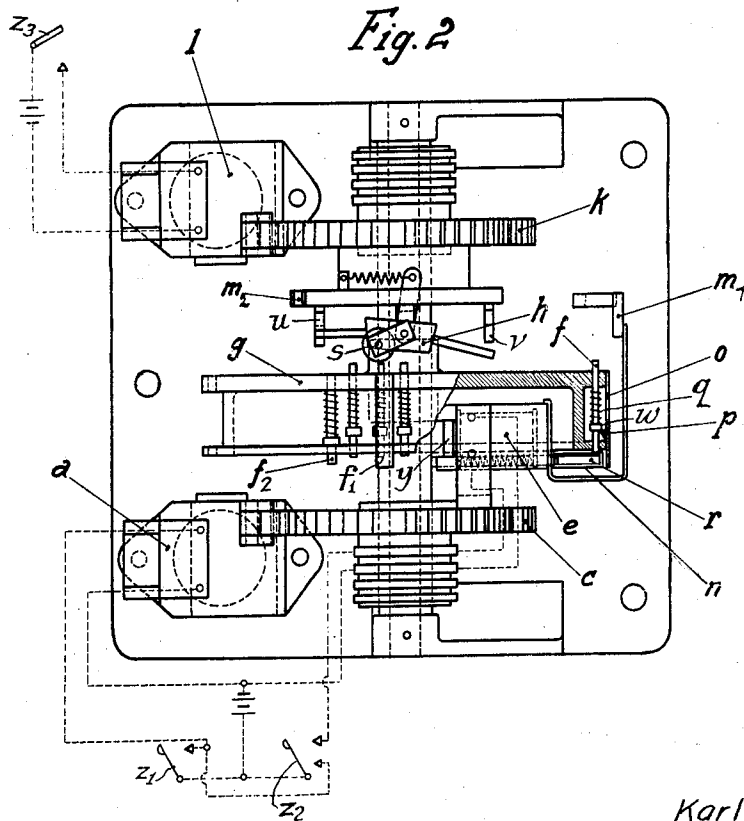
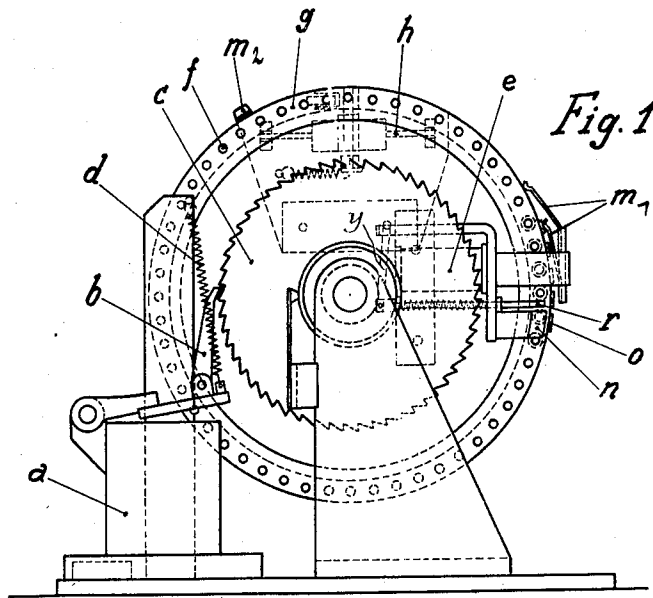
Aug. 8, 1933.

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1,921,395

SHUNTING SYSTEM

Filed Dec. 6, 1928



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UNITED STATES PATENT OFFICE

1,921,395

SHUNTING SYSTEM

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Application December 6, 1928, Serial No. 324,310,
and in Germany January 21, 1928

3 Claims. (Cl. 104—26)

The present invention has as its object a device for the accumulation of the energy of various switching or shunting actions. This device is of special importance in the operation of gravity railway switch-yards, in which the cars are automatically started down a hill and individually distributed to the various branch tracks for the purpose of making up a train for subsequent dispatch. The prior art has endeavored to control the changing of the switches by the cars themselves in the manner that the cars roll over contacts thereby closing an electric circuit which insures directly or indirectly the throwing of the points. Now, in order to set the switch for one direction, a corresponding electric circuit must be closed, while the switch is set in the other position by the influence of another circuit. In order to avoid, during the gravity switching, previously setting the switches, an accumulator is provided which controls the various switching operations. The energy of switching impulses are first set up in the accumulator so that the switch will be thrown into the desired position and the car, by rolling over the rail contact, releases the impulse to so actuate the switch.

Many other cases also require the pre-accumulation of the energy of various switching impulses which are to occur in consecutive order. In all such cases the present invention may be made use of. In the devices for the accumulation of the energy of the switching impulses, known to the prior art, a drum was disposed rotatably, while the magnets, which actuated the contacts of the drum or absorbed the energy of the different switching impulses, were arranged in fixed position. At the same time a magnet was provided, disposed in the interior of the drum, which was actuated by the cars, and caused the further rotation of the drum. However, this type of construction resulted in an arrangement of parts which was quite inaccessible and could not be watched during operation. The present invention represents an improvement in such devices in that the drum for the accumulation of the energy of the switching impulses is stationary while the two ratchet mechanisms for the accumulation and release of the energy of said switching impulses can turn independently of one another on the axis of the fixed drum.

In the following description such a construction is set forth, as schematically shown in Figures 1 and 2 of the accompanying drawing, in which, for simplicity, only two switching impulses of a different type are considered.

In the accompanying drawing forming part hereof,

Figure 1 is a side elevation of an apparatus embodying a practical form of the invention.

Figure 2 is a plan view of the same with a portion of the drum member shown in section to reveal the construction of the same and its apertures.

Throughout, the same reference indicia refer to the same or like parts.

A fixed drum *g* is provided with pins *f*, which are encircled and actuated by springs *q* in the drum. When a pin *f* is pressed, against the action of the spring *q*, into the drum, a resilient catch *p* engages the front of an annular stop *w*, of said pin *f*, thereby holding the pin in the pressed-in position. This insures the possibility of releasing the energy of two different switching impulses by means of these pins according to whether their end extends beyond the wall of the drum or not. Now, in order to accumulate the energy of several different switching impulses in the drum, it is necessary to either leave the pins in their successive order in their normal position or to bring the same into the pressed-in position. This is accomplished with the aid of two magnets *a* and *e*.

The armature of magnet *a* is provided with a forward feed pawl *b*, which engages a ratchet wheel *c*. The forward movement in a clockwise direction of the wheel *c* is effected by the pawl *b* under the action of a spring *d* when there is no current in the electro-magnet *a*, the armature being drawn away by said tension spring *d*.

When magnet *a* is energized, it attracts its armature which carries the pawl *b* with it until the latter engages the next tooth on wheel *c*. To the ratchet wheel *c* is attached the ratchet magnet *e* which glides, during the turning of toothed wheel *c*, along the outer side near the periphery of the drum. The pins *f* are pressed into the drum by means of a lug *n* which is carried by wheel *c*.

When the magnet *e* is energized it attracts its armature *y* and presses a spring pin *r* against the leaf spring *o* to which is attached the catch *p*. The latter releases the stop *w* with the result that the particular pin *f* is forced, due to the action of spring *q*, out of the drum, hence assuming the position of the pin designated by *f*₂ in Fig. 2. In this way the magnet *e* is brought, at such release of magnet *a*, from one pin *f* to the other, releasing however the corresponding pin *f* only if it is energized, the pin *f* staying in the pressed-in position if magnet *e* is without current. The

energizing of magnet *a* is controlled by means of a switch *Z*₁ and magnet *e* by a switch *Z*₂. This results in the advantage that a simple contact device is sufficient for the actual ratchet operation. It is, of course understood that each pin *f* is individually associated with a leaf spring *o* as well as a catch *p* and a stop *w*.

On the other side of the drum *g* is disposed a change-over switch *h* pivotally mounted on a second rotatable ratchet wheel *k*. This change-over switch *h* glides with its roll *s* over the pins *f* and takes a position corresponding to whether the pin *f*, engaged at the time, is pressed in or not. As shown in Fig. 2, the roll *s* is engaging a pressed-in pin *f*₁, which has placed the change-over switch *h*, against the action of a spring *t*, into the position shown in the drawing, closing a contact *u*. If roll *s* moves to a position over a pin which is not pressed in, for instance over the pin *f*₂, the contact *u*, due to the action of spring *t*, is opened and a contact *v* is closed. The wheel *k* is kept moving by a magnet *l* in the same manner as the wheel *c* is kept moving by magnet *a*. Hence, the energy of one of the accumulated switching impulses is active at each actuation of magnet *l* by means of a switch *Z*₃. Immediately after the start of said accumulation the release of the energy of the switching impulses may begin so that both operations may occur simultaneously. Should the accumulation operate alone for a longer time than the release, an over-accumulation in the drum might occur. This is prevented by two contacts *m*₁ and *m*₂, *m*₁ being rigidly connected to ratchet wheel *c* while *m*₂ is mounted on the ratchet wheel *k* so as to stop the accumulation process as soon as they get in touch with one another. A further continuation of the accumulation process is then automatically prevented in any desirable manner.

The operation of the device is as follows:

For the accumulation of the energy of the switching impulses only the switch *Z*₁ need to be operated but may also be effected by simultaneous operation of both switches *Z*₁ and *Z*₂. By closing *Z*₁, magnet *a* receives current, attracts its armature with the forward moving pawl *b* thereby causing the latter to engage the next tooth of the ratchet wheel *c*. This results in applying tension to spring *d* which moves, after the opening of *Z*₁, the ratchet wheel *c* by one tooth. In its movement the ratchet wheel *c* carries with it a lug *n* which presses in the pins *f* one after the other. If, upon the further movement of the ratchet wheel *c*, *e* is energized by closing switch *Z*₂, the corresponding pin *f* is released, as previous described, the other pins *f* remaining in their pressed-in position. Hence, it is optional to leave, by opening or closing the switch *Z*₂, the contacts *f* in their successive order in the pressed-in position or to bring the same in the released position.

The release of the energy of the accumulated switching impulses is accomplished by the closing of switch *Z*₃. Because, as above described, the ratchet wheel *k* is moved by one tooth with each closing of the switch *Z*₃ by means of magnet *l*, the roll *s* gliding over the pins, the switch *u* or the switch *v* being closed according to whether or not the ends of the pins protrude from the back side of the drum. It is readily seen in Fig. 2 that the pins *f* can assume either of two different positions, and consequently are adapted to direct wheel *S* in either of two directions. In one direction, the switch *U* will be closed, and the switch occupies one position, while in the oth-

er direction, *V* is closed and the switch assumes another position.

In railway gravity switch yards the switch *Z*₃ is replaced by a rail contact which is closed by the cars. Hence, in this case, the individual switch positions may be predetermined for the individual cars. Hence, switch *Z*₃ is thus closed by movement of a car over the rails, while switches *Z*₁ and *Z*₂ are manually operated. The contact switch may be designed so that when once operated by a car wheel passing over the same, known means of deceleration for said contact may be incorporated which will maintain the contact in operated or closed condition for a period of 2 to 4 seconds or so. This is based on the fact that each car is from 15 to 30 feet long, having an average running speed of 15 to 20 feet per second, and the train as a whole having a total length of at least 50 feet. Hence, when once operated by the wheel of the first car, the contact will only be opened when all wheels of the car in line with said first wheel have passed over said contact, yet it will be definitely opened before the next car passes over it. Thus the contact will be operated but once by each car. Furthermore, if in front of each switch a rail contact is disposed which is connected with the ratchet magnet *l*, the car produces the throwing of the switch by rolling over the rail contact with a corresponding change of the change-over switch *h*. In the subsequent accumulation all pins which are in the position of *f*₂ are pressed again into the drum by means of the lug *n*. Contacts *u* and *v* are placed in circuit with the relays or magnets (not shown) which indirectly or directly actuate the rail switch into a corresponding position.

Having now fully described my invention, I claim:—

1. Apparatus for the accumulation and release of the energy of switching impulses for the operation of the switches of switching systems comprising a drum fixed to a shaft, two ratchet mechanisms rotatably mounted upon said shaft and arranged on each side of the drum, slidable contacts on said drum adapted to assume at least two different positions, means individually associated with said contacts adapted to hold them in one of said two positions, means provided in association with one ratchet mechanism adapted to move said contacts into the other of said two positions, movable means operated by the slidable contacts, and means associated and cooperating with said movable means adapted to assume either one of two different positions therewith corresponding with the two positions of said contacts.

2. Apparatus for the accumulation and release of the energy of switching impulses for the operation of the switches of switching systems comprising a drum fixed to a shaft, two ratchet mechanisms rotatably mounted upon said shaft and arranged on each side of the drum, slidable contacts on said drum adapted to assume at least two different positions, means individually associated with said contacts adapted to hold them in one of said two positions, means provided in association with one ratchet mechanism adapted to move said contacts into the other of said two positions, movable means operated by the slidable contacts, means cooperating with said movable means adapted to assume either one of two different positions therewith corresponding with the two positions of said contacts to the switches, tension springs controlling the rotation step by

step of the ratchet wheels in one direction, and electromagnets adapted to extend said tension springs.

3. Apparatus for the accumulation and release
5 of the energy of switching impulses for the operation of the switches of switching systems comprising a drum fixed to a shaft, two ratchet mechanisms rotatably mounted upon said shaft and arranged on each side of the drum, slidable con-
10 tacts in the form of spring actuated pins on said drum adapted to assume at least two different positions, means individually associated with said contacts adapted to hold them in one of said
15 two positions, means provided in association with one ratchet mechanism adapted to move said contacts into the other of said two positions, mov-

able means operated by the slidable contacts, and means cooperating with said movable means adapted to assume either one of two different positions therewith corresponding with the two po-
80 sitions of said contacts, means for controlling the rotation step by step of said wheels in one direction, a change over switch carried by the re-
85 lease ratchet wheel controlled by said spring-actuated pins, a magnet adapted to render inoperative said pins with respect to said change
90 over switch, and a projection carried by the accumulation ratchet wheel adapted to engage and bring said pins into their operative position with respect to said change over switch.

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