

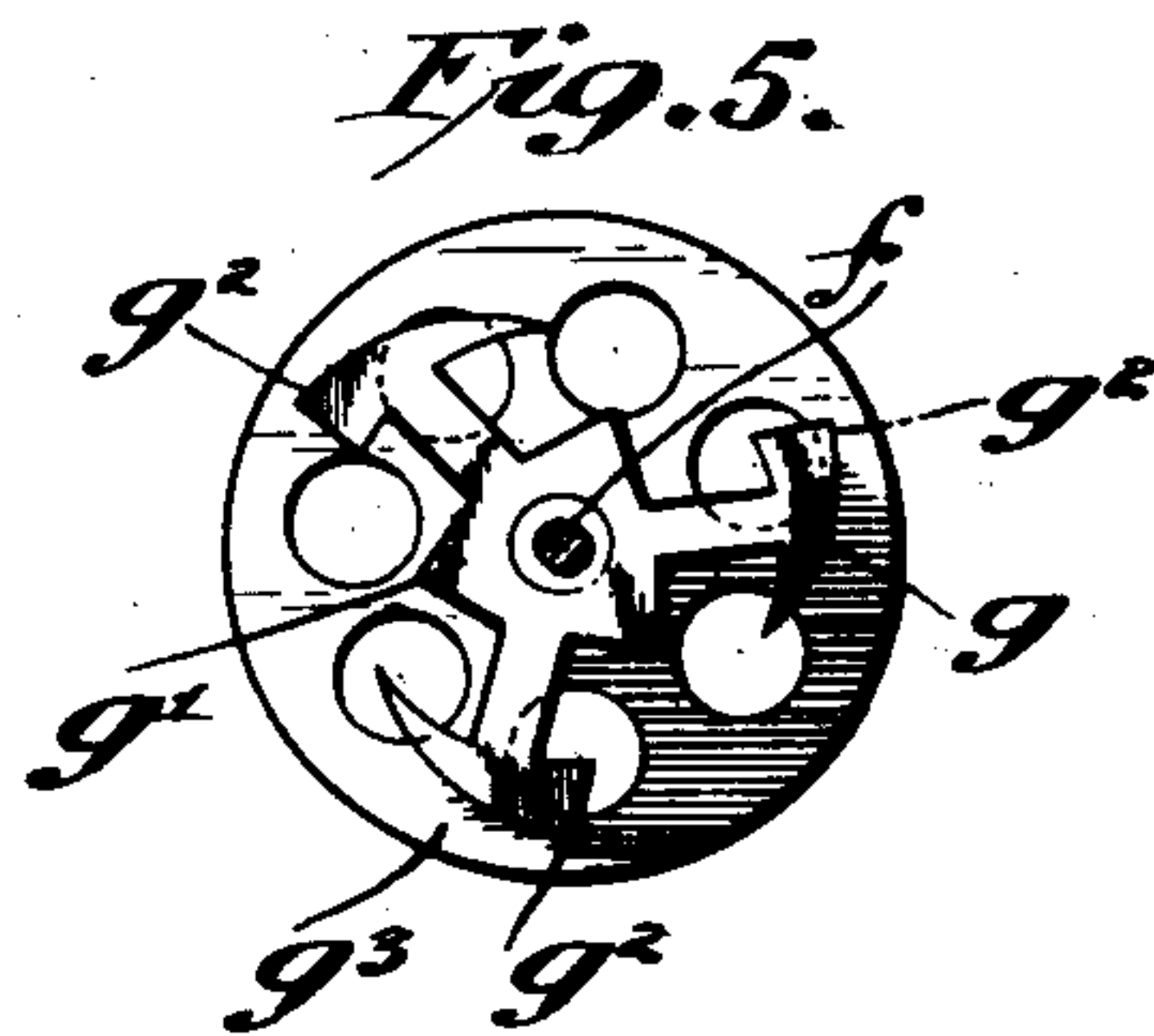
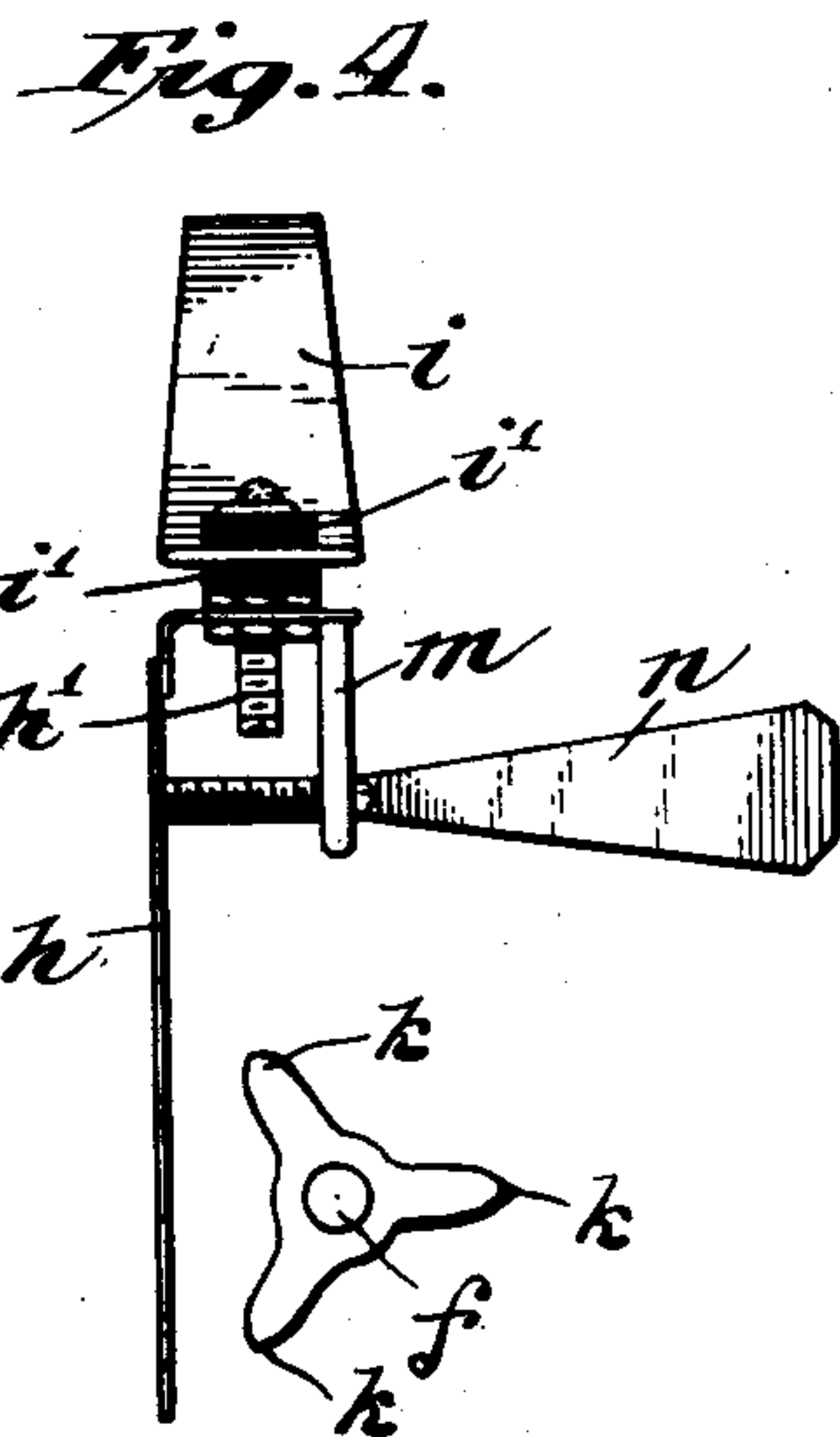
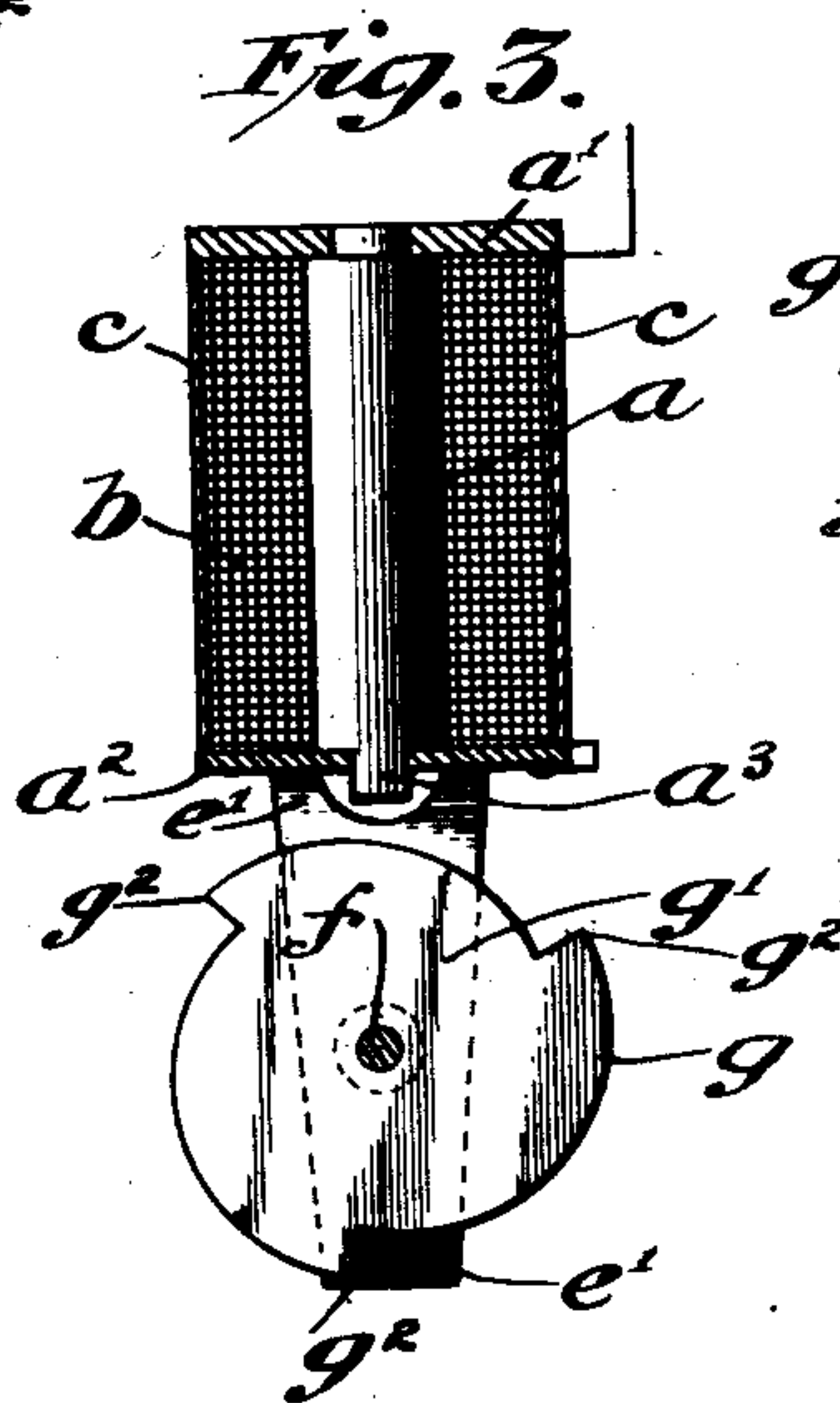
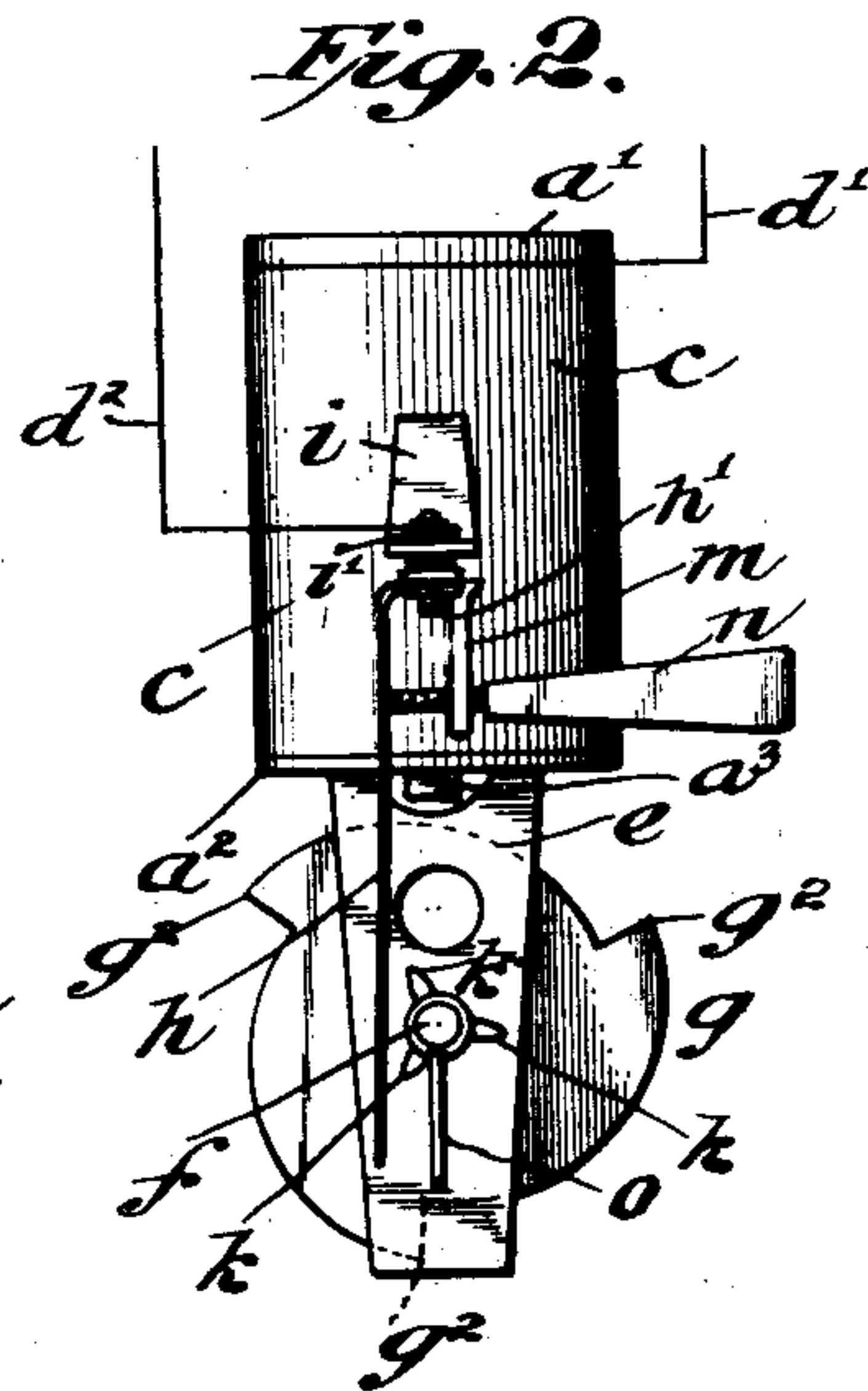
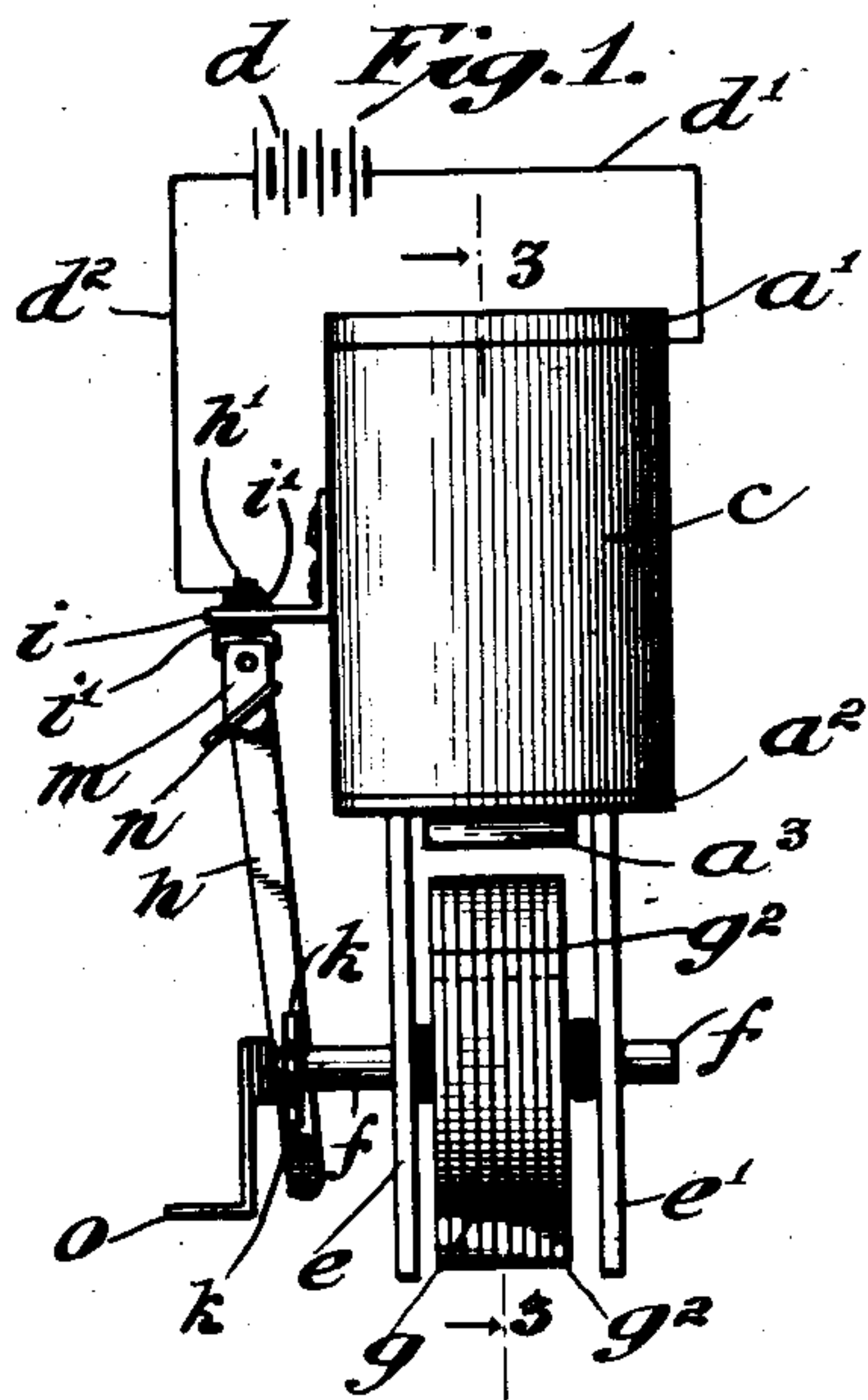
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PATENTED SEPT. 11, 1906.

C. G. MORTIMER, JR.

GAME AND TOY.

APPLICATION FILED JAN. 16, 1906.



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UNITED STATES PATENT OFFICE.

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MINIATURE LAMP COMPANY, A CORPORATION OF NEW YORK.

GAME AND TOY.

No. 830,801.

Specification of Letters Patent.

Patented Sept. 11, 1906

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To all whom it may concern:

Be it known that I, CHARLES G. MORTIMER, Jr., a citizen of the United States, residing in the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Games and Toys, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to games and toys, and more particularly to a class of electrical toys.

The main object of my invention is to provide an electrical toy simulating a rotary engine wherein a rotary armature associated with a balance-weight as a fly-wheel will be actuated from a fixed electromagnet, which magnet will be energized and deenergized synchronously with the rotation of the armature in a manner to impart motion to the armature in such rapid succession through the intermittent attraction of the armature by the magnet as to give with the aid of said balance-weight continuous rotary motion thereto.

A further object is to provide a toy electric motor which may be run with a very low electromotive force.

A still further object is to provide in a toy of this description a simple make-and-break mechanism to intermittently energize the magnet.

A still further object is to provide a make-and-break mechanism which may be so adjusted as to advance or retard the closing of the circuit energizing the electromagnet to control within limits the speed of the armature rotation.

A still further object is to provide an armature which will be strongly attracted by the magnet and yet will not be so influenced by the residuary magnetism as to retard its rotation; and a still further object is to provide a scientific toy which will be simple and inexpensive to manufacture, which may be applied to various uses requiring small power, and which will not be subject to such disarrangement as will permit of its readily getting out of order.

The invention consists in such novel features of construction and combination of parts as are hereinafter set forth and de-

scribed, and more particularly pointed out in the claims hereto appended.

Referring to the drawings, Figure 1 is a front elevation of a toy embodying my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a section on the line 3 3 of Fig. 1. Fig. 4 is an enlarged view of the make-and-break mechanism, and Fig. 5 is a view of a modified form of the armature and fly-wheel construction.

Like letters refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings I employ an electromagnet comprising a core *a*, having spool-heads *a'* and *a''* permanently secured thereto and a winding *b* of insulated wire upon said core for energizing same. The core *a* and head *a'* are preferably of steel, and the head *a''* is preferably of brass and thinner than the head *a'*. Inclosing the winding *b* is a sheet-iron cylindrical jacket *c*. The terminals of the winding *b* are respectively in electrical connection with one pole of a source of electrical energy, as a dry battery-cell (indicated at *d*) and the head *a''*. One pole of the core *a*, as *a'*, passes through and projects beyond the head *a''*.

The head *a''* carries oppositely-disposed brackets *e e'*, one or both of which is or are in electrical connection therewith, said brackets having suitable bearings therein for a shaft or axle *f*, made of metal, or placed in electrical connection with either or both of said brackets *e e'*. Mounted on said shaft or axle *f*, between said brackets *e e'* and extending into close juxtaposition to the protruding pole *a'* of the core *a*, is an armature *g*. This armature is preferably composed of a plurality of steel laminæ, as shown, forming a central hub, and web *g'*, carrying about the periphery thereof a succession of raised sections *g''*, spaced at points equidistant from each other and preferably three in number. The surface of each raised section preferably extends from the web *g'* and rises in a gradual curve in the direction of rotation of the armature to its highest point, descending substantially radially of the armature to the starting-point of the next such section, forming a shoulder, as shown, although, as shown in Fig. 5, if desired, said raised sections may each comprise merely a portion projected from the web *g'*, having a curved surface of

varying radii, as before described. This arrangement and construction of the raised sections g^2 is designed to counteract any effects of residual magnetism in the core a , 5
tending to impede the continued rotation of the armature under acquired momentum. While this armature is preferably laminated, it may be cast or drop-forged in a single piece. This armature g or its shaft f is weighted so
10 as to give acquired momentum sufficient with each impulse from the magnet to carry the raised section attracted thereby across said magnet sufficiently to actuate the make-and-break mechanism to deenergize said mag-
15 net and energize it again to cause the attraction of the succeeding raised section g^2 to continue the rotary movement of the entire armature. The requisite balanced weight may be in the nature of a heavy web g' in the
20 preferred form or in the form of a balance or fly wheel g^3 , as shown in the modification in Fig. 5. It is apparent that the armature g may be rotated solely through successive im-
25 pulses on the raised sections g^2 by the magnet and that to accomplish this it is requisite that the magnet-core a should be energized and deenergized during each complete rotation of the armature as many times as
30 there are spools on said armature and that the period or interval at which it is energized each time must be at a time when any two successive raised sections g^2 are unevenly
35 spaced with relation to the protruding pole a^3 of the core a with the approaching raised section the nearer in order to avoid the equal attraction of both such sections. This make-
and-break mechanism preferably comprises a brush h , mounted on a bracket i , from
40 which it is insulated by a rubber or vulcanite bushing i' , said bracket preferably being mounted on the jacket c , and a tappet-plate mounted on the shaft or axle f , comprising a
45 plurality of tappets k , so set as to respectively contact with the brush h . These tappets correspond in number with the raised sec-
tions g^2 and are so set relative thereto and to the shaft f as to cause their contact with the
50 brush h to be as described when the raised section approaching said core is the nearest thereto, the exact positioning of said tappets varying with the location of the brush-sup-
port.

The battery-terminals d' d^2 are connected directly or through interposed binding-posts 55
(not shown) with the terminal b' and with the screw or other means h' , securing the brush h to the bracket i , respectively, so that the circuit will be closed through said brush
60 h , the tappet k , the shaft or axle f , either of the brackets e e' , and the head a^2 .

It is desirable in a toy of this description to provide means varying the speed or power of the engine, which I accomplish by means for
65 regulating the instant of contact of the tappets k with the brush h , thus either advanc-

ing or retarding the energizing of the mag-
netic core a and increasing or diminishing the duration of the period of attraction, with a
corresponding diminution or increase of the deenergized period wherein the armature ro- 70
tates under momentum. This means comprises a bracket m , carried by the screw or other means attaching the brush h to the
bracket i , in the offset arm of which is a thumb-screw n , acting against the tension of 75
the brush. It will be observed that the screw n is in circuit with said brush, thus avoiding any possibility of short-circuiting
and the necessity for insulating it.

The herein-described make-and-break 80
mechanism is employed because it is reliable and serves all the purposes required of it, while capable of being produced at a very low cost.

The shaft f is provided with a crank-arm 85
or other means whereby the small power developed may be utilized in various relations, as for driving a propeller-shaft or the run-
ning-gear of a toy, being in the nature of an impact-coupling common to various mechan- 90
ical toys.

The operation of the herein-described elec-
trical toy is substantially as follows, the proper battery connections having been made in any
desired manner. It has been demonstrated 95
that a single dry battery-cell, developing approximately one and one-half volts and eighteen amperes, will suffice to run a toy for
a period in excess of ten hours. To start the toy, it is necessary to rotate the armature by 100
hand until one of the tappets k contacts with the brush h , whereupon the circuit is closed, flowing from the battery d and its terminal d^2
to the screw h' , the brush h , the tappet k to the axle or shaft f , either bracket e e' to the head 105
 a^2 , and through the coil b to the other battery-terminal d' and the other battery-pole. As said circuit is closed a shoulder of one of the
raised section g^2 is approaching the protrud-
ing pole a^3 of the core a and is attracted 110
thereby. As the highest point of the raised section passes from directly beneath said pole a^3 or the forward edge of said section so
passes the circuit is opened by the escape of the tappet k from said brush, thus permitting 115
the armature to rotate under momentum of the weighted web g' or of the fly-wheel g^3 . Any residuary magnetism in said core is com-
pensated for by the gradual increase of the gap between the pole a^3 and the raised sec- 120
tion g^2 , due to the shape of the latter, which result is accomplished without unduly dimin-
ishing the size of the section. As said section passes said pole a^3 the succeeding tappet
contacts with the brush h , again closing the 125
circuit, with the result, as aforesaid, with the succeeding raised section g^2 , thus continuing
the rotation of the armature by a series of impulses derived through the intermittent
energizing of the electromagnet. If it be de- 130

sired to increase the velocity of rotation of the toy, the thumb-screw *n* is retracted, permitting the brush *h* to spring in close to the axis of the shaft *f*, resulting in an earlier contact and a later escape, thus increasing the duration of attraction of the armature. If it be desired to decrease the velocity or power, said screw may be used to force said brush *h* away from said axis, with a resultant diminution of the duration of attraction of the armature. The weighted web *g'* or fly-wheel *g*³ develops sufficient momentum to carry the armature during the interval when the magnet is deenergized.

It is not my intention to limit the invention to the precise details of construction shown in the accompanying drawings, as it is apparent that such may be varied to so adapt the toy as to develop motive power for various contrivances.

Having described the invention, what I claim as new, and desire to have protected by Letters Patent, is—

1. In an electrical toy, the combination of an electromagnet included in an electric circuit, comprising an elongated core, oppositely-disposed heads of different thickness, said core projecting through the thinner of said heads, a winding on said core between said heads, a rotary armature having a plurality of raised sections disposed about the periphery thereof, mounted in close juxtaposition to the projecting core of said magnet, and a make-and-break mechanism arranged in said circuit and actuated through the rotation of said armature whereby said core will be energized as each of said raised sections approaches, and be deenergized as each of said sections is passing, said core.

2. In an electrical toy, the combination of an electromagnet included in an electrical circuit, a rotary armature having a plurality of raised sections disposed about the periphery thereof mounted in close juxtaposition to the core of said magnet, each said raised section comprising a projection the surface of which rises in a gradual curve relative to the periphery of said armature and descends substantially radially thereof to form a shoulder presented in the direction of rotation of said armature, and a make-and-break mechanism arranged in said circuit and actuated through the rotation of said armature whereby said magnet is energized as each said shoulder approaches, and deenergized as each said shoulder passes, said magnet.

3. In an electrical toy, the combination of an electromagnet included in an electrical circuit, a rotary armature having a weighted balanced web having a plurality of raised sections disposed about the periphery thereof mounted in close juxtaposition to the core of said magnet, each said raised section comprising a projection, the surface of which rises in a gradual curve relative to said web

and descends substantially radially thereof, to form a shoulder presented in the direction of rotation of said armature, and a make-and-break mechanism arranged in said circuit and actuated through the rotation of said armature whereby said magnet is energized as each shoulder approaches, and deenergized as each said shoulder passes, said magnet.

4. In an electrical toy, the combination of an electromagnet included in an electrical circuit, comprising an elongated core, oppositely-disposed heads, said core projecting through one of said heads, a winding on said core between said heads and in electrical connection with the head having the core projecting therethrough, oppositely-disposed brackets carried by said last-mentioned head and in electrical connection therewith, a shaft journaled in, and in electrical connection with at least one of said brackets, a rotary armature having a plurality of raised sections disposed about the periphery thereof, mounted on said shaft and extending into close juxtaposition to the protruding core of said magnet, and a make-and-break mechanism arranged in said circuit and in electrical connection with, and actuated from, said shaft, whereby said core will be energized as each said raised section approaches, and be deenergized as each said section is passing, said core.

5. In an electrical toy, the combination of an electromagnet included in an electrical circuit, comprising an elongated core, oppositely-disposed heads, said core projecting through one of said heads, a winding on said core between said heads and in electrical connection with the head having the core projecting therethrough, and an inclosing metallic jacket, oppositely-disposed brackets carried by said last-mentioned head and in electrical connection therewith, a shaft journaled in, and in electrical connection with at least one of, said brackets, a rotary armature having a plurality of raised sections disposed about the periphery thereof mounted on said shaft and extending into close juxtaposition to the protruding core of said magnet, and a make-and-break mechanism arranged in said circuit and in electrical connection with, and actuated from, said shaft, whereby said core will be energized as each said raised section approaches, and be deenergized as each said section passes, said core.

6. In an electrical toy, the combination of an electromagnet included in an electrical circuit, comprising an elongated core, oppositely-disposed heads, said core projecting through one of said heads, a winding on said core between said heads and in electrical connection with the head having the core projecting therethrough, and an inclosing metallic jacket, oppositely-disposed brackets carried by said last-mentioned head and in electrical connection therewith, a shaft jour-

naled in, and in electrical connection with at least one of, said brackets, a rotary armature having a plurality of raised sections disposed about the periphery thereof mounted on said shaft and extending into close juxtaposition to the protruding core of said magnet, and a make-and-break mechanism comprising a plurality of tappets secured to and in electrical connection with said shaft, and a brush mounted on, and insulated from said jacket, arranged in said circuit, whereby said core will be energized as each of said raised sections approaches, and be deenergized as each of said raised sections is passing, said core.

7. In an electrical toy, the combination of an electromagnet included in an electrical circuit, comprising an elongated core, oppositely-disposed heads, one of which is of a magnetic metal and the other of which is of brass, said core projecting through said brass head, a winding on said core between said heads and in electrical connection with said brass head, oppositely-disposed brackets carried by said last-mentioned head and in electrical connection therewith, a shaft journaled in, and in electrical connection with at least one of, said brackets, a rotary armature having a plurality of raised sections disposed about the periphery thereof mounted on said shaft and extending into close juxtaposition to the protruding core of said magnet and a make-and-break mechanism arranged in said circuit and in electrical connection with, and actuated from, said shaft, whereby said core will be energized as each said raised section approaches, and be deenergized as each said section is passing, said core.

8. In an electrical toy, the combination of an electromagnet included in an electrical circuit, comprising an elongated core, oppositely-disposed heads, one of which is of a magnetic metal and the other of which is brass, said core projecting through said brass head, a winding on said core between said heads and in electrical connection with said brass head, oppositely-disposed brackets

carried by said last-mentioned head and in electrical connection therewith, a shaft journaled in, and in electrical connection with at least one of, said brackets, a rotary, laminated armature having a plurality of raised sections disposed about the periphery thereof, each said raised section having a surface which rises from said periphery gradually in the direction of rotation of the armature, and descends substantially radially thereof forming a shoulder facing the direction of rotation of the armature, mounted on said shaft and extending into close juxtaposition to the projecting core of said magnet, and a make-and-break mechanism arranged in said circuit and in electrical connection with, and actuated from, said shaft whereby said core will be energized as the shoulder of each said raised section approaches, and be deenergized as the graduated portion thereof is passing, said core.

9. In an electrical toy, an armature comprising a plurality of raised sections projecting from the periphery thereof, the surface of each of which rises relative to said periphery, gradually in the direction of rotation of the armature, and descends substantially radially thereof, forming a shoulder facing the direction of rotation of said armature.

10. In an electrical toy, an armature formed of a plurality of laminae, comprising a plurality of raised sections projecting from the periphery thereof, the surface of each of which rises relative to said periphery, gradually in the direction of rotation of the armature, and descends substantially radially thereof, forming a shoulder facing the direction of rotation of said armature.

In witness whereof I have hereunto affixed my signature, this 19th day of December, 1905, in the presence of two witnesses.

CHARLES G. MORTIMER, JR.

Witnesses:

W. H. BLAIN,

F. T. WENTWORTH.