

July 3, 1934.

R. M. HICKS ET AL

1,965,377

REGENERATOR UNIT

Filed Feb. 16, 1931

2 Sheets-Sheet 1

Fig. 3.

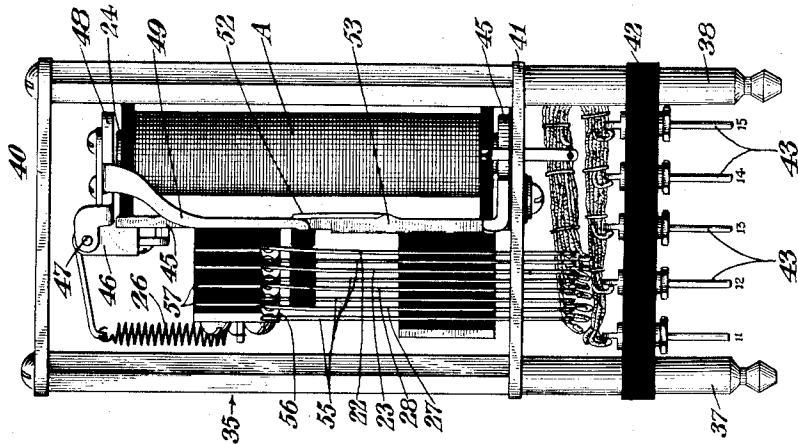


Fig. 1.

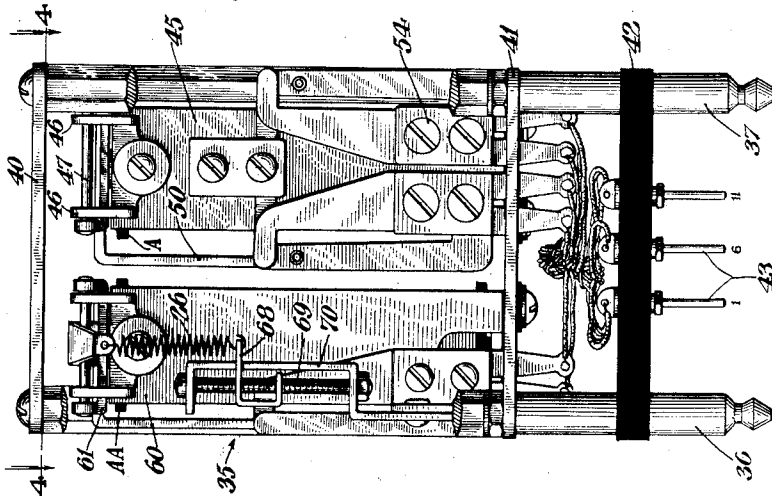
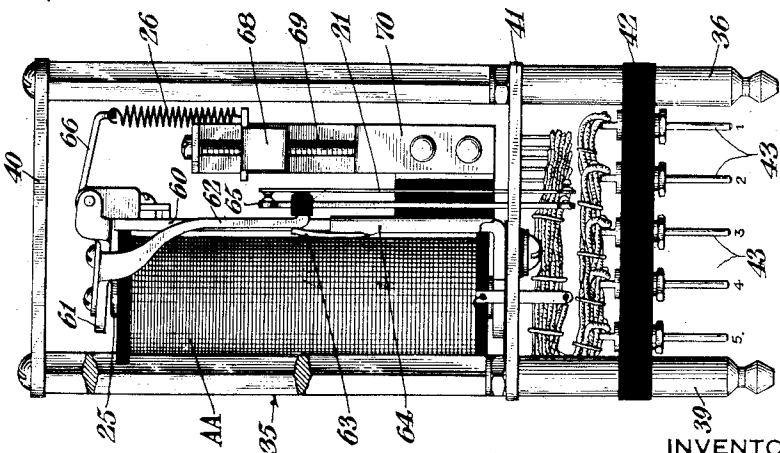


Fig. 2.



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2 Sheets-Sheet 2

Fig. 6.

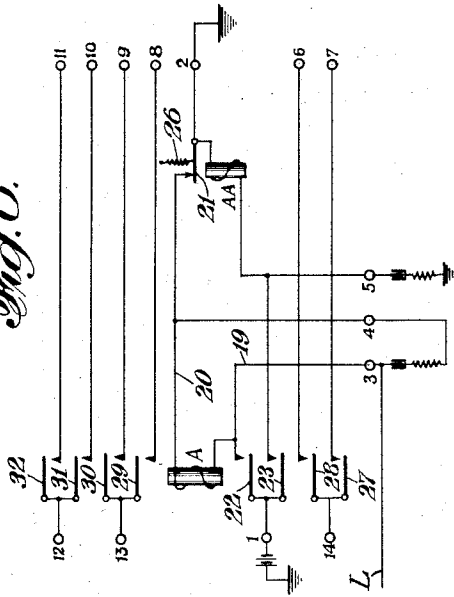


Fig. 7.

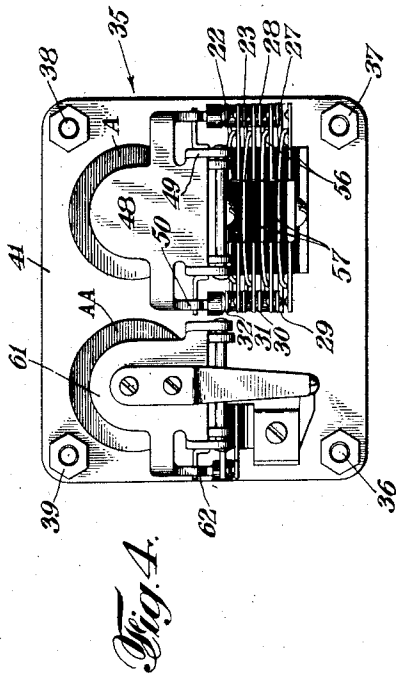
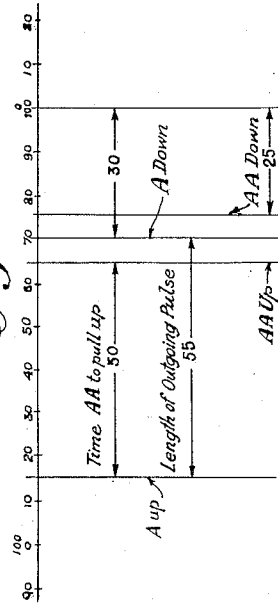
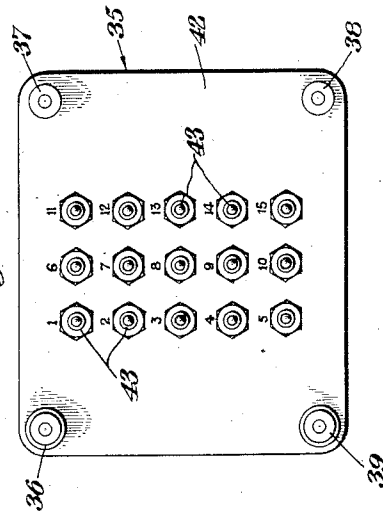


Fig. 5.



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1,965,377

REGENERATOR UNIT

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Application February 16, 1931, Serial No. 516,080

9 Claims. (Cl. 175—294)

This invention relates to a regenerator unit. Among the objects of this invention are the provision of means for controlling the lengths of outgoing pulses and for maintaining them at a constant length regardless of the varying lengths of the incoming pulses, the provision of adjustable means for controlling the lengths of the outgoing pulses, the provision of a frame for suitably supporting the mechanism, and the provision of means for detachably supporting said frame in position in a cabinet and effecting incoming and outgoing circuit connections.

Other objects of the invention will appear from the following description taken in connection with the drawings, in which:

Fig. 1 is a side view of a regenerator unit, parts of the frame mechanism broken away;

Fig. 2 is a side view of the unit looking toward the right in Fig. 1;

Fig. 3 is a side view of the unit looking toward the left in Fig. 1;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 1;

Fig. 5 is a bottom view of the unit;

Fig. 6 is a wiring diagram of the regenerator unit, and

Fig. 7 is a diagram showing the lengths of the incoming and outgoing pulses and the timing of the relays.

As shown in Fig. 6 the incoming line L is connected over a line 19 to one end of the coil of the relay A, the other end of which is connected by line 20 over the break contact 21 of relay AA to ground. An incoming pulse over the line L causes the relay A to pick up which over its make contact 22 closes a holding circuit for itself from battery, as indicated. The A relay will therefore be held up as long as the break contact 21 of the relay AA remains closed regardless of the length of the incoming pulse on the line L. It is only necessary that the incoming pulse be long enough to pull the relay A up to close the contact 22.

As the relay A picks up it also applies battery over its contact 23 which connects battery to one terminal of the coil of relay AA, the other terminal of which is connected to ground. This causes the relay AA to pick up, and as this relay picks up it opens the circuit for the A relay at its contact 21 causing this relay to release.

The A relay is of ordinary construction while the AA relay has a large number of windings to provide high inductance to slow up its operation. The relays A and AA are preferably respectively provided with brass caps 24 and 25, Figs. 3 and 2, on their armature ends to provide for fast release. The function of the brass caps is to reduce the effect of the residual magnetism. As indicated in the diagram, the movement of the contact 21 of the relay AA is resisted by a spring 26 which as described later is made adjustable so as to control

the time in which the relay AA pulls up and opens the circuit of the relay A at the contact 21.

As the relay A operates it connects battery over its contacts 27, 28, 29, 30, 31 and 32 to extend battery over various outgoing lines, as indicated.

If it is assumed that it takes the A relay 15% of the total time of a pulse and a space to pull up, (Fig. 7), and that it takes the AA relay 50% of time to pull up, and that the release time of each of the relays A and AA is 5%, and that the incoming pulse is a 35% pulse, the relay A will be picked up at the end of 15% and will stay up until the AA relay is picked up, which requires 50%, so that the length of the outgoing pulse over the contacts 27 to 32 will equal to 55%, i. e., 50% plus 5% which is the release time of the relay A. The length of the outgoing pulse can be controlled by adjusting the spring 26 to be of any length between 30% and 80%, and the construction is such that the pulse on the incoming line may be anywhere from 15% to 75%.

The relays A and AA and their contacts may be mounted in a frame 35, Figs. 1 to 5, which may include four legs 36, 37, 38 and 39, the upper ends of which may be secured to a rectangular plate 40. These legs may be made in sections so as to detachably support a plate 41 on which the relays are supported and a plate of insulating material 42 on which slip contacts 43 are supported. The lower ends of the legs may be fashioned to connect with retaining means in a cabinet so that the whole unit may be readily mounted on and detached from a suitable cabinet or supporting frame.

The relay A is supported on an L-shaped soft iron member or cover plate 45 which is insulated from and supported on the plate 41 and to which the core of the relay is secured. The member 45 extends to the upper end of the relay and has secured thereon lugs 46 of brass for supporting a brass rocking shaft 47 to which are secured ears formed on the armature 48. The construction is such that there is a very small gap between the plate 45 and the armature 48 to provide an easy path for the magnetic lines of flux through the core, cover plate and armature.

Secured to or integral with the armature 48 are switch operating arms 49 and 50 each of which carries a piece of insulating material which operates against the rearmost contact of four contacts 22, 23, 28 and 27, or 32, 31, 30 and 29, Figs. 4 and 6, the first three of which may carry insulating material for spacing the contacts from each other and for transmitting movement from the rear contact to the most forward contact. The counterclockwise movement of the arm 49 is limited by an adjustable portion 52 on a member 53 which is in contact with the plate 45 and is secured thereto by screws 54

which secure the movable contacts 22, 23, 28 and 27, and 32, 31, 30 and 29, as well as cooperating stationary contacts, generally indicated at 55, to the plate 45, the movable and stationary contacts being arranged in alternate fashion and suitably insulated from each other, as shown. As shown in Figs. 3, 4 and 6, movable and fixed contacts are preferably arranged in two sets of four movable and fixed contacts. The movement of the arm 50 may be limited by a means similar to the adjustable portion 52 on the member 53.

The connection between the lower ends of the movable and stationary contacts with the clips 43 may be made in any suitable manner, and any or all of these contacts and clips may be used as desired.

As shown in Figs. 3 and 4, the home position of the upper ends of the stationary contacts 55 is adjustably controlled by fingers 56 on plates 57 which are insulated from each other and are secured to the plate 45.

The relay AA comprises a winding of a large number of turns and its stationary core is preferably supported on a cover plate 60 which supports an armature 61 provided with a switch operating arm 62 limited in one direction of its movement by a lip 63 on a plate 64 secured to the plate 60. The arm 62 carries a piece of insulation adapted to contact with the movable contact member 21 to move it out of engagement with the fixed contact 65 as the relay AA is energized.

For the purpose of adjusting the operating time of the relay the armature 61 has secured thereto an arm 66 to which is anchored one end of the spring 26, the other end of which is anchored to a clip 68 adjustably by means of a screw 69 on a bracket 70 which, together with the movable contact 21, stationary contact 65 and the plate 64, are secured to the cover plate 60 the parts being suitably insulated from each other, as shown. By adjusting the screw 69 the tension on the spring 26 may be increased to control the operating time of the relay AA which in turn governs the release of the relay A and the length of the outgoing pulse.

While the invention has been described with particularity in reference to a single embodiment disclosed, it is apparent to those skilled in the art that the invention in its broader aspect could be carried out by other instrumentalities, and it is understood that the terms used in the claims are words of description and not limitation except as necessitated by the prior art.

What is claimed is:

1. The combination of a relay responsive to incoming pulses of varying lengths and provided with a plurality of contacts one of which closes the circuit over an outgoing line, a second relay energized over a contact of said first relay, the operating circuit for said first relay extending over a break contact of said second relay, and a holding circuit for said first relay including a make contact on said first relay and said break contact on said second relay.

2. The combination of a relay responsive to pulses of varying lengths and adapted to control the length of outgoing pulses, a holding circuit for said relay, and means for controlling the duration of said holding circuit to control the length of the outgoing pulses.

3. The combination of a relay responsive to pulses of varying lengths and adapted to control the length of outgoing pulses, a holding circuit

for said relay, and adjustable means for controlling the duration of said holding circuit to control the length of the outgoing pulses.

4. The combination of a relay responsive to incoming pulses of varying lengths and provided with a plurality of contacts one of which closes a circuit over an outgoing line, a second slow operating relay energized over a contact of said first relay, and a holding circuit for said first relay including a make contact on said first relay and a break contact on said second relay.

5. The combination with a relay responsive to incoming pulses of variable lengths and provided with a plurality of contacts, one of which closes a circuit over an outgoing line, a second slow operating relay energized over a contact of said first relay, means for adjusting the operating time of said second relay, and a holding circuit for said first relay including a make contact on said first relay and a break contact on said second relay.

6. The combination with a relay responsive to incoming pulses of variable lengths and provided with a plurality of contacts, one of which closes a circuit over an outgoing line, a second slow operating relay energized over a contact of said first relay, means for adjusting the operating time of said second relay, a holding circuit for said first relay including a make contact on said first relay and a break contact on said second relay, and means providing for fast release of said relays.

7. The combination of a relay responsive to incoming pulses of varying lengths and provided with a plurality of contacts one of which closes a circuit over an outgoing line, a second relay energized over a contact of said first relay, a holding circuit for said first relay including a make contact on said first relay and a break contact on said second relay, said second relay being slow operating, a frame for supporting said relays and contacts, a plurality of clips for incoming and outgoing circuits, and means on the frame for detachably securing the same in a cabinet and for effecting circuit connections between said clips and leads on said cabinet.

8. The combination of a relay responsive to incoming pulses of varying lengths and provided with a plurality of contacts, one of which closes a circuit over an outgoing line, a second relay energized over a contact of said first relay, a holding circuit for said first relay including a make contact on said first relay and a break contact on said second relay, a cover plate for said second relay, a spring mounted on said cover plate to oppose the closing movement of said armature, and means for adjusting the tension of said spring.

9. The combination of a relay responsive to incoming pulses of varying lengths and provided with a plurality of contacts, one of which closes a circuit over an outgoing line, a second relay energized over a contact of said first relay, a holding circuit for said first relay including a make contact on said first relay and a break contact on said second relay, a cover plate for said second relay, a spring mounted on said cover plate to oppose the closing movement of said armature, means for adjusting the tension of said spring, and means for supporting said adjusting means on said cover plate.

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