

No. 750,938.

PATENTED FEB. 2, 1904.

C. A. BROWN.

ALTERNATING CURRENT WATTMETER.

APPLICATION FILED JULY 24, 1900. RENEWED JUNE 24, 1903.

NO MODEL.

Fig. 1

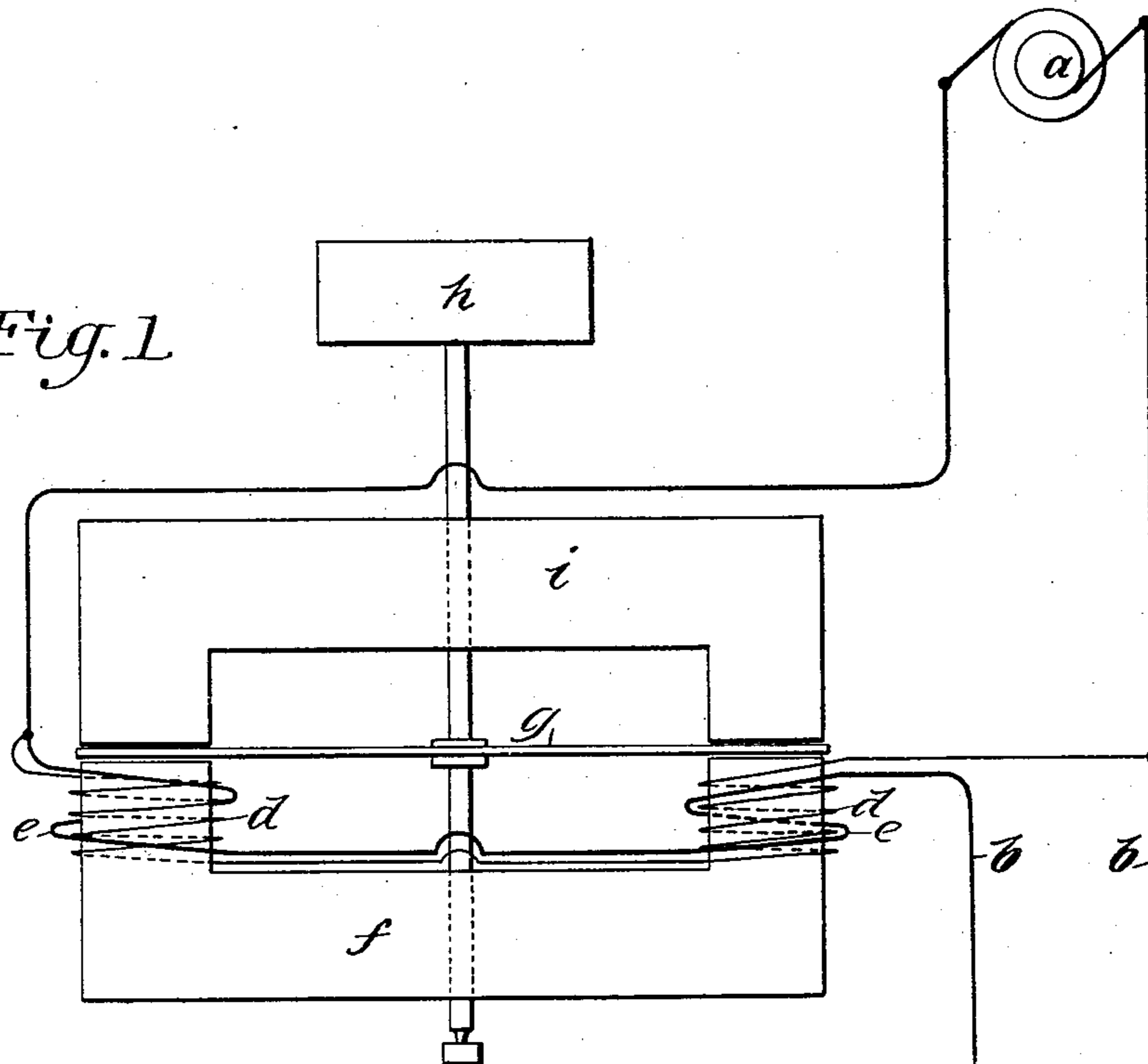
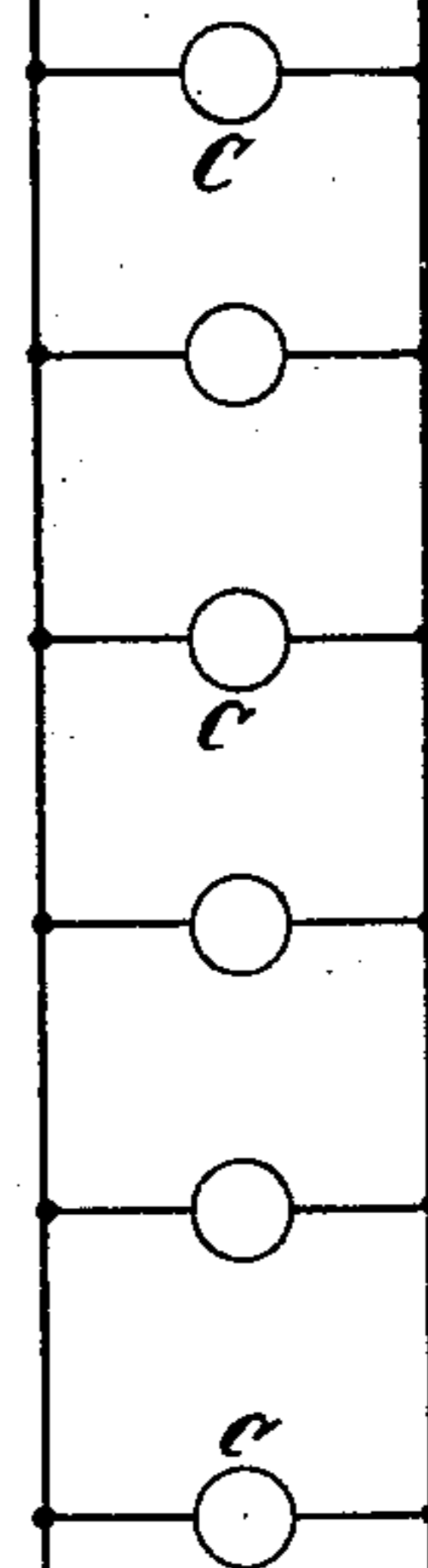
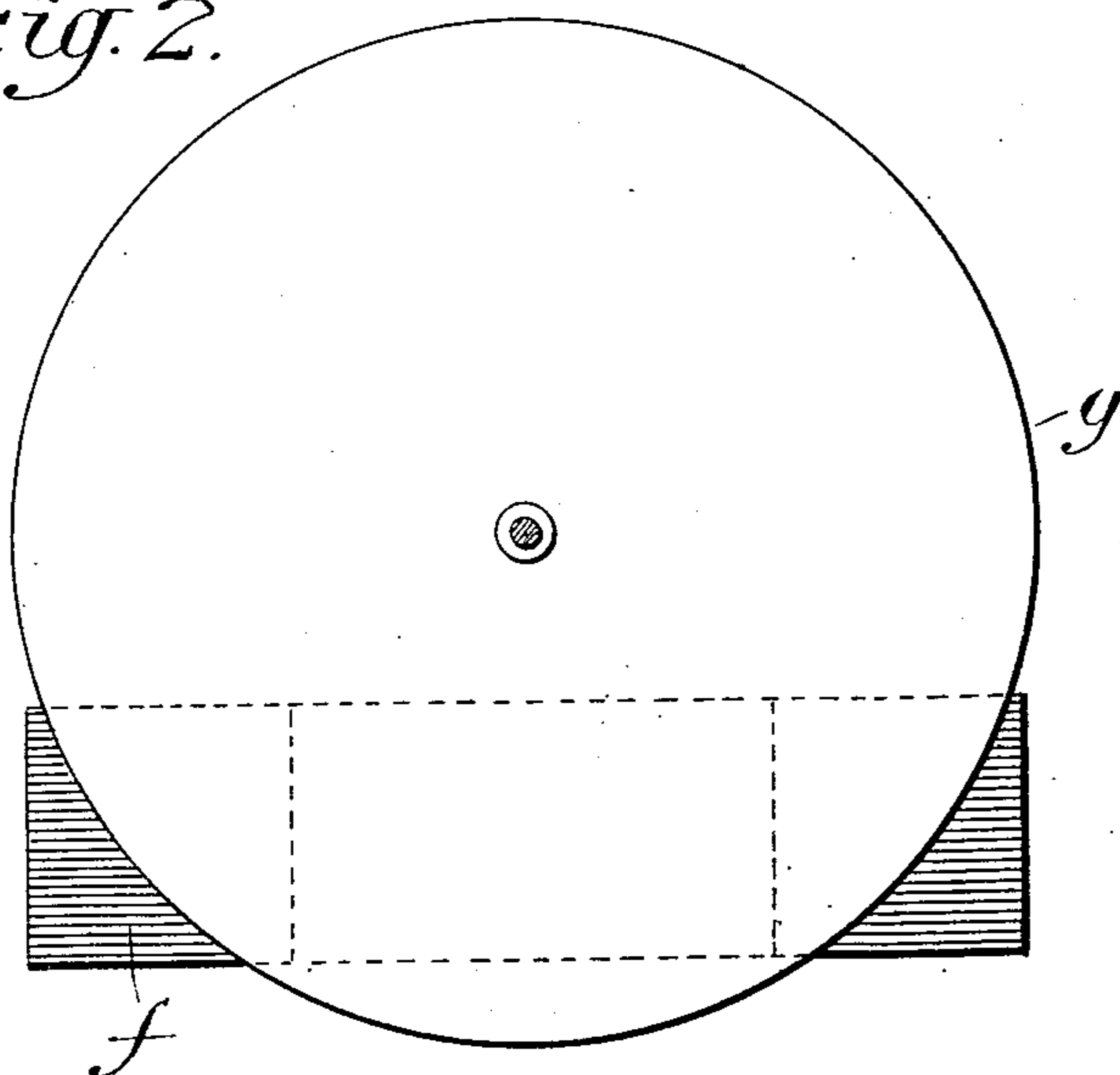


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES A. BROWN, OF CHICAGO, ILLINOIS.

ALTERNATING-CURRENT WATTMETER.

SPECIFICATION forming part of Letters Patent No. 750,938, dated February 2, 1904.

Application filed July 24, 1900. Renewed June 24, 1903. Serial No. 162,840. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Alternating-Current Wattmeters, (Case No. 6,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to alternating-current wattmeters employing current and pressure field-windings, and has for its object the provision of an improved form of meter wherein the currents in the pressure and current field-windings may jointly produce magnetic fields that react upon a movable element to secure the desired measurement.

Heretofore alternate-current wattmeters have generally been provided with pressure and current field-windings displaced with respect to each other and serving to produce independent polar regions or magnetic fields which have a resultant effect upon the movable member or armature of the meter to effect its actuation. These distinct magnetic fields may give rise to complications and error.

In accordance with my invention the pressure and current field-windings are collocated, so that these windings serve to produce a single field or a plurality of fields, according to the number of coils into which the windings are subdivided. One of the windings in accordance with my invention is superposed upon the other, so that they may have a common magnetizing effect upon the same portion of the magnetic core about which they are disposed. The same effect obviously may be secured in other ways, the purpose being to direct the magnetic flux due to the currents in the two windings through substantially the same magnetic path. I preferably provide the pressure-winding with a large number of turns of fine wire and connect the same in bridge of supply-mains and also, preferably, include the current-winding in series with a main.

By means of the device of my invention I am able to produce a meter that is extremely simple in construction and free from errors

that may be due to a separation of the fields created by the windings of the meter.

I will explain my invention more fully by reference to the accompanying drawings, in which—

Figure 1 diagrammatically illustrates a meter constructed in accordance with my invention associated with an alternating-current work-circuit. Fig. 2 is a top view of a meter, the upper core being removed.

Like characters of reference indicate like parts in the two figures.

I have illustrated a source of single-phase alternating current a in circuit with supply-mains $b\ b$ that supply current to translating devices $c\ c$ at a district of consumption. The pressure-winding of the meter is preferably subdivided into two coils $d\ d$ and is connected in bridge between the supply-mains. The current-winding is also, preferably, divided into two coils $e\ e$ and is in series with one of the distributing-mains. The series or current coils are superposed upon the pressure-coils, so that each pair of coils $d\ e$ produces but one magnetic region. A field-core f is illustrated of U shape, the sides of the core forming the poles thereof, about which the coils d and e are disposed. I have illustrated the armature in the form of a disk g , that may serve to actuate the measuring device h , the disk being mounted to rotate above the poles of the core f in a plane perpendicular thereto. A back piece i , of magnetisable material, may be provided upon the other side of the armature g to afford a closed circuit for the magnetic flux passing through the armature. The windings of the meter preferably produce fields that are proportional to the pressure and current, so that a torque is produced upon the armature that is proportional to the product of the current and the pressure. It will be observed that the windings are so disposed upon the core that the current-winding and the pressure-winding cooperate at one pole and are opposed in effect at the other pole. The two magnetomotive forces produced by the currents in the two windings combine to produce a single field in the iron core and a single field through the disk.

I have herein shown one embodiment only of my invention; but it is obvious to those skilled in the art that the details of construction and the type of meter may be departed from and that the precise circuit connections illustrated may be varied without departing from the spirit of my invention, and I do not, therefore, wish to be limited to the precise embodiment of the invention herein shown and particularly described.

While I have explained my invention in its application to a meter, it will be understood by those skilled in the art that it is equally applicable to other devices—as, for instance, motors.

I believe it to be broadly new with me to produce motion in an armature by means of currents in two or more energizing-circuits in inductive relation thereto, said currents being adapted to produce magnetic fluxes following substantially the same magnetic path.

I claim—

1. In an alternating-current wattmeter, the combination with the armature thereof, of a pressure-winding and a current-winding, the windings of the meter being one superposed upon the other, whereby the fields due to the windings are collocated, substantially as described.

2. In an alternating-current wattmeter, the combination with the armature thereof, of a pressure-winding and a current-winding, the windings of the meter being one superposed upon the other, whereby the fields due to the windings are collocated, and a core about which the windings of the meter are disposed, substantially as described.

3. In an alternating-current wattmeter, the combination with the armature thereof, of current and pressure field-windings, each subdivided into a plurality of coils, the coils of one winding being superposed upon the coils of the other, whereby the current and pressure coils produce collocated fields, substantially as described.

4. In an alternating-current wattmeter, the combination with the armature thereof, of current and pressure field-windings, each subdivided into a plurality of coils, the coils of one winding being superposed upon the coils of the other, whereby the current and pressure coils produce collocated fields, and a core for the coils of the meter, substantially as described.

5. In an alternating-current wattmeter, the combination with the armature thereof, of means for producing collocated fields that are proportional to the current and pressure in the working circuit, substantially as described.

6. In an alternating-current meter, the combination with the armature thereof, of means for producing collocated fields that exert torque upon the armature proportional to the product, of the current and the pressure in the working circuit, substantially as described.

7. In a device of the class described, the com-

bination with two energizing-circuits serving to carry currents adapted to produce magnetic fluxes following substantially the same magnetic path, of an armature in inductive relation to said circuits, substantially as described.

8. In a device of the class described, the combination with two energizing-circuits one superposed upon the other, whereby the magnetic fluxes due thereto are confined substantially to the same path, of an armature in inductive relation thereto, substantially as described.

9. In a device of the class described, the combination with an armature, of an equal number of pressure and current coils inductively related to the armature, said coils being disposed about a common path of the magnetic flux produced by each, one of said current-coils being opposed in magnetic effect to one of said pressure-coils, whereby two field-poles of unequal strength are produced and movement of the armature is secured.

10. In a device of the class described, the combination with an armature, of an equal number of pressure and current coils inductively related to the armature, said coils being disposed about a common path of the magnetic flux produced by each, one of said current-coils being opposed in magnetic effect to one of said pressure-coils, the polar axes of said coils lying transversely to the plane of said armature, whereby two field-poles of unequal strength are produced and movement of the armature is secured.

11. In a device of the class described, the combination with an armature, of a pressure-winding in inductive relation thereto, a current-winding also in inductive relation to said armature, said pressure and current windings being both disposed about a common path of the magnetic flux produced by each winding, a portion of said pressure-winding being opposed in effect to a portion of said current-winding, whereby poles of unequal strength are presented to the armature.

12. In a device of the class described, the combination with an armature, of a pressure-winding in inductive relation thereto, a current-winding also in inductive relation to said armature, the polar axis of said windings lying transversely to the plane of said armature, said pressure and current windings being both disposed about a common path of the magnetic flux produced by each winding, a portion of said pressure-winding being opposed in effect to a portion of said current-winding, whereby poles of unequal strength are presented to the armature.

13. In a device of the class described, the combination with an armature, of pressure and current windings connected with the main circuit and inductively related to each other and to the armature, and means for causing the magnetic field due to their conjoint effect to act upon said armature in a common area.

14. In a device of the class described, the combination with an armature, of a pressure-energizing circuit and a current-circuit combined with said pressure-circuit to produce a magnetic field due to the conjoint effect of the said circuits and acting in a common area upon said armature, said armature being in inductive relation to both of said circuits.

15. In a device of the class described, the combination with an armature, of pressure and current windings in inductive relation thereto, said pressure and current windings being both disposed about a common path of the magnetic flux produced by the windings, substantially as described.

16. The combination with an armature, of a field-core associated therewith, energizing-windings on said core in inductive relation with said armature, said energizing-windings being disposed upon said core so that they cooperate at one pole and are opposed in effect at the other pole of the core substantially as described.

17. The combination with field-cores, of an armature interposed in the path of the magnetic flux between the poles of said cores, current-windings on said cores, and pressure-windings on said cores, the windings acting

cumulatively at one pole and opposedly in effect at another pole, whereby the armature is caused to rotate, substantially as described.

18. The combination with field-cores, of an armature interposed in the path of the magnetic flux between the poles of said cores, a plurality of pressure-coils on said cores, a current-winding on said cores, part of said pressure-coils acting cumulatively at one pole with said current-winding and opposedly to said current-winding at another pole, substantially as described.

19. The combination with field-cores, of an armature interposed in the path of the magnetic flux between the poles of said cores, a plurality of energizing-windings on said cores disposed about a common path of the magnetic flux produced by the windings, part of said windings acting cumulatively at one pole and opposedly in effect at another pole, substantially as described.

In witness whereof I hereunto subscribe my name this 17th day of July, A. D. 1900.

CHARLES A. BROWN.

Witnesses:

GEORGE L. CRAGG,
HARVEY L. HANSON.