

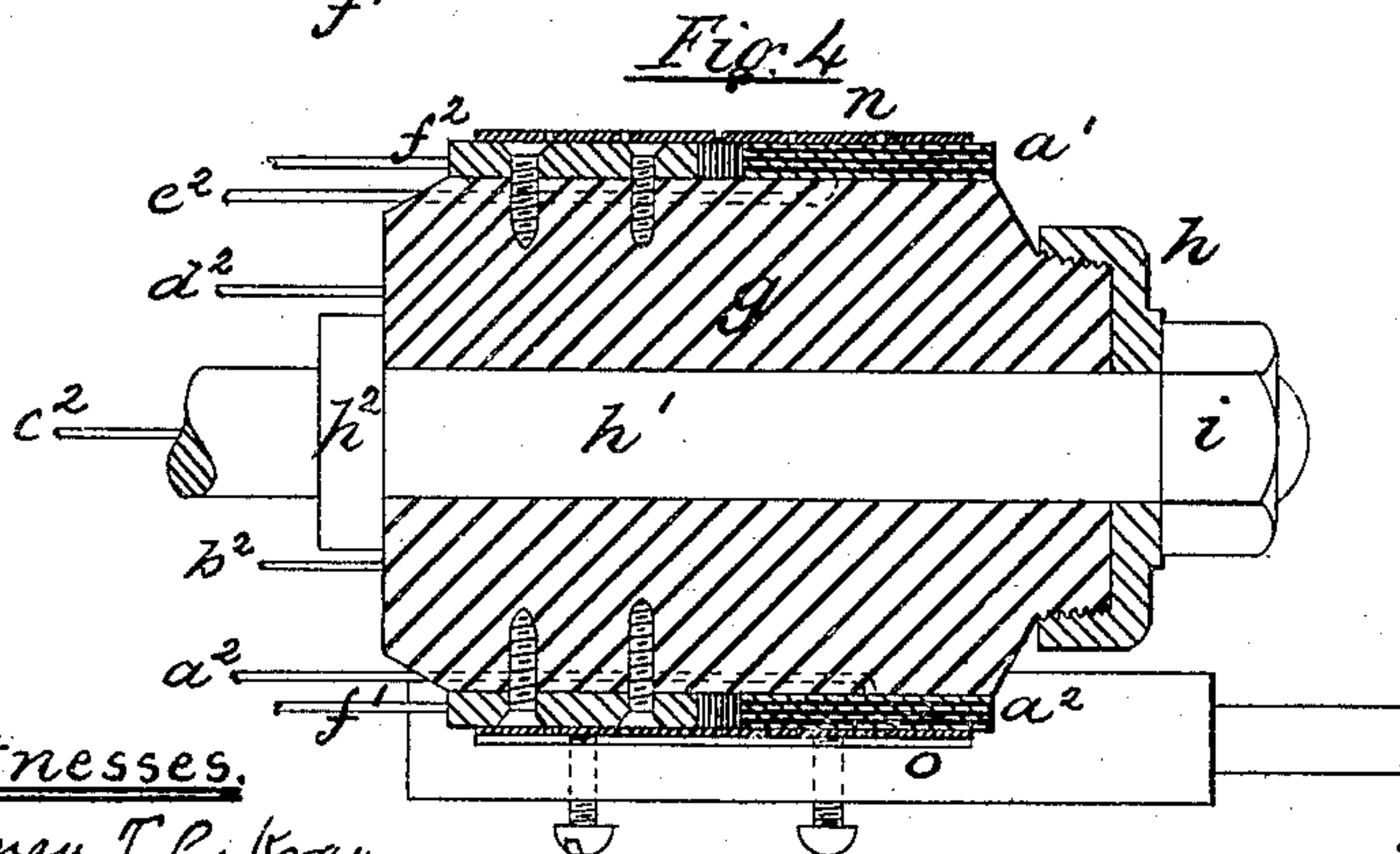
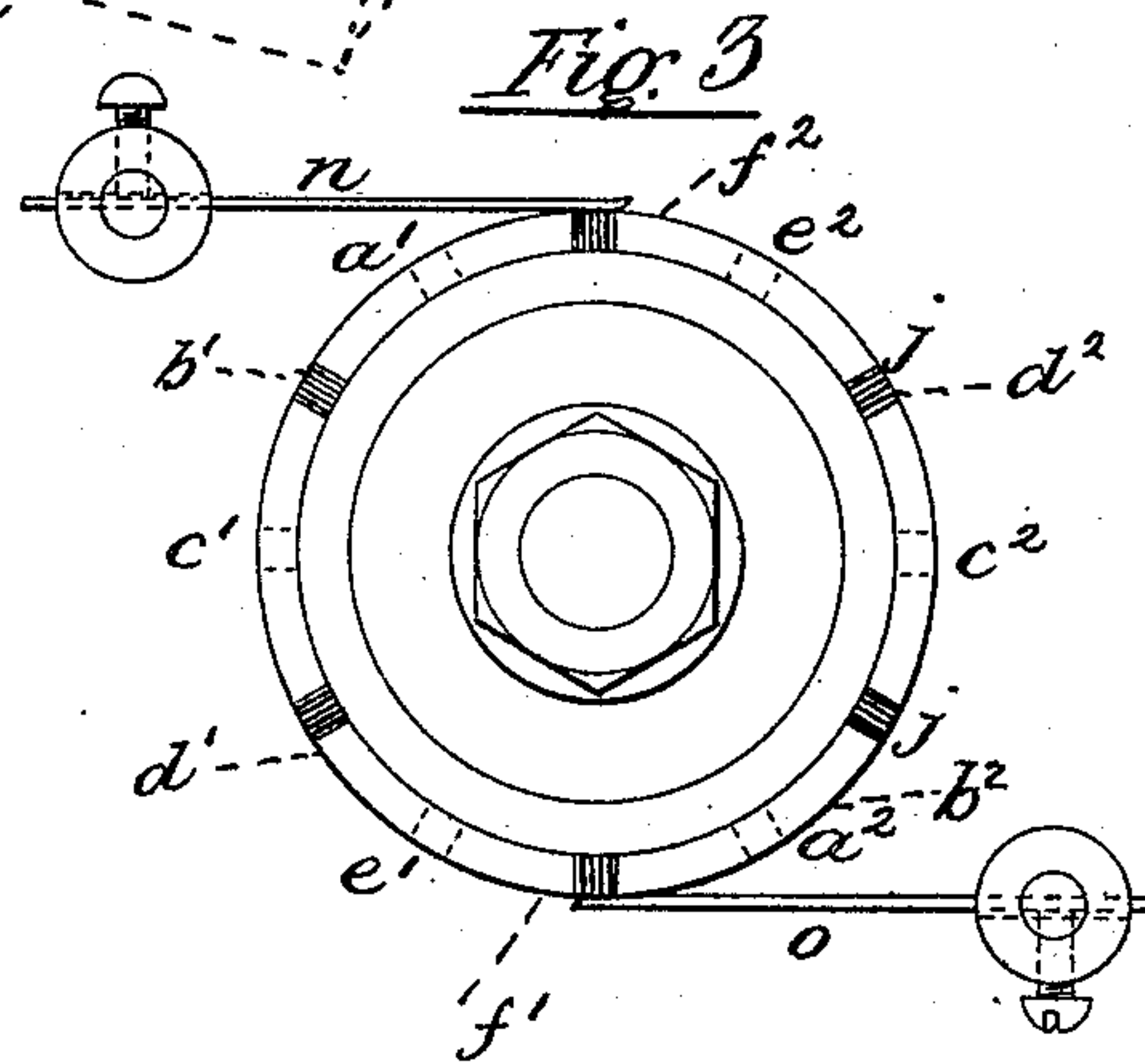
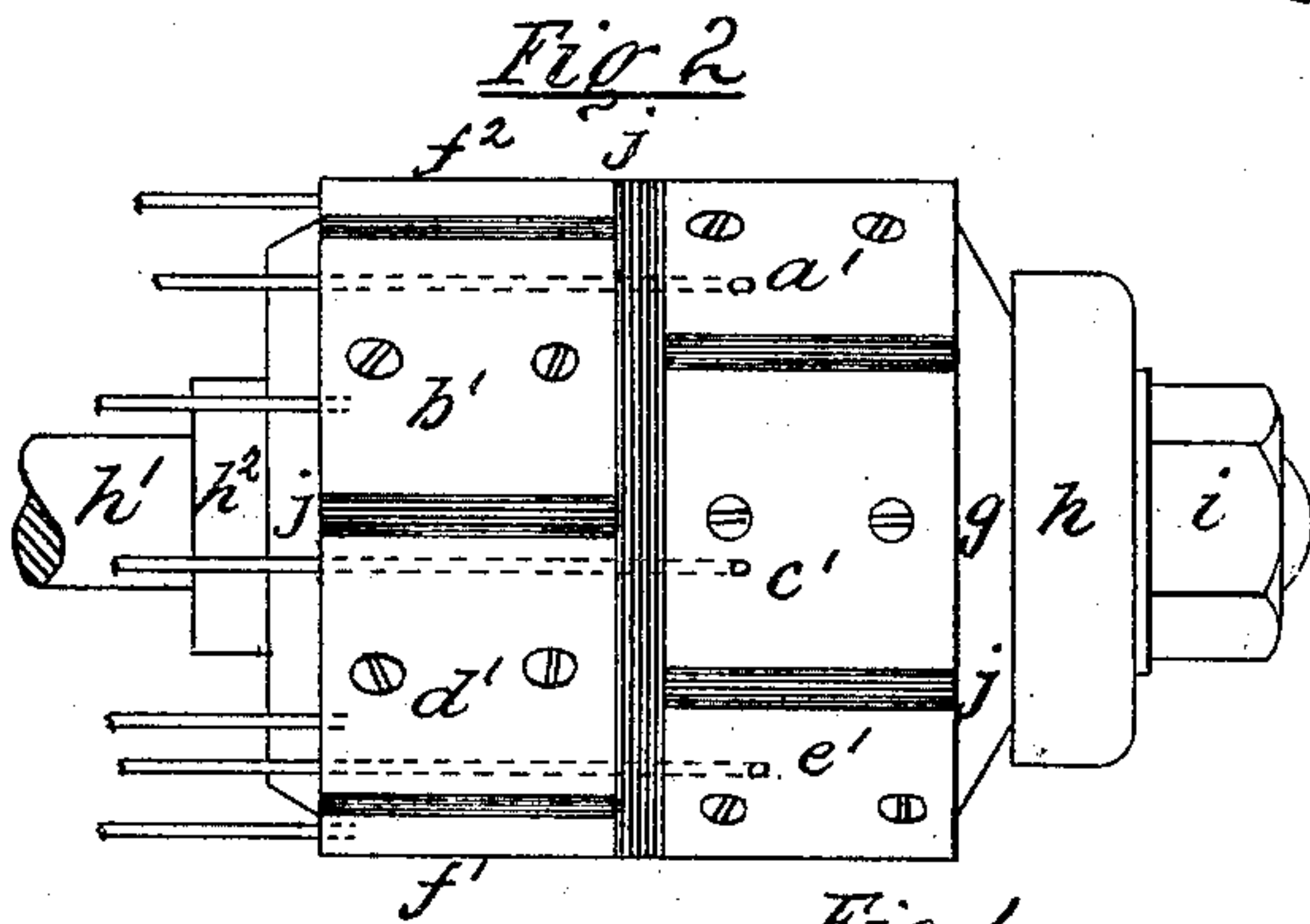
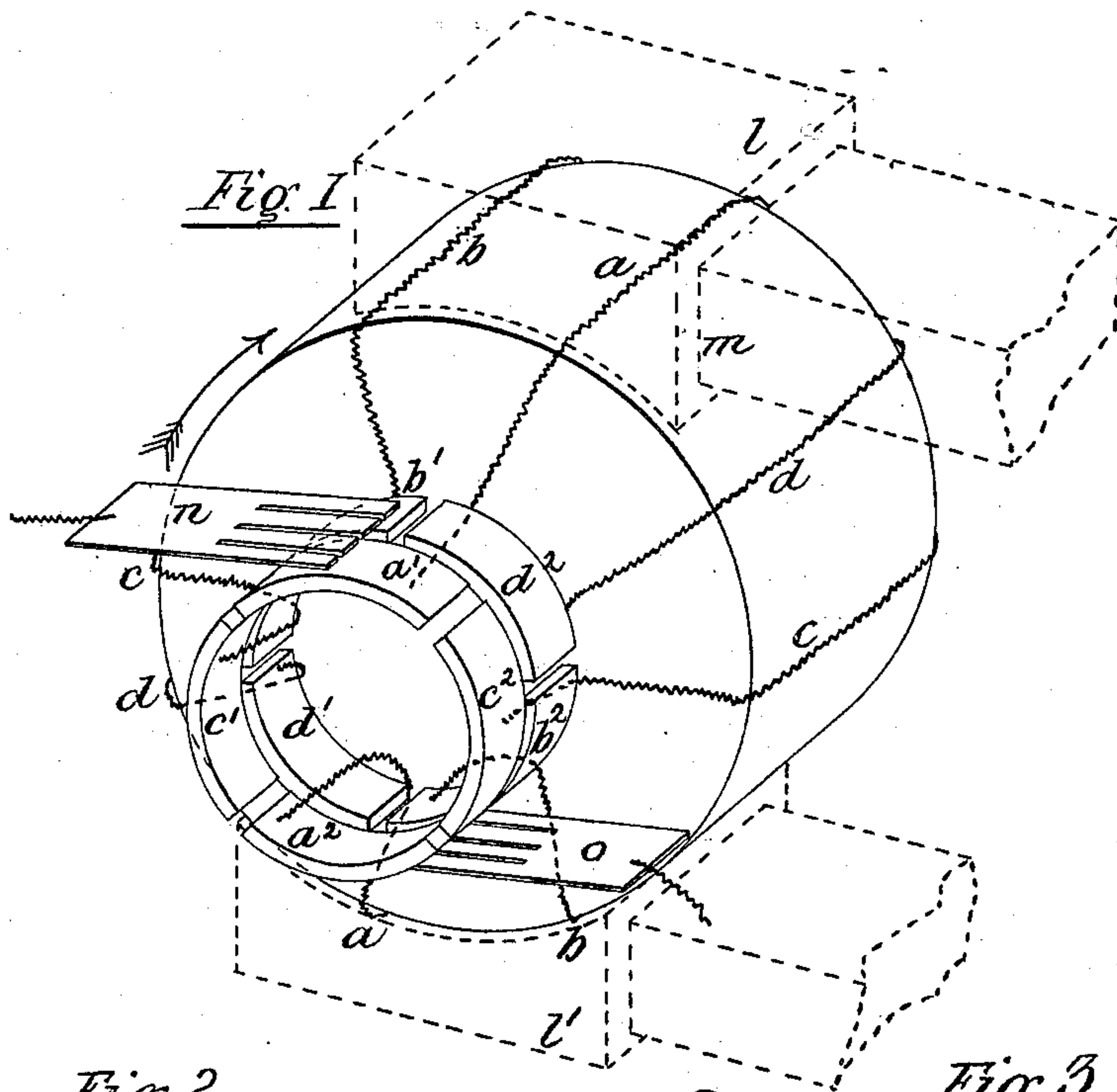
(No Model.)

H. JACOBS.

COMMUTATOR FOR MAGNETO ELECTRIC MACHINES.

No. 246,612.

Patented Sept. 6, 1881.



Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY JACOBS, OF TOLEDO, OHIO.

COMMUTATOR FOR MAGNETO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 246,612, dated September 6, 1881.

Application filed April 4, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY JACOBS, of Toledo, county of Lucas, State of Ohio, have invented certain new and useful Improvements in Commutators for Magneto-Electric Machines, of which the following is a specification.

This invention relates to magneto-electric machines; and it consists of certain improvements in the manner of collecting the induced electric currents from the sections or bobbins of the armature, and in the construction of commutators used for this purpose.

The commutator is composed of two or more series of segmental plates secured to a cylinder of insulating material, side by side. Each series comprises an equal number of plates, and their combined number equals the number of ends of the armature-sections, all of which are free, and the plates of the series alternate or break joints on the periphery of the cylinder. All of the ends of the sections or bobbins of the armature are connected to separate segmental plates of the series in such a manner that the electric current is taken from all the bobbins in the field of magnetic action in multiple circuit by means of collecting-brushes which extend across the series of plates, by which arrangement a steady current is produced and the effectiveness greatly increased of machines in which the ends of the bobbins of the armature are free, and sparks are entirely avoided, thereby reducing the wearing away of the commutator-plates, and the commutators of this class of magneto-electric machines may be made smaller in diameter than heretofore.

For the insulating-cylinder I prefer to use wood, which I strengthen and prevent from splitting by means of a metal cap screwed on the end; and I fill the spaces between the segmental plates with paper and shellac to insure perfect insulation and cause the commutator to work smoothly and without noise under the collecting-brushes.

Figure 1 is a diagram view, showing the arrangement of two series of segmental plates, their relative positions, and manner of connecting them to the free ends of the armature-bobbins. Fig. 2 is a side elevation of the commutator complete. Fig. 3 is an end view of the same, and Fig. 4 is a longitudinal section.

In Fig. 1, *m* represents an armature of the cylindrical type, wound longitudinally with insulated wire in four sections or bobbins, *a*, *b*, *c*, and *d*. The dotted lines *l* and *l'* represent the two poles and parts of the core of a horse-shoe magnet. The first end of bobbin *a* is connected to the commutator-plate *a'* of one series, the first end of bobbin *b* to the next succeeding plate, *b'*, of the other series, the first end of bobbin *c* to the next succeeding plate, *c'*, of the first series, and the first end of bobbin *d* to the next succeeding plate, *d'*, of the second series. The last ends of the bobbins are connected, respectively, to the plates *a''*, *b''*, *c''*, and *d''*, each of which is diametrically opposite the plate to which the first end of the respective bobbin is attached. The collecting-brushes *n* and *o* bear on the plates of the two series, and it will be observed that the currents are being collected in multiple circuit from the bobbins *a* and *b*, which are now supposed to be within the field of magnetic action between the poles *l* and *l'* of the field-magnet, the armature and commutator being supposed to be revolving, as indicated by the arrow. As the bobbin *a* leaves the field the plates *a'* and *a''* pass by the ends of the brushes *n* and *o*; but the brushes are still collecting the current from the bobbin *b*, and the bobbin *c* is within the field when the plates *c'* and *c''* pass under the brushes, so that a current is produced all the time, and from two bobbins, except during the small break between the commutator-plates.

Only four divisions in the armature are shown to clearly illustrate the way the commutator-plates of the two series are connected to the ends of the bobbins, and from which it will be readily seen how this improvement in commutators may be applied to any form of armature of any number of divisions.

The commutator shown at Figs. 2, 3, and 4 is designed to be used with an armature of six divisions, the two series of segmental plates being designated by the letters *a'* *a''*, *b'* *b''*, *c'* *c''*, *d'* *d''*, *e'* *e''*, and *f'* *f''*, their arrangement and relative connection with the bobbins of the armature, whose ends are shown connected to the plates, being in accord with the above description of Fig. 1. The segmental plates are fastened by means of screws to the cylinder *g*, of wood or other suitable insulating material, which is strengthened by means of the metal

cap *h*, screwed on its end, as shown. This wooden cylinder *g* is firmly held on the end of the armature-shaft *h'* by being pressed against the collar or shoulder *h*² by means of the nut
 5 *i*. The segmental plates of the inside series are connected directly to the ends of the bobbins of the armatures and of the outside series by the wires passing longitudinally through the wooden cylinder *g*, as shown by the dotted
 10 lines in Fig. 4.

Figs. 3 and 4, in conjunction with Fig. 1, so clearly show the manner in which the collecting-brushes *n* and *o* bear on the plates of the two series that further description is unneces-
 15 sary.

The spaces between the segmental plates and between the two series of plates are filled up flush with the surface of the plates with paper and shellac or other suitable varnish or
 20 cement, as shown at *j j*.

In machines in which more than two divisions or bobbins of the armature are under the influence of the poles of the field-magnets at one time, the number of series of com-
 25 mutator-plates will correspond to the number of bobbins so influenced, and the plates in each series will be arranged to break joints and be connected to the free ends of the various bobbins, substantially as before described,
 30 and each collecting-brush will also bear on all the sections, so that the current will be taken from all the bobbins in the field in multiple circuit.

It is obvious that this principle of collect-
 35 ing the currents from the bobbins of armatures of magneto-electric machines may be accomplished by arranging the series of commutator-plates in other ways than that shown or described—as, for instance, the spaces be-
 40 tween the plates of each series may be in line with one another, and the edges of the collecting-brushes formed in steps to leave the edges of the plates of the different series which approach the brushes in successive order; and,

also, the plates may be arranged on the side of 45 a disk instead of on the periphery of a cylinder. So I do not wish to confine myself to the particular construction shown; but

What I claim, and desire to secure by Letters Patent, is—

1. As an improvement in magneto-electric machines, a commutator consisting of twice as 50 many insulated plates as there are divisions or bobbins on the armature, arranged in as many series as there are bobbins under the influence 55 of the magnetic field at one time, the free ends of each bobbin being connected to diametrically-opposite plates of the commutator, and each successive bobbin to the successive plates of the different series, as described, and brushes 60 adapted to bear on the adjacent plates of all the series, whereby the current induced in all the divisions or bobbins in the magnetic field at one time are collected in multiple circuit, substantially as hereinbefore set forth. 65

2. In combination with the divisions or bobbins of the armature of a magneto-electric machine, a commutator composed of two sections of segmental plates arranged alternately on 70 an insulating-cylinder, the diametrically-opposite plates of one series being consecutively connected to the free ends of each alternate division or bobbin of the armature, and the adjacent opposite plates of the other series to the corresponding intervening bobbins, and col- 75 lecting-brushes adapted to bear on the two series of plates, whereby the currents induced in the divisions or bobbins in the field at one time are collected in multiple circuit, substantially as and for the purpose hereinbefore set 80 forth.

In testimony whereof I have hereunto set my hand this 30th day of March, 1881.

HENRY JACOBS.

Witnesses:

WILLARD L. CANDEE,
 ALFRED SHEDLOCK.