

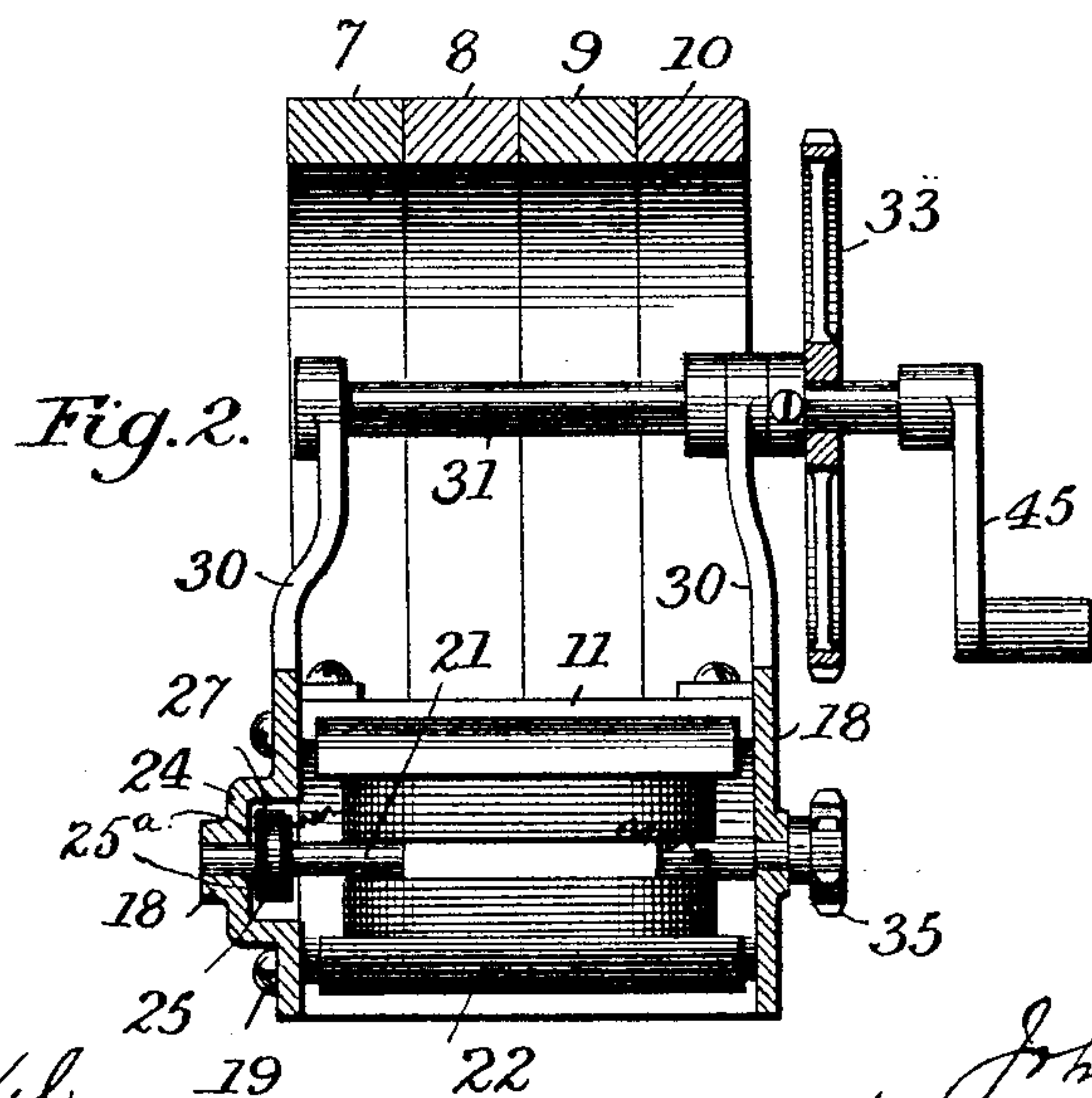
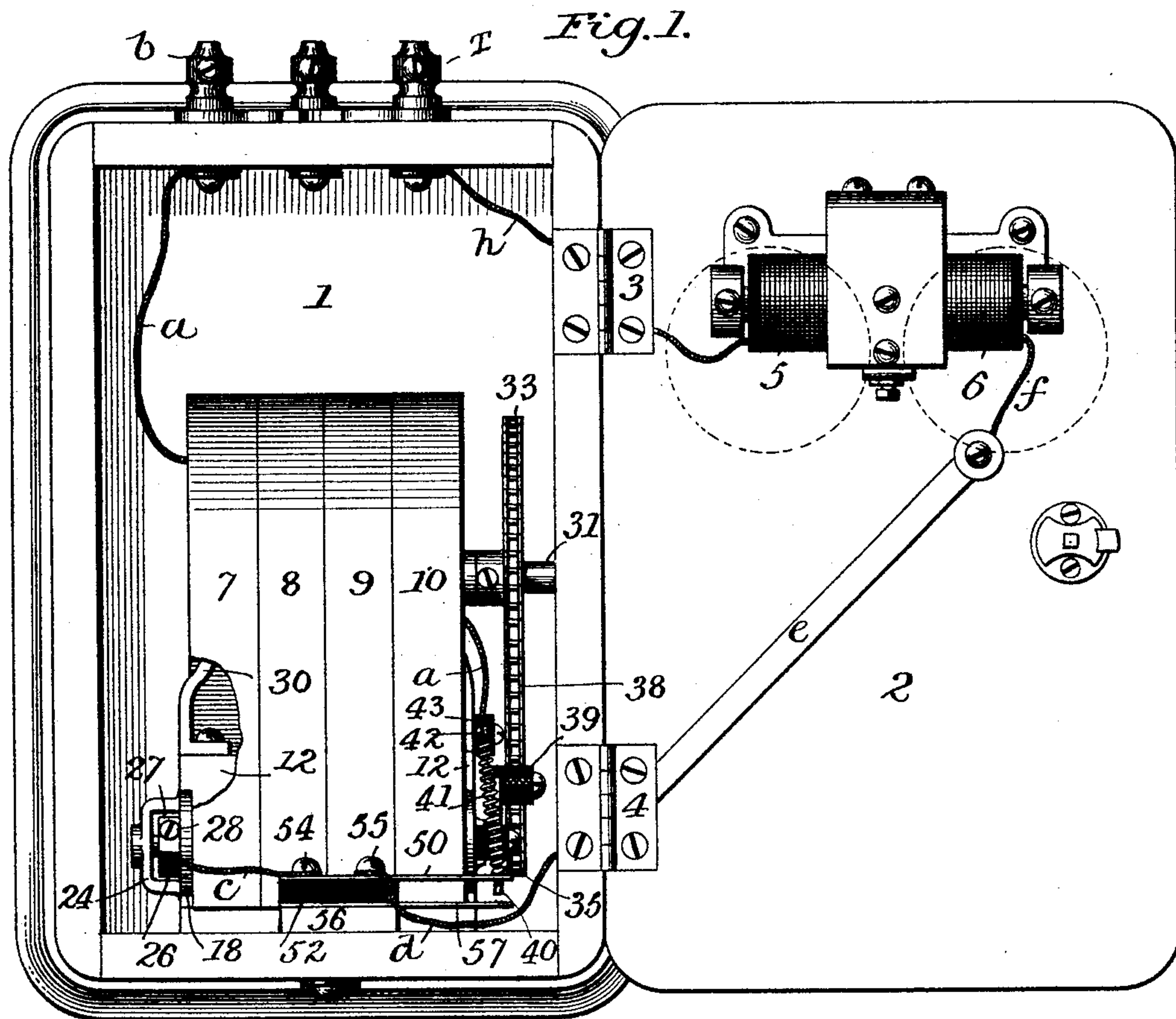
(No Model.)

2 Sheets—Sheet 1.

J. C. FRANCIS.
MAGNETO GENERATOR.

No. 571,305.

Patented Nov. 10, 1896.



Witnesses

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

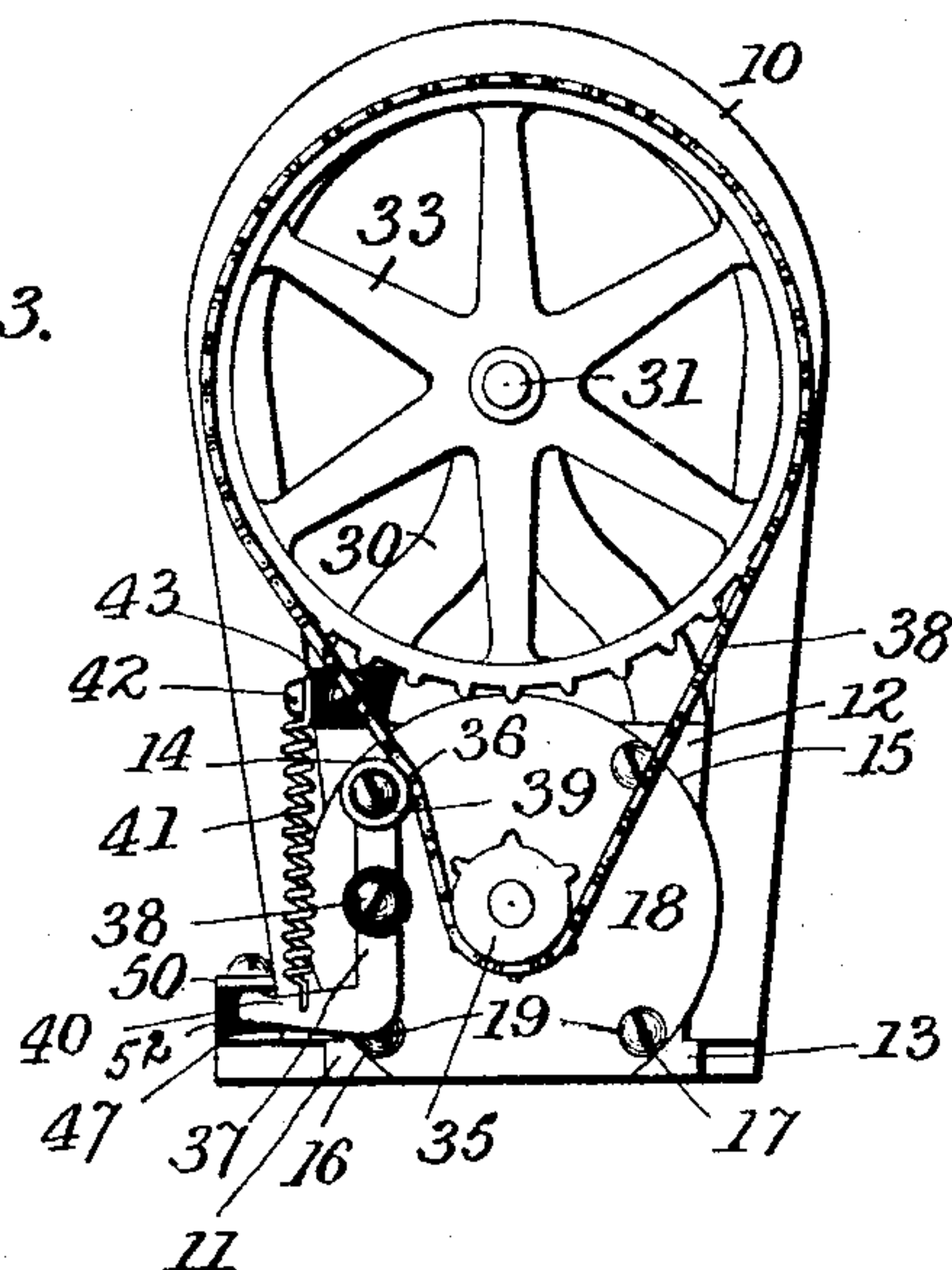


Fig. 4

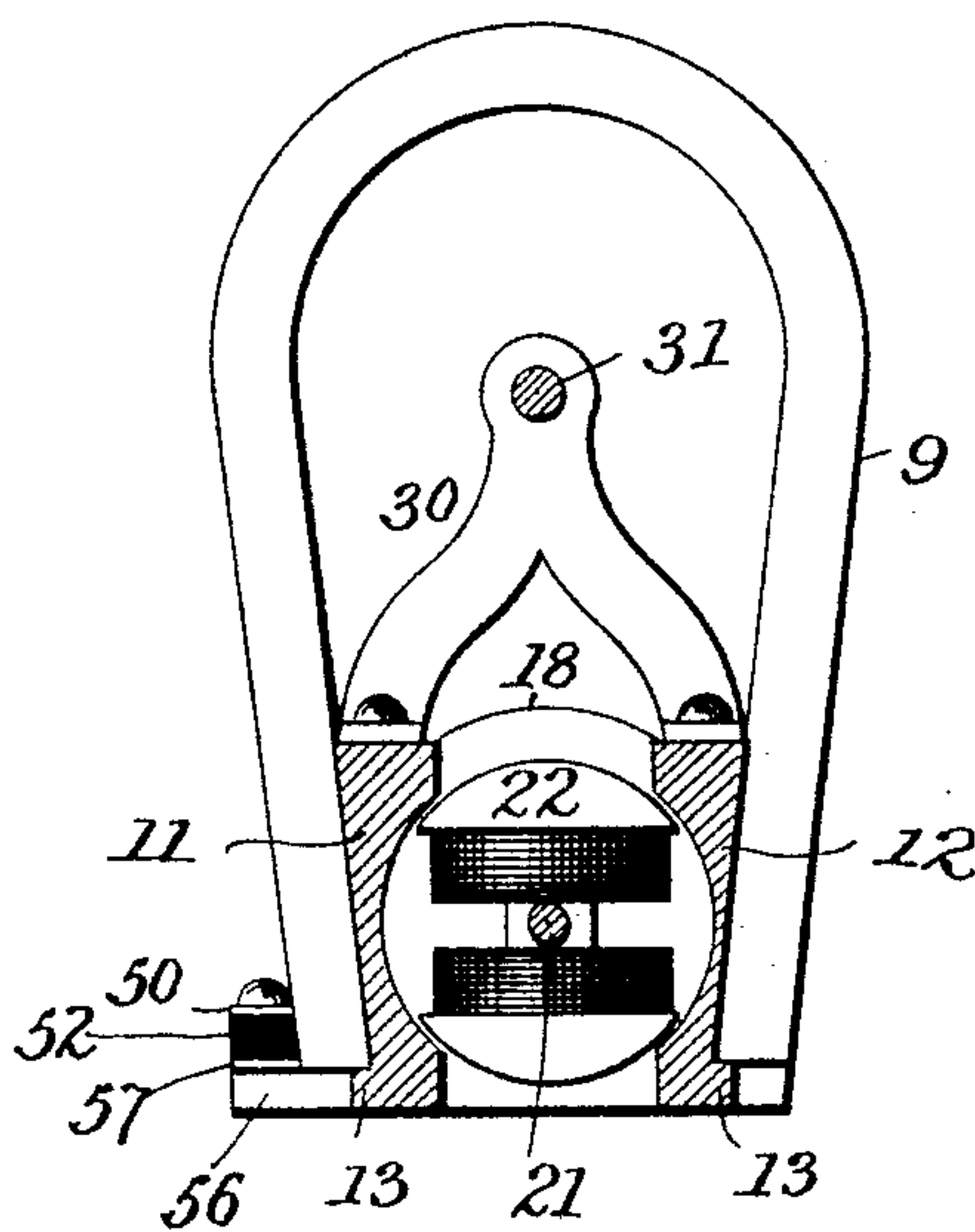
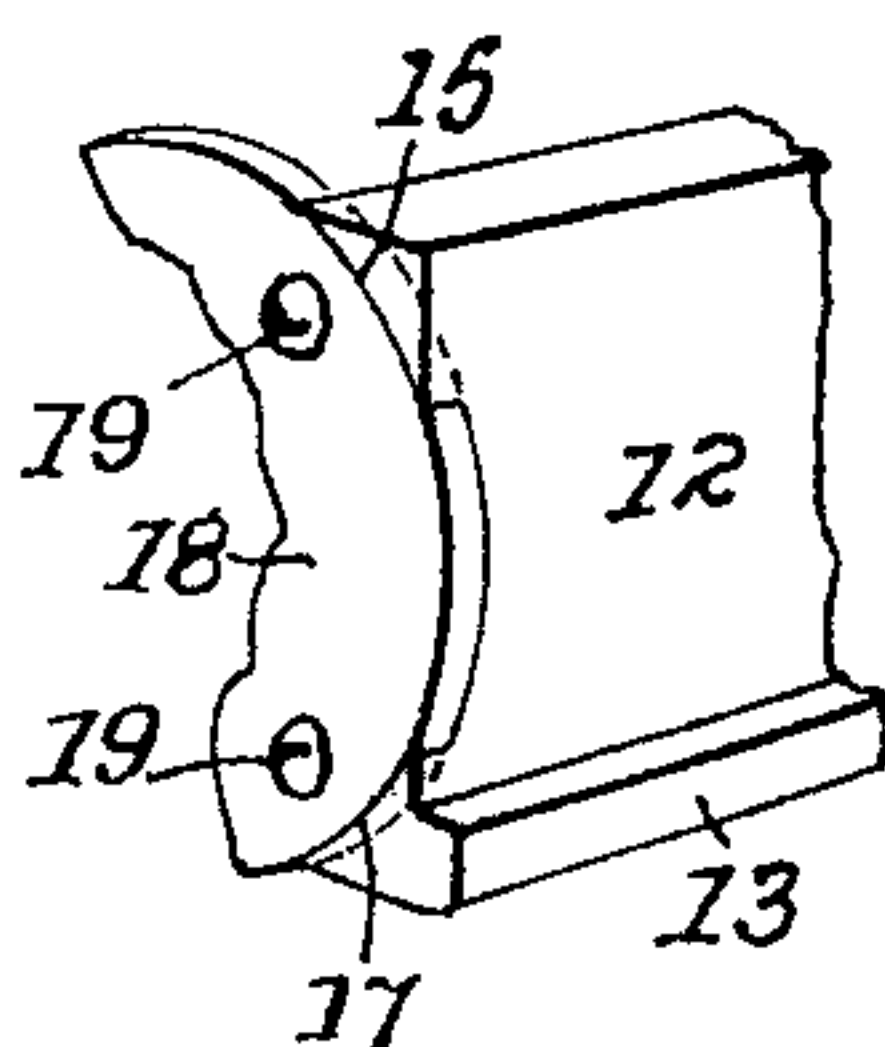


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN CHISHOLM FRANCIS, OF NEW YORK, N. Y., ASSIGNOR TO ELIAS M. GREENE, OF SAME PLACE.

MAGNETO-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 571,305, dated November 10, 1896.

Application filed January 2, 1896. Serial No. 574,126. (No model.)

To all whom it may concern:

Be it known that I, JOHN CHISHOLM FRANCIS, a citizen of the United States, residing in the city, county, and State of New York, have
5 invented certain new and useful Improvements in Magneto-Generators, of which the following is a specification.

This invention relates to electromagnetic generators; and it consists substantially in
10 such features of improvement as will hereinafter be more particularly described.

The invention has reference more particularly to that class of electromagnetic generators in which are embodied ordinary horse-
15 shoe-magnets, together with the usual armature rotating between the poles or lower ends of the magnets, an automatic armature cut-out, and a bell or other similar call-signal.

The invention has for its object the simplification of construction of this class of devices generally, as well as to render the same
20 very compact, in order that the box may be materially reduced in size.

A further object of the invention is to ring
25 up the call or signal without working through the high resistance offered by the armature and to automatically throw the armature into circuit, and to also insure the centralization of the armature between the poles of the
30 magnet.

Other objects of the invention will more fully hereinafter appear when taken in connection with the accompanying drawings, wherein—

35 Figure 1 represents a front view in elevation, showing the call-box open and indicating very clearly the disposition or arrangement of the magnets, as well as the cut-out and the armature and bell circuits. Fig. 2
40 is a sectional view, partly in elevation, to indicate more clearly the construction and arrangement of parts. Fig. 3 is an end view to indicate more clearly the construction and mode of operation of the automatic cut-out
45 devices; and Fig. 4 is a view in part elevation and in part section, taken at right angles to Fig. 2 and representing more clearly the construction of the pole-pieces which I employ in connection with my improved electro-
50 magnetic generator. Fig. 5 is a detail view in perspective of a part of one of the pole-

pieces to more clearly indicate the counter-bore at the end to receive the head.

While my invention is capable of several different embodiments in use, I preferably
55 resort to the construction and arrangement of parts substantially such as I have herein illustrated in the accompanying drawings, wherein—

1, Fig. 1, represents the ordinary box or receptacle for containing the generator and its
60 appurtenances, and 2 is the usual door for closing the said box, the hinges 3 and 4 of said door being utilized in this instance to complete the circuits. The bells or ringer
65 devices are preferably arranged to the outer side of the door 2, and therefore they simply appear in dotted lines in Fig. 1. The usual or ordinary form of magnetic coils 5 and
70 6 are employed to operate the ordinary vibrating armature, (not shown,) which is caused to vibrate between the bells in an obvious manner and thereby produce the sound or call-signal.

The bell-circuit as well as the armature-circuit will be hereinafter more specifically referred to in connection with the armature cut-out and the contacts, and therefore for the present we will leave the circuits and proceed
80 to describe the construction and arrangement of the said generator and armature generally.

As shown in the several figures of the drawings, there are four horseshoe-magnets, (indicated, respectively, at 7, 8, 9, and 10,) and these
85 are of the ordinary form, and which have been adopted owing to their simplicity and the great convenience attached thereto.

In order not to have to bring the lower ends or poles of the magnets too close together
90 by which to derive the desired effect produced by the rotating armature, I preferably employ separate pole-pieces 11 and 12, (seen more plainly in Fig. 4,) and these pole-pieces are concaved on their inner faces by
95 which the armature is centralized more perfectly between the poles, while at their lower ends the said pole-pieces are formed or provided with laterally-projecting feet 13, which
100 project beneath the lower ends of the magnets and are in close contact therewith. The faces of the pole-pieces, which rest against the poles of the magnets, are in very close con-

tact with the latter, and in addition to the feet 13 of the pole-pieces increasing the contact-surface these said feet serve also as a rest for the lower ends of the magnets, and when the parts are put together or united, as hereinafter described, it will be seen in what manner the said pole-pieces serve to maintain the proper relationship between the several parts or elements. The said pole-pieces 11 and 12 are, furthermore, counterbored at each end between corners, as indicated at 14, 15, 16, and 17, leaving curved edges or faces, which, if continued around so as to join or connect each other, would constitute substantially a circular recess, and into this recess is inserted at each end of the generator a head 18, each being secured to the pole-pieces by means of suitable screws 19, or other similar fastening devices. The said heads serve between them to support the shaft 21 of the armature 22, which latter is of any suitable ordinary form and which, as has been stated, rotates centrally of the lower ends of the magnets between the pole-pieces 11 and 12. At one end of the generator (shown in this instance at the left-hand side of Fig. 1) is an ordinary bracket 24, in which one end of the shaft rests, and this bracket or "bridge," as it may be termed, is to allow sufficient room for the accommodation of an ordinary collector 25, having heads 25^a, of insulating material, and which collector rotates with the shaft, and attached to the head 18 with which said bridge or bracket is formed is an insulated block 26, to which the collector-spring 27 is secured by a screw 28, the said spring being made to rest upon the collector in the usual or well-known way.

The pole-pieces 11 and 12 have each mounted thereon at each end of the generator a bracket 30, which between them serve as supports or bearings for the shaft 31, through the medium of which the automatic cut-out of the armature is effected. Carried by one end of the said shaft is a large sprocket-wheel 33 rigid with the shaft, and this sprocket-wheel is in movable connection with a small sprocket-pinion 35 on the corresponding end of the armature-shaft through the medium of a sprocket-chain 38, the latter being normally maintained or held a little slack for reasons as will hereinafter appear. While I employ this chain preferably as a movable connection between the sprocket wheel and pinion, it is to be understood that I am not limited thereto in its precise form, since in some instances I may resort to the use of a wheel and pinion without sprockets, and in which case I could adopt any ordinary form of connecting belt or band having its outer surface formed at suitable distances apart with projections for effecting the results to be obtained, which results are to be more fully explained. The purpose is in the main to effect a cut-out of the armature-circuit for a purpose such as is well understood. I prefer the use of the chain, however, since the

same is exceedingly light and noiseless in operation and is always easily to be obtained at small cost.

The slack in the chain or band is taken up by a small degree of pressure exerted thereon at the point 36 by the upper end of a pivoted arm or lever 37, having its pivotal support at 38 in the corresponding head 18 of the generator. The said lever is provided at its upper end with a small roller 39, of rubber or other suitable material, while the lower extremity thereof is bent outwardly at right angles to constitute a lower projecting arm 40. A coiled spring 41 has its lower end attached to the said projecting arm 40, while the upper end of said spring is attached or fastened to a binding-screw 42, which is inserted in an insulating-block 43, attached to the corresponding bracket 30. The tendency of the said spring is to maintain the said pivoted lever normally in the position shown in Fig. 3 of the drawings, that is, with the end of arm 40 thereof slightly elevated, and it is evident that when the shaft 31 is rotated by means of the crank 45, secured to the end thereof, the pulling side of the chain will straighten out, thus taking up the "slack" and forcing the roller 39 and lever 37 up, and consequently lowering the end of arm 40. The said lower arm of the lever is preferably provided at the end with a slightly-enlarged portion 47, the upper edge of which is normally in contact with the under surface of a contact-spring 50, which latter is secured upon the upper part of an insulating-block 52, arranged at one side of the central magnets 8 and 9 of the generator by means of binding-screws 54 and 55. Projecting from the pole-piece 11, located at this side of the magnets, is a projecting portion 56, between which and the block 52 another contact-spring 57 is secured in place, this latter constituting a part of the armature-circuit and normally being out of contact with any portion of the pivoted lever. The said pivoted lever may be variously constructed and arranged, but I prefer the arrangement shown, and it will be understood also that various changes could be made in the construction and arrangement of the other parts referred to. The said lever is connected in circuit through the medium of the coiled spring 41, since attached or fastened to the same binding-screw 42, to which the upper end of said spring is connected, is a conductor *a*, properly insulated and extending to a binding-post *b*, thence to line.

An insulated wire connection *c* connects the spring 50 with the collector-spring through screw 54, and likewise a similar insulated wire connection *d* leads from binding-screw 55 of said spring, thence extends to hinge 4 of the box through metallic strip *e* and connection *f* to coil 6 of the ringer-magnets, from coil 6 to coil 5, thence from the latter to hinge 3, connection *h*, and to ground.

From this description it will be understood that when the handle or crank is grasped and

the sprocket-chain straightens out the armature is automatically thrown into circuit, and the bells will ring in the usual way by vibration of an ordinary ringer-armature pivotally supported between the two bells in any ordinary or well-known way.

It will be seen that normally the bell-movement is in circuit and ready to be rung up without having to work through the high resistance of the armature, the circuit being through the binding-post *b*, conductor *a*, contact 42, spring 41, lever 37, spring 50, conductor *d*, hinge 4, conductors *e f*, bell-magneto 6 5, hinge 3, conductor *h*, to binding-post T, and to ground or line. In order to send a signal, the crank is operated, and as soon as the chain is started the lever 37 is forced against the spring 57 and the armature is connected in circuit and the signal sent, and when the parts are allowed to come to a position of rest the automatic cut-out of the armature is effected by virtue of the restoration of the pivoted lever to its original position with the end of its arm 40 bearing against the under side of spring 50. In thus operating the chain the circuit will be from line to binding-post *b* and conductor *a*, contact 42, spring 41, to lever 37, to contact-spring 57, to projection 56 of pole-piece 11, through adjacent head 18, to armature-shaft 21, to one end of the armature coil or winding, as usual, through said coil to the collector 25, to collector-spring 27, to connection *c*, thence through connection *d*, via spring 50, to hinge 4, strip *e*, and connector *f*, to coils 6 and 5 of ringer-magneto, and finally to hinge 3 and connection *h*, to post T, to ground or line, as the case may be.

It will thus be seen in what manner my improved electromagnetic generator is constructed and held together, and I desire it to be understood that I am not limited to the precise details of construction herein shown and described. If desired, suitable screws or other fastenings may be inserted into the under side of the pole-pieces and made to enter the lower ends of the magnets, so as to secure an additional strength of structure, but for all ordinary purposes they have not been found to be necessary.

By notching or counterboring the ends of the pole-pieces in the manner shown and described the heads serve to firmly and securely maintain the relation of said pole-pieces in that they cannot become readily separated, nor are they permitted from this construction to be forced together in the act of bending or springing the ends of the permanent magneto into place.

It will be further understood that I lay no claim herein to the particular form or arrangement of the magnetic coils 5 and 6 which operate the bells, since they are of ordinary construction and arrangement, and are simply shown herein as a conventional means by which to complete the description to a full understanding of my invention.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. The combination in an electromagnetic generator, of the contacts, the contact-lever, and a slack chain arranged to operate the lever when said chain is tightened, substantially as described.

2. The combination in an electromagnetic generator, of ordinary horseshoe-magnets, separate pole-pieces confined between the poles or lower ends of said magnets and counterbored at each end to constitute recesses for the reception of supporting heads or bearings for the shaft of the armature, substantially as described.

3. The combination in an electromagnetic generator, of separate pole-pieces confined between the poles or lower ends of the magnets, heads recessed or sunken into the ends of said pole-pieces, and supporting the rotating armature-shaft, brackets secured to the upper part of the pole-pieces at their ends, a shaft supported in said brackets, a bell and armature circuit, and means for automatically cutting out the armature, substantially as shown and described.

4. The combination in an electromagnetic generator, of ordinary horseshoe-magnets and an armature rotating between the lower ends of the latter, a pinion carried by one end of the armature-shaft, an enlarged sprocket-wheel supported in bearings above the pinion, and a sprocket-chain connecting the two, and being normally somewhat slack, the pivoted lever normally pressing against the chain to take up the slack therein, and the coiled spring connecting the lower arm of said lever, the whole being arranged substantially as shown and for the purpose set forth.

5. The combination in an electromagnetic generator, of the separate pole-pieces, the armature-shaft, the pivoted lever, the enlarged sprocket-wheel and the sprocket-pinion, the connecting-chain, the contact-springs, the coiled spring connecting the lever, and the armature and bell circuits, substantially as shown and herein described.

6. The combination in an electromagnetic generator, of the pivoted lever, the upper contact-spring with which the lever is normally in contact, the lower contact-spring, constituting a part of the armature-circuit, connections to complete both the armature-circuit with the magnets and the bell-circuit, the bell-operating devices, and an automatic device for operating said lever, substantially as shown and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN CHISHOLM FRANCIS.

Witnesses:

ARTHUR DELAPIERRE,
P. C. SIMPSON.