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CIRCUIT CLOSER FOR AUTOMATIC SIGNALING SYSTEMS.

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1,215,242. Patented Feb. 6, 1917.

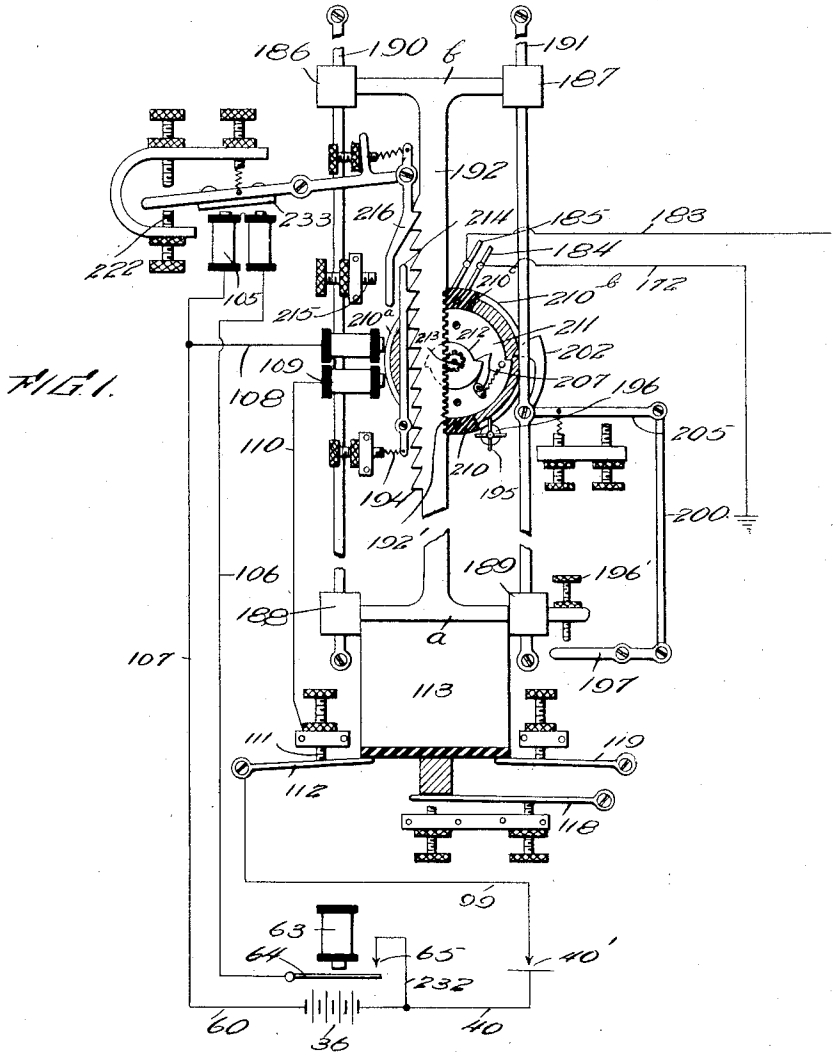

FIG. 1.

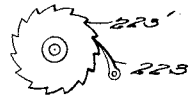

FIG. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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CIRCUIT-CLOSER FOR AUTOMATIC SIGNALING SYSTEMS.

1,215,242. Specification of Letters Patent. Patented Feb. 6, 1917.

Application filed June 3, 1914. Serial No. 842,771.

To all whom it may concern:

Be it known that I, CLINTON L. BOPP, a citizen of the United States, residing at Hawkeye, in the county of Fayette and State of Iowa, have invented certain new and useful Improvements in Circuit-Closers for Automatic Signaling Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to circuit closers, and especially to devices of that class designed for use in connection with automatic signaling systems for railways.

The apparatus herein described is designed to be operated for receiving a given number of impulses transmitted over a signal wire and to automatically operate in the reverse direction for transmitting the same number of impulses when the line or the apparatus for which the signal is intended is free.

In the accompanying drawings Figure 1 is a view of the device in elevation, and Fig. 2 is a detail showing ratchet mechanism on the end of the drum opposite to that appearing in Fig. 1.

The construction will now be described in detail and during such description the operation will also be made clear.

When magnet 63 is energized from any suitable source of current forming a part of the signal apparatus not described, contact is closed at 65 completing a circuit through wire 232, battery 36, wire 60, wire 107, magnet 105, wire 106, armature 64 and contact 65.

Magnet 105 will then attract its armature 233 against adjustable stop 222, and pawl 216 pivoted to the armature will engage rack bar 192 and raise weight 113, pawl 214 retained by spring 194 acting as a stop. The free ends of the pawls overlap, and pawl 216 is limited in its movement by stop 215. Each impulse through the circuit abovementioned will raise bar 192 one step.

The toothed edge 192′ of bar 192 engages pinion or gear 213, and concentric with the latter are ratchet wheels 211, 212 and drum 210, the drum being of insulating material and having mounted thereon spaced contact plates 210^a, 210^b, engaged by brushes 184, 185. The contact plates bridge the gap between the brushes when the drum is in position to effect that result. The pawls of the ratchet wheels are designated 207 and 202. A fan governor 195 is provided with a sleeve 196 having frictional contact with the drum for retarding the movement of the latter.

Pawl 202 is connected with a bar 205 pivoted to a rod 200 which in turn is pivoted to arm 197, one end of which makes contact with screw 196′ carried by member 189. Guides 188, 189 are connected by a cross bar *a* carried by bar 192, and the cross bar supports weight 113. An upper cross bar *b* connects guides 186, 187, these several guides moving on vertical bars 190, 191. Pawl 202 is therefore controlled by the weight, which also controls spring 112. Contact springs 118, 119 control special circuits connected with the signaling system not here described.

The circuit for magnet 109 when 40′ is closed by the operation of the signaling apparatus not shown, leads through battery 36, wire 40, contact 40′, wire 99, spring 112, contact 111, wire 110, magnet 109, wire 108, wire 107, wire 60, back to battery 36.

When magnet 109 is thus energized (contact having been previously closed at 111, 112, by raising the weight from spring 112), pawls 214 and 216 are released. As weight 113 descends, pinion 213, wheels 211, 212 and drum 210 will move toward the left through one-half of a revolution, causing a circuit to be completed across brushes 184, 185, the latter coming into engagement with one of contact plates 210^a, 210^b on drum 210. These plates are separated by insulation 210^c. Wheels 212, 213 move together; likewise wheel 211 and drum 210. The last two are independent of the first two, except for the pawls. A ratchet wheel 223′ on the reverse side is engaged by pawl 223 and prevents the drum from rotating when the weight is moving upwardly.

Wire 172 leading from brush 184 is connected to ground, and wire 183 is connected with the line, and transmits an impulse each time the several elements specified are operated.

What I claim is:

1. In a circuit closing device, a rotary member carrying contacts, a reciprocating member, means for operating the former from the latter, means for operating the reciprocating member, a retaining device for the latter engaging the means last men-

tioned, and a magnet for releasing the retaining device and operating means simultaneously.

2. In a circuit closing apparatus, a plurality of devices certain of which are operated in a given direction upon receiving a current impulse, a contact device remaining stationary while the apparatus is receiving said impulse, mechanism causing the operation of said devices in the opposite direction for transmitting an impulse, a circuit arranged to be closed when the devices last mentioned are operated, and means for releasing the devices, transmitting the impulse.

3. In a circuit closing device, a reciprocable member, means for operating the latter when receiving a current impulse, a rotary contact member remaining stationary while the impulse is being received, and means connecting these members for causing the reciprocable member to operate the other member when transmitting an impulse.

4. In a circuit closing device, a reciprocating weight, a notched bar connected with the weight, electro-magnetically energized means engaging the notched bar for raising the weight, means engaging said bar for retaining the latter in a raised position, a rack carried by the bar, a gear engaging the rack, contact members mounted to move simultaneously with the bar when the latter descends, means driven from the gear and carrying the contact members, means for releasing the bar, and a circuit adapted to be closed by the contact members as the bar descends for rotating the gear.

5. In a circuit closing device, a reciprocating notched bar, electro-magnetic means associated with the bar for raising the latter, a rack moving with the bar, a gear engaging the rack, a drum carrying contacts, means for rotating the drum from the gear, means holding the drum against rotation in one direction, separate electro-magnetically controlled means associated with a notched bar for retaining and releasing the same, and a circuit adapted to be closed as the bar rotates the drum.

6. In a circuit closing device, a reciprocating bar having notches thereon, electro-magnetic means associated with the bar for raising the bar through a predetermined distance a plurality of times, a rack carried by the bar, a gear engaging the rack and adapted to make a half revolution each time the bar is raised, a drum rotatable in one direction, means for rotating the drum from the gear, contacts carried by the drum, and a circuit adapted to be closed through the contacts as the drum revolves.

7. In a circuit closing device, a reciprocating bar, electro-magnetic means associated therewith for causing the same to be raised a predetermined distance, a rack moving with the bar, a gear engaging the rack, a ratchet wheel rigid with the gear, a drum, means for rotating the drum from the ratchet as the bar descends, contacts carried by the drum, and a circuit adapted to be closed through the contacts as the bar descends.

8. In a circuit closing device, a reciprocating bar, electro-magnetic means for raising the bar a predetermined distance, means for maintaining the same raised, a rack moving with the bar, a gear engaging the rack, a ratchet wheel carried by the gear, a drum, a pawl pivotally mounted on the drum and adapted to engage the ratchet wheel as the bar descends, spaced contact plates carried by the drum, and means adapted to engage the contact plates as the drum rotates.

9. In a circuit closing device, a notched member having a rack on one side thereof, means for moving the notched member upward, a cog engaging the rack, a drum, means operatively connected with the cog and drum for rotating the drum when the cog moves in a given direction, spaced contact members carried by the drum, a pair of terminals adapted to engage one of said contact members at a time as the drum rotates, and a weighted member secured to the notched member, adapted to lower the latter when released, to cause the drum to rotate.

10. In a circuit closing device, a cog, a drum mounted independently of said cog, a vertically reciprocable notched member having a rack on one side thereof, means engaging the notched member for raising the rack one notch at a time, said cog being adapted to move through a given angle as the notched member is raised one notch, means separate from those aforesaid for retaining and releasing the notched member, a weighted member secured to the notched member for causing the latter to descend when released, means for operatively connecting the cog and said drum for causing the drum to rotate as the notched member descends, a contact member carried by the drum, and a pair of terminals adapted to engage said contact member as the drum rotates.

11. In a circuit closing device, a cog, a drum mounted independently thereof, a notched member, means for raising the latter one notch at a time, a rack formed on one side of the notched member, engaging the cog and adapted to rotate the cog through a given angle when the notched member is raised one notch, means to cause the notched member to descend when released, a plurality of contact members carried by the drum, the length of each member corresponding with the angular distance through which the cog rotates as the notched member is raised one notch, a pair of terminals adapted to engage said contact members as the drum rotates, and means opera-

tively connected with the cog and drum to cause the drum to rotate as the notched member descends.

12. In a circuit closing device, a cog rotatably mounted, a vertically reciprocable rack engaging said cog, a drum mounted for rotation, but independent of said cog, spaced contact members carried by the drum, a pair of terminals adapted to engage said spaced contact members as the drum rotates, means to raise and hold the rack in raised position, means separate from those aforesaid to retain and release the rack, means to cause the rack to descend, and means operatively connected to the cog and drum to cause the drum to rotate as the rack descends.

13. In a circuit closing device, a ratchet wheel, a vertically reciprocable rod, means operatively connected to the rod and rigid with the ratchet wheel adapted to rotate the ratchet wheel as the rod is reciprocated, a drum, a pawl pivoted on the drum, a plurality of spaced contact members carried by the drum, and a pair of terminals adapted to engage one of said spaced contact members at a time as the drum rotates, said pawl adapted to engage the ratchet wheel.

In testimony whereof I affix my signature in presence of two witnesses.

CLINTON L. BOPP.

Witnesses:
JOHN A. SHALES,
CLYDE A. MUNSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."