

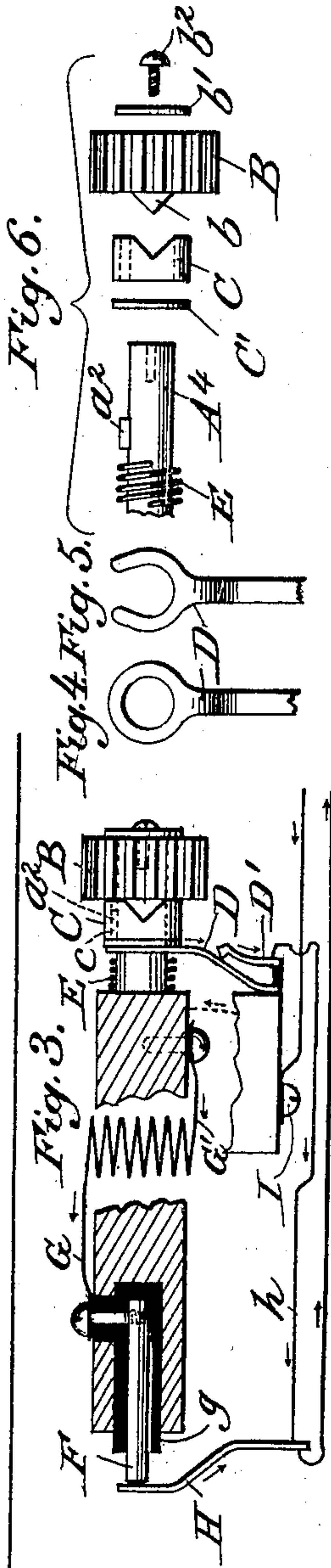
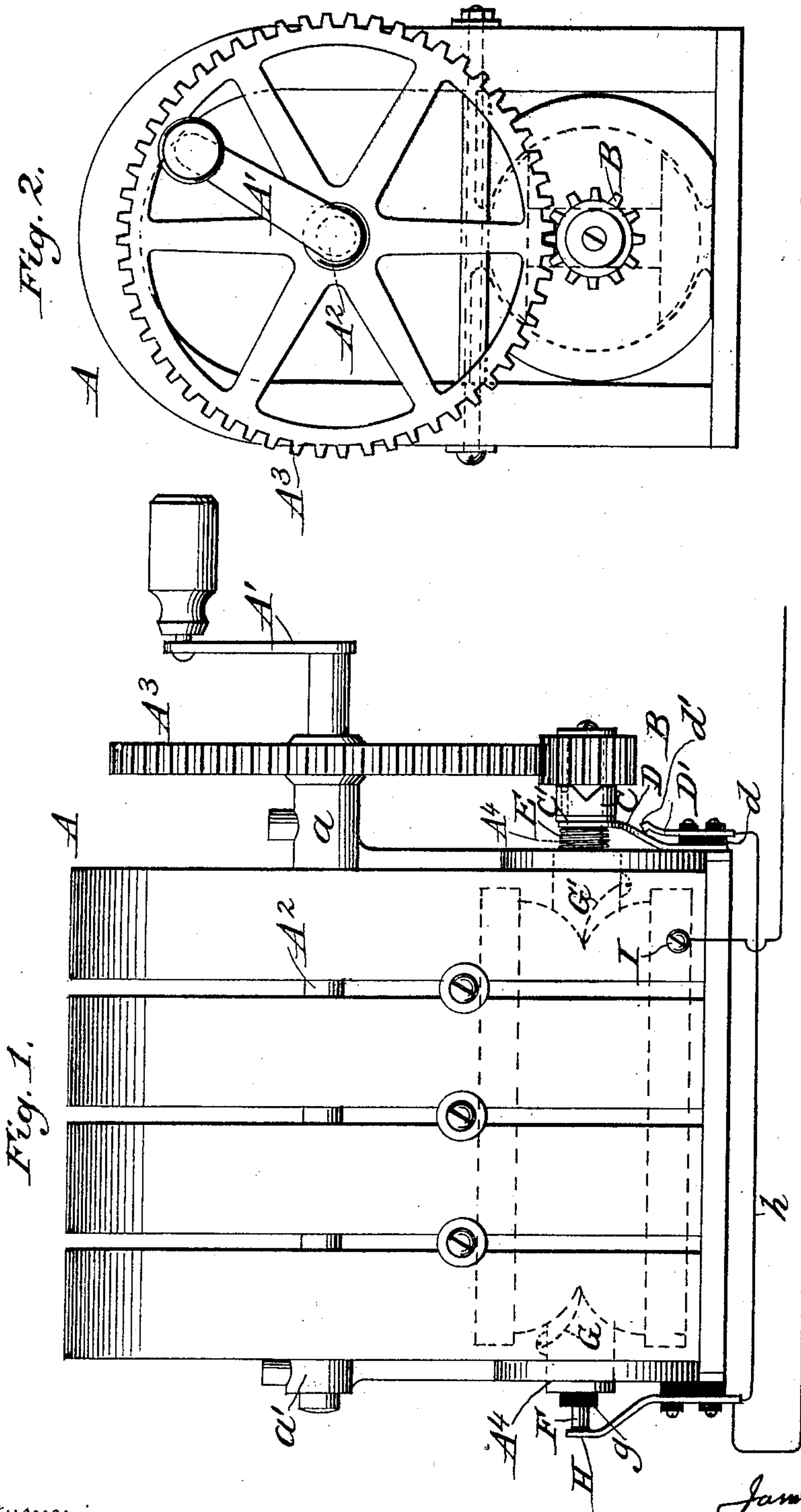
J. G. NOLEN.

COMBINED GEAR MUFFLER AND SHUNT FOR MAGNETO GENERATORS.

(Application filed May 10, 1900.)

(No Model.)

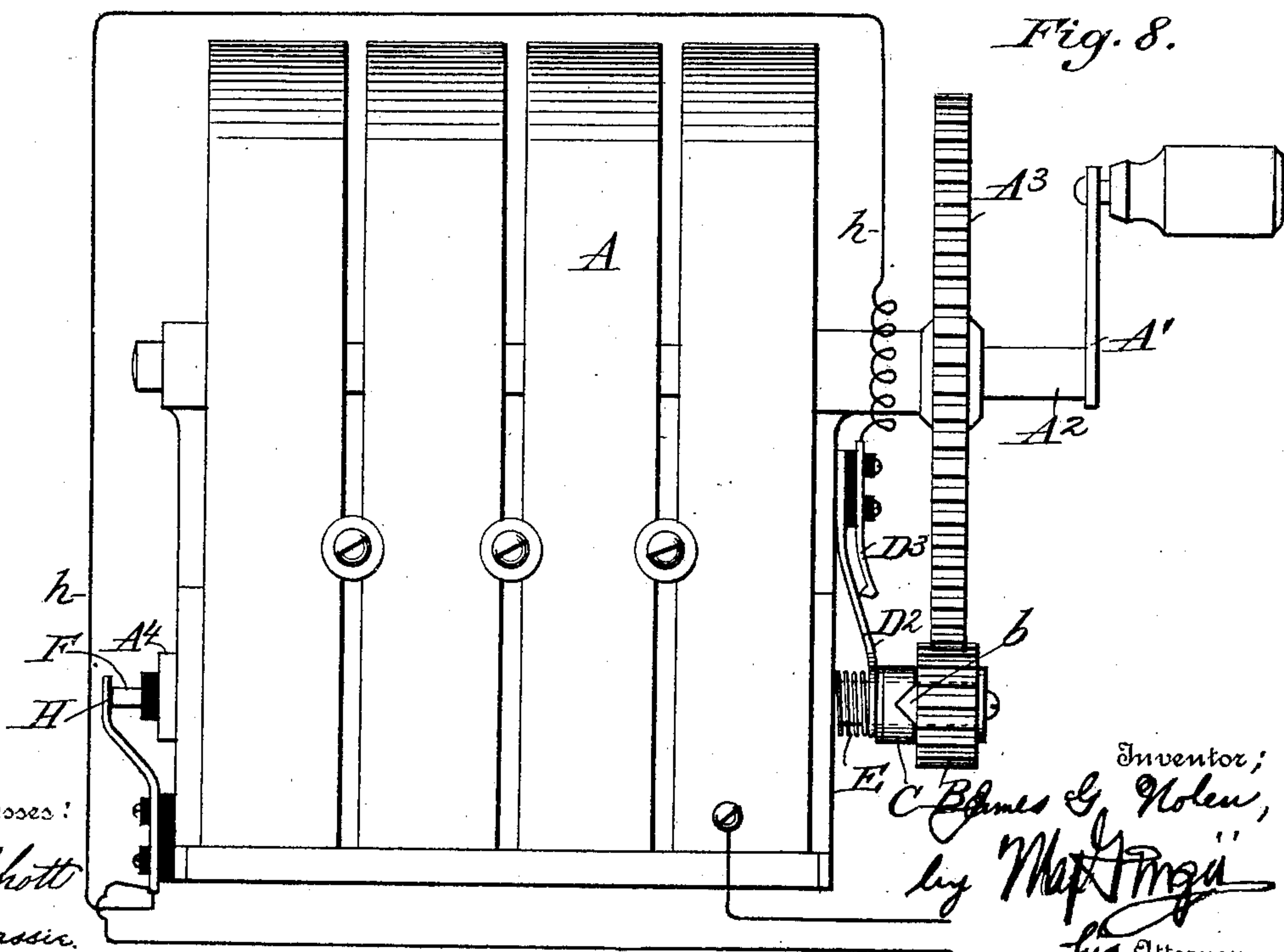
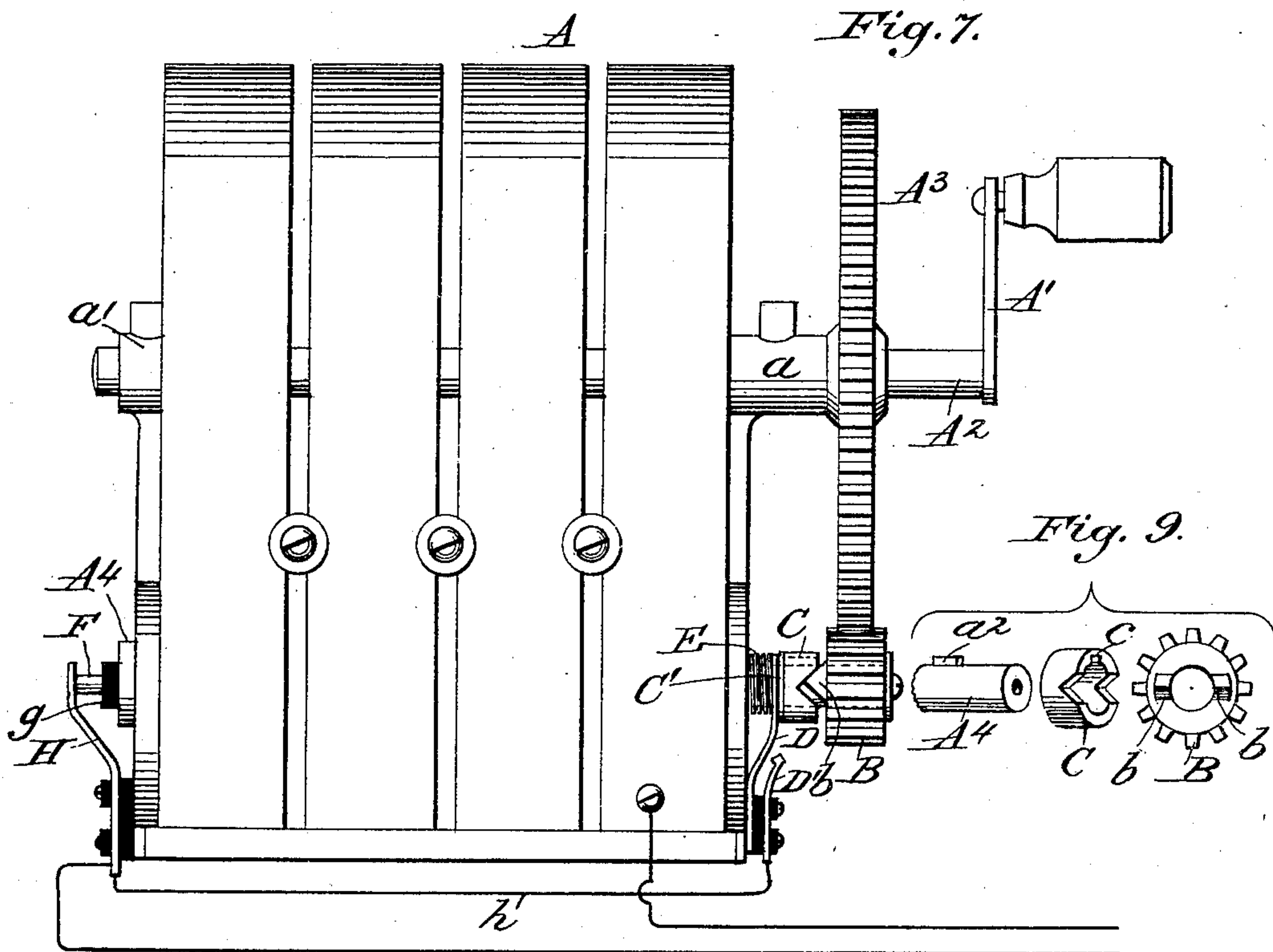
2 Sheets—Sheet 1.



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UNITED STATES PATENT OFFICE.

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COMBINED GEAR-MUFFLER AND SHUNT FOR MAGNETO-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 652,485, dated June 26, 1900.

Application filed May 10, 1900. Serial No. 16,207. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. NOLEN, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain
5 new and useful Improvements in a Combined Gear-Muffler and Shunt for Magnetic Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled
10 in the art to which it appertains to make and use the same.

My invention relates to an improved gear-muffler and shunt for telephone magneto-generators and the like.

15 The object of my invention is to provide a mechanism by means of which the noise in the gear-driven magneto-generator due to backlash will be avoided, while at the same time the mechanism used for this purpose
20 will also participate in the automatic opening and closing of a shunt-circuit around the armature-coils of the generator.

With this general object in view my invention consists in the features, details of construction, and combination of parts, which
25 will first be described in connection with the accompanying drawings, and then particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation
30 of a magneto-generator embodying my invention in its preferred form; Fig. 2, an end elevation of the same; Fig. 3, a detail view indicating the circuits; Fig. 4, a view of a part of the movable spring-arm; Fig. 5, a similar
35 view of a modified form of spring-arm; Fig. 6, a detail view, in side elevation, showing the gear-muffling mechanism in position for assembling; Fig. 7, a side elevation of a generator, showing the shunt-circuit opened; Fig.
40 8, a similar view of a modified form of my invention; and Fig. 9, a detail perspective view of the end of the armature-shaft, the sleeve, and the pinion.

Referring to the drawings, A is a magneto-
45 generator provided with a crank A', fixed to the end of a crank-shaft A², mounted in bearings a a' in the generator-frame. Upon this crank-shaft is secured a gear-wheel A³. The generator has its armature-shaft A⁴ extended

at one end, said end being preferably reduced 50
in diameter and provided with a radial projection a², preferably in the form of a feather or spline, as shown in Figs. 6 and 9. This spline is located somewhat inward from the
55 end of the armature-shaft, and on that portion of the shaft which projects beyond the spline is loosely mounted a pinion B, which has an inward-extending projection b, preferably V-shaped, the said pinion meshing
60 with the gear-wheel A³. The pinion is held on the shaft by a washer b', secured to the end of the shaft A⁴ by a screw b². The projection b on the pinion enters a correspond-
65 ingly-shaped groove in a sleeve C, which is movably mounted on that part of the armature-shaft which is provided with a spline, the said spline being received in a key way
70 or slot c, Fig. 9, in said sleeve. The inner surface of the sleeve is in contact with a washer C', which bears against the end of a
movable spring-arm D, which arm has one
75 end secured to and in electrical communication with the generator-frame. Over this fixed end of said spring-arm D is secured a fixed contact-spring D', which is insulated from the
spring-arm D by a layer of insulating material, as indicated at d, the said contact-spring
80 D' having a contact-point d', arranged to contact with the spring-arm D when the latter is in its normal position.

The end of the spring-arm D which bears against the sleeve C may be forked to receive the armature-shaft A⁴, as shown in Fig. 5, or preferably may have an eye formed thereon, through which the shaft passes, as
85 is shown in Fig. 4.

Inside the movable spring-arm D is located a helical spring E, surrounding the armature-shaft A⁴, which spring assists the spring-arm D in pressing the sleeve C outward.
90

The end of the armature-shaft A⁴ which is opposite the driving mechanism is provided with a pin F, insulated from said armature-shaft and connected to one end G of the armature-winding, the other end G' of which
95 winding is connected to the armature-shaft in the usual way. The pin F is insulated from the armature-shaft A⁴ in any desired

manner—as, for example, by driving it into a hole in a bushing *g*, of vulcanite or the like, Fig. 3, which bushing is inserted in a hole in the end of the armature-shaft. A spring H is arranged to bear against the pin F, said spring being insulated from the generator-frame, as shown in Fig. 1.

The generator-frame is provided with a binding-post I, Fig. 7. The said binding-post and the spring H form the two terminals of the apparatus. The spring H is connected by a conductor *h* to the fixed contact-spring D'.

The manner of connecting the generator with the line being well known need not be described.

The operation of this apparatus is as follows: When the generator is not in operation, the sleeve C is held at its extreme outward position by the resiliencies of the movable spring-arm D and the coiled spring E. In this condition the contact-point *d'* of the fixed contact-spring D' touches the outer face of the movable spring-arm D, whereby the circuit from the lines is closed not only through the armature-coils in the usual way, but also through the spring-arm D, contact-point *d'*, fixed contact-spring D, conductor *h*, and contact-spring H, the shunt-conductor *h* being in parallel with the armature-coil. The resistance of this divided path is therefore very low. When the crank A' is turned to operate the generator, the initial rotation of the gear-wheel A³ causes the pinion B to rotate, and the sleeve C is moved longitudinally inward against the action of the movable spring-arm D and the coiled spring E, this inward movement of the sleeve C being due to the fact that the inclined surfaces of the projection *b* on the pinion acting against the corresponding inclined surfaces of the groove in the end of the sleeve translate the movement of rotation of the pinion B into a longitudinal movement of the sleeve C. This movement of the sleeve causes the spring-arm D to leave the contact-point *d'*, thus opening the shunt-circuit through the conductor *h*, as will be understood from Fig. 7. As the sleeve C moves inward the resiliency of the spring becomes greater and finally prevents the further inward movement of the sleeve at such a point that the sleeve is still in engagement with the feather or key *a*², whereupon the rotation of the pinion B produces rotation of the armature-shaft, and thus causes the generation of electricity in the armature-coil. As the shunt is open at this time, the current of electricity is sent out on the line. When the operation of the generator is stopped, the spring-arm D, assisted by the coiled spring E, forces the sleeve C outward into its normal position, at the same time closing the shunt-circuit by coming into contact with the contact-point *d'*.

It will be noted that during the operation of the generator the resiliencies of the spring-arm D and of the coiled spring E keep a certain amount of yielding pressure on the pin-

ion in a direction opposite to that in which it is being rotated. Hence all backlash between the pinion and its gear-wheel is taken up, and thereby all rattling is avoided and the noise of operation of the gear and pinion is reduced to a minimum.

In Fig. 8 I have shown a modified form of my invention, which differs from that previously described only in having the spring contact-arm D² and the fixed contact-spring D³ located above the armature-shaft instead of below it.

Referring to the preferred form of spring-arm D, (shown in Fig. 4,) it is to be noted that as the end of the said spring-arm encircles the crank-shaft the pressure of the sleeve C is brought upon the end of the spring in an even manner, and at the same time all twisting of the spring is avoided. It will be noted that the said spring D, whether made in the form shown in Fig. 4 or that shown in Fig. 5, not only performs its function of closing the shunt-circuit, but also acts to assist the spring E in returning the sleeve C to its normal position.

In addition to the above advantages it will be seen that but two contact-springs are necessary with my construction, and these springs are so located as to be easily attached and readily accessible.

It will be seen that the inclined projection *b* on the pinion B and the correspondingly-inclined reëntrant surfaces on the sleeve C form what may be termed "cam-surfaces," and these cam-surfaces together form a cam device, which, in combination with the sleeve C, the spring E, and the spline *a*², forms a flexible connection between the armature-shaft and the pinion B, which also acts as a backlash device. Of course the spring-arm D may be employed alone as the spring device for pressing the sleeve outward; but in order not to unnecessarily wear out the spring D the coiled spring E is preferably employed also.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a magneto-generator, the combination with an armature-shaft, and means for rotating the same, of a backlash device intermediate said rotating means and the armature-shaft, and a circuit-breaking device operated by the backlash device.

2. In a magneto-generator, the combination with a gear-wheel and means for rotating the same, of a pinion driven by said gear-wheel, an armature-shaft, a flexible connection between said pinion and the armature-shaft, and a circuit-breaking device operated by the flexible connection.

3. In a magneto-generator, the combination with a driving-wheel, and means for rotating the same, of a driven wheel loosely mounted on the armature-shaft, a sleeve longitudinally movable on the armature-shaft, a cam device intermediate the driven wheel and the sleeve and means for yieldingly pressing the sleeve toward the driven wheel.

4. In a magneto-generator, the combination with a driving-wheel, and means for rotating the same, of a driven wheel loosely mounted on the armature-shaft, a sleeve longitudinally movable on the armature-shaft, a cam device intermediate the driven wheel and the sleeve, means for yieldingly pressing the sleeve toward the driven wheel, and a circuit-breaker operated by the sleeve.

10 5. In a magneto-generator, the combination with an armature-shaft, a pinion loosely mounted thereon and provided with cam projections, a sleeve having cam-grooves arranged to receive said cam projections, a mov-

able spring-arm provided with an opening at one end into which enters the armature-shaft, and a coiled spring encircling the armature-shaft and arranged to press the spring-arm and sleeve outward, of a fixed contact-spring arranged to engage the spring-arm when the latter is in its outward position. 15 20

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

JAMES G. NOLEN.

Witnesses:

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