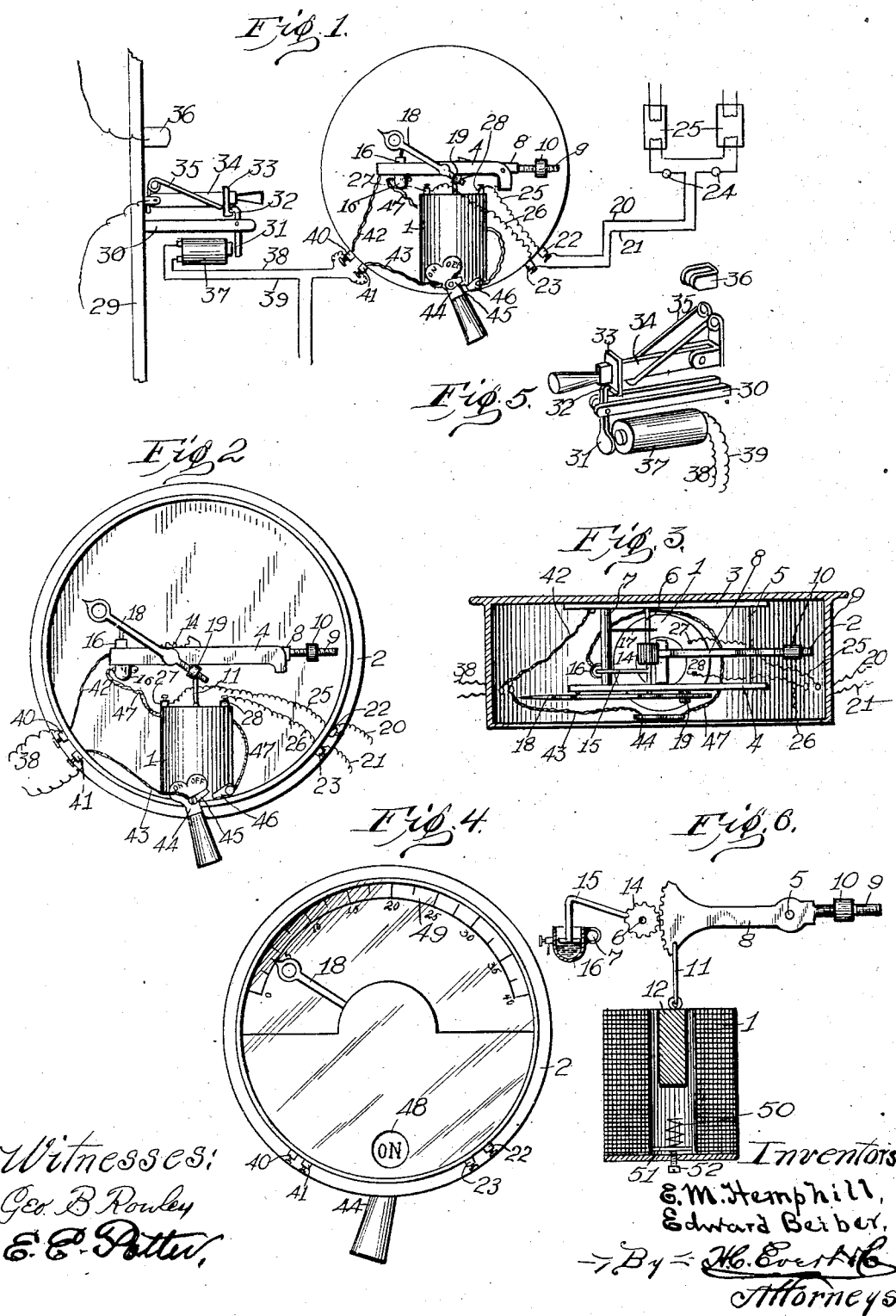


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AUTOMATIC PARALLELING DEVICE.

APPLICATION FILED DEC. 24, 1902.

NO MODEL.



UNITED STATES PATENT OFFICE.

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AUTOMATIC PARALLELING DEVICE.

SPECIFICATION forming part of Letters Patent No. 729,934, dated June 2, 1903.

Application filed December 24, 1902. Serial No. 136,444. (No model.)

To all whom it may concern:

Be it known that we, ELI M. HEMPHILL, residing at Avalon, and EDWARD BEIBER, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, citizens of the United States of America, have invented certain new and useful Improvements in Automatic Paralleling Devices, of which the following is a specification, reference being had
10 therein to the accompanying drawings.

This invention relates to certain new and useful improvements in automatic paralleling devices, and has for its object the provision of means whereby two alternating-current generators adapted to run in parallel are automatically placed in parallel as soon as the generators are in step or synchronism. Heretofore and before our invention this has generally been done by the use of two or more
20 lamps connected between the transformers and termed "synchronizing-lamps." With such a system it is necessary that these lamps be watched by a man at the board until they go out entirely, and the operator then throws
25 in the switch. Thus it requires the service of two men, one at the switch to observe the synchronizing-lamps and one at the engine to vary the speed. By the aid of our invention it requires no operator or watcher at the
30 board, as the switch is automatically thrown in as soon as the generators are in step or synchronism.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a diagrammatical view showing the circuits to the transformers and switch.
40 Fig. 2 is a plan view of the indicator, which is located at the engine (not shown) with the front plate or dial removed. Fig. 3 is a horizontal sectional view of the same. Fig. 4 is a front elevation thereof. Fig. 5 is a detached
45 detail perspective view of the switch and operating-magnet. Fig. 6 is a sectional view of a part of the indicating-mechanism magnet or solenoid, showing the mercury-cup and the segment mechanism.

50 Our device embodies a solenoid located at the engine and in circuit with a small mag-

net located at the switchboard and also in circuit with the transformers, and an indicating-pointer is mounted adjacent to this solenoid and controlled thereby. We preferably arrange the mechanism at the engine within a
55 suitable casing, and though this is not essential we have so shown and will describe the same. To this end we have shown the solenoid 1 arranged in a circular casing 2, which
60 latter may be mounted in any suitable manner at a desired point on or near the engine. (Not shown.) To the inner face of the back plate of this casing is attached a frame-bar 3, connected to a front frame-bar 4 by arbors 5,
65 6, and 7, respectively. The arbor or shaft 5 has mounted thereon a segment 8, provided with a threaded shank 9, on which is mounted a regulating-weight 10. A link 11 connects the segment 8 to the core or armature 12 of
70 solenoid 1. The toothed segment 8 meshes with a pinion 14, mounted on the arbor or shaft 6, which arbor or shaft carries a contact 15, adapted to make contact with a mercury-cup 16, whereby to complete the circuit
75 and operate the switch when the generators are in step or synchronism. This mercury-cup 16 is supported by and insulated from the arbor or shaft 7, and the throw of the arbor or shaft 6 is limited by a stop 17, carried
80 by the arbor or shaft 6. The arbor or shaft 6 extends through the front frame-bar 4 and has mounted on its forward end an indicating-pointer 18, provided with an adjustable weight 19. Circuit-wires 20 21 connect from
85 binding-posts 22 23 on the casing 2 through the synchronizing-lamps 24 with the transformers 25, connected to the machines to be synchronized, respectively, these binding-posts being connected by wires 25 26 with
90 binding-posts 27 28, to which the windings of the solenoid 1 are connected.

On the switchboard 29 is mounted supporting-posts 30, in which is pivoted an armature 31, the upper end of which has a catch 32 to
95 engage with a plate 33, carried by the switch 34, which is connected in the main circuit leading from the generators. This switch is pivoted in a clip 35, carried by the switchboard 29, and when the catch end of the armature is released from the plate 33 a spring
100 35 forces the switch up into engagement with

the clips 36, which is connected in the main circuit, leading off the current from the generators. This spring we preferably make in the form of a yoke, as shown, coiling the same near its ends and inserting the ends through keepers. Located below the supports 30 is a magnet 37 in circuit with the exciter or generator through wires 38 39, connected to binding-posts 40 41. These binding-posts are connected, respectively, by wires 42 to the rear bar 3 of the frame and by wire 43 to a switch 44. The contact 15 is thus electrically connected to wire 42 through the frame. The contact 45 of this switch is adapted to engage when the switch is closed with a contact 46, this contact 46 being connected by wire 47 with the mercury-cup 16. The switch-handle 44 carries the indicating-signs "On" and "Off," and the front plate of the casing is provided with an aperture 48, so that said indicating-signs may be observed to indicate or denote the position of the switch. The upper part or portion of the front plate of the casing is made of transparent material, and an indicating-scale 49 is preferably provided to indicate the amount of current.

In operation when the switch-handle 44 is "off" or in the position shown in Fig. 1 the current indicating the advance of one generator over the other flowing through the transformers 25 and the wires 20 21 will energize the magnet 1 and draw inward its core, which will in turn cause the pointer 18 to rise, and the vibrations of this pointer will indicate approaching synchronism of the generators driven by said engines. As the pointer indicates the approaching synchronism the engineer throws switch-handle so as to move contact 45 in engagement with contact 46 and as the contact 15 engages in the mercury-cup 16 and completes the circuit through wires 42 43 wires 38 39 to energize the magnet 37 and attract armature 31, thereby releasing switch 34 and allowing spring 35 to force said switch into engagement with its clip 36 to close the same, thereby throwing the current of the generators into the same circuit.

In order to cushion the armature or core 12, we preferably provide a spring 50, carried on a disk 5, which latter is mounted on a screw 52 in the lower end of solenoid 1.

To operate by hand, the operator will simply throw in the switch when pointer 18 comes to rest.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A device of the type set forth comprising in combination with transformers adapted to be connected with generators to be synchronized, synchronizing-lamps connected to the transformers, a solenoid electrically connected with said lamps, means secured to the core of said solenoid for establishing a circuit to actuate a main switch upon the synchronizing of the generators, indicating means connected therewith, and a main switch adapted to close the circuit between the generators, substantially as described.

2. A device of the character described, comprising a main switch, a circuit for leading off the current of two synchronized generators controlled thereby, an electrically-actuated means for actuating said switch, a circuit leading from said means, a switch for said last-named circuit, means for completing said circuit on the synchronizing of the generators comprising a mercury-cup connected in said circuit, a pivoted contact-piece therefor carrying a pinion, a pivoted arm carrying a segment meshing with said pinion, a solenoid, a core therefor secured to said pivoted arm, adapted to actuate the same, synchronizing-lamps electrically connected with the solenoid, and with transformers, said transformers being connected with the generators, and means actuated by the solenoid-core for indicating approaching synchronizing of the generators, substantially as described.

3. A device of the type set forth comprising in circuit with transformers, synchronizing-lamps, a solenoid connected therewith, means actuated by the core thereof to complete a second circuit, means for indicating synchronism actuated thereby, a switch for the second circuit, a main switch adapted to be actuated upon the closing of said last-named circuit, and a circuit adapted to conduct off the current from the synchronized generators, upon the closing of the said main switch, substantially as described.

In testimony whereof we affix our signatures in the presence of two witnesses.

ELI M. HEMPHILL.
EDWARD BEIBER.

Witnesses:

A. M. WILSON,
E. E. POTTER.