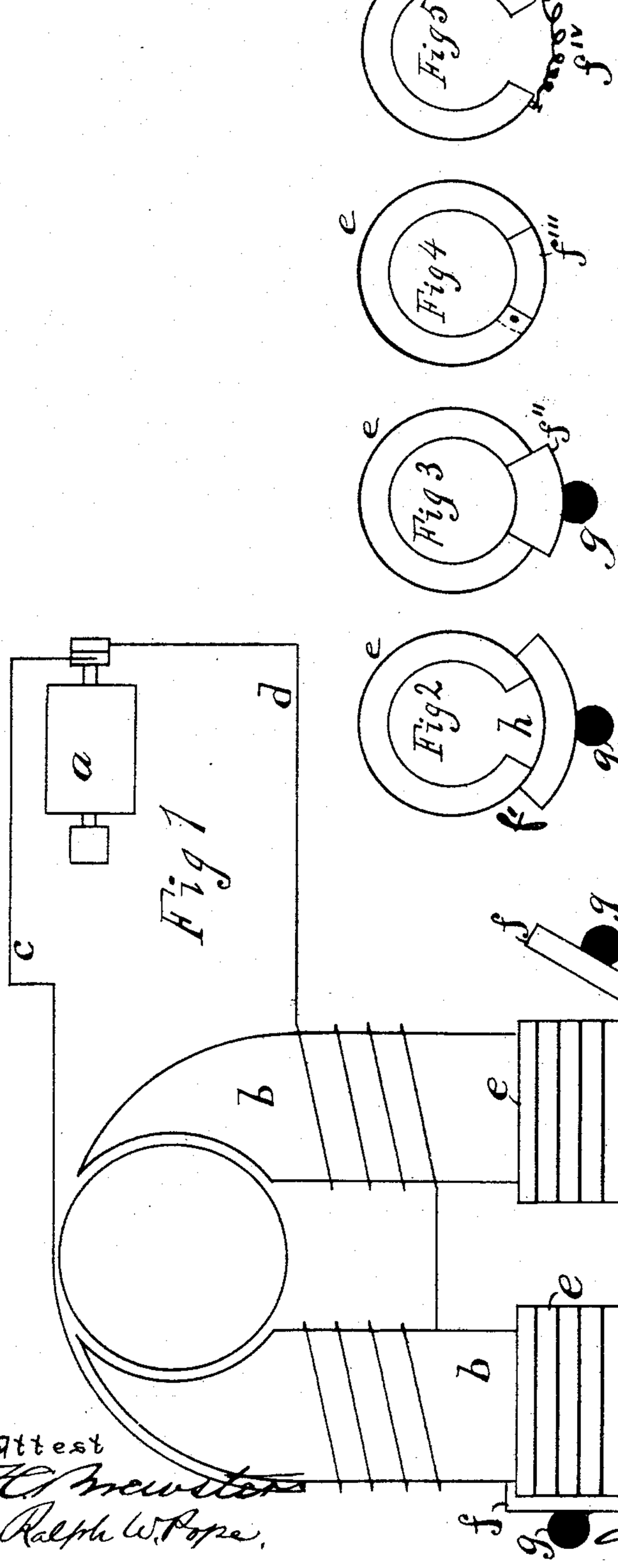
(No Model.)

L. GUTMANN.

ELECTRIC REGULATOR.

No. 414,043. Patented Oct. 29, 1889.



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LUDWIG GUTMANN, OF FORT WAYNE, INDIANA.

ELECTRIC REGULATOR.

SPECIFICATION forming part of Letters Patent No. 414,043, dated October 29, 1889.

Application filed December 5, 1888. Serial No. 292,688. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG GUTMANN, a subject of the Emperor of Germany, and a resident of Fort Wayne, in the county of Allen and State of Indiana, have invented a certain new and useful Improvement in Electric-Motor Regulators, of which the following is a specification.

My invention relates to means for regulating the speed of rotation of electric motors when employed upon variable work or when included in a variable-current circuit.

The construction underlying the invention is simple, and is described by reference to the accompanying drawings, in which—

Figure 1 is a view in elevation of the principal parts of a motor equipped with my invention and included in an electric circuit with an alternating electric generator. Figs. 2, 3, 4, and 5 are plan views of modified forms of regulator. Fig. 6 is a view in elevation, and Fig. 7 a plan view of another modification. Fig. 8 is a view in side elevation, and Fig. 9 another side elevation of a further modification.

Referring to Fig. 1, the system consists of the combination of an alternating-current generator *a*, field-magnets *b* of a suitable alternating-current motor, the said field-magnets being included in a suitable electric circuit formed of conductors *c* and *d*, rings *e*, of good conducting material, mounted upon the arms of the field-magnet, whereby they become paths of a secondary current from induction, being in inductive relation with the circuit of the generator, the said rings being provided with slots or openings for the reception of circuit-closers *f*, provided with insulated handles *g*. In Fig. 2 these rings may be seen in plan, the slots or openings being represented by the letter *h*. In this figure the circuit-closer is *f'*, and consists of several conducting-pieces, of which one is shown at *f'*, adapted to overlap the openings. In the figure the rings are shown closed.

In Fig. 3 the closers *f''* are shown fitting into the openings.

In Fig. 4 the closers are represented hinged at one side of the opening and adapted to open and shut. In Fig. 5 they are wires adapted to be attached at each end to binding-posts at the sides of the openings.

In Fig. 1 the closers are hinged at a point below the openings in such a manner, as shown, that the same may be opened and shut.

In Fig. 6 the closer consists of an insulated rod *g'*, to which there are springs of conducting material (lettered *l l' l'' l'''*, &c.) arranged on the length of the rod, while the rod is adapted to slide up and down in the openings.

In Figs. 8 and 9 there is an insulated rod, to which are fixed contact-pieces *m*, while the rod is pivoted at its lower end. The sides of the openings are provided with terminals *n* and *n'*, respectively. The rod is so pivoted and the contacts or terminals *n* and *n'* are at such a distance that when the rod is turned to the right the plates or contacts *m* will close the terminals *n* and *n'* in pairs and in order from the top to the bottom of the set of rings.

The current flowing through the coils of the conductors connected with the generator induces in the rings, when closed, currents which are opposed to those in the said coils. The reactive effect of the current in the rings causes a stronger current in the said coils than if the said rings were open. Consequently when it is desired to have the motor perform more and more work the rings are gradually and successively all closed. When the motor is to do a little work, one or more of the said rings are opened.

I claim as my invention—

1. In an electric-motor regulator, the combination of one set of coils connected in circuit with an alternating-current generator and mounted upon the arms of the field-magnet of the motor, and a set of rings of conducting material mounted on the same field-magnet core and provided with openings or slots, and a circuit-closer for said openings, the said closers being adapted to open and close the openings.

2. In an electric-motor regulator, the combination of conducting-rings mounted upon and surrounding the arms of the field-magnet of the said motor, and provided with openings to form incomplete rings, and a movable conducting-rod fitting into said openings.

3. In an electric-motor regulator, the combination of field-magnets provided with coils and independent concentric open rings insu-

lated from one another mounted on the said field-magnets and provided with terminals, as and for the purpose described.

4. In combination with the field-magnets of an electric motor, open conductors surrounding in part the arms of the field-magnets and movable conductors connecting the open parts of the said open conductors.

5. In a regulator, the combination, with an iron core of a motor, choking-magnet, converter, or other induction apparatus, of a conductor in form of coils mounted upon the said iron core and in circuit with a suitable generator of alternating, pulsating, or intermittent currents, open conductors surrounding the said iron core, and means for closing said open conductors.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 30th day of November, 1888.

LUDWIG GUTMANN.

Witnesses:
WILLIAM C. RYAN,
PHILLIP S. MALLEY.