

No. 750,939.

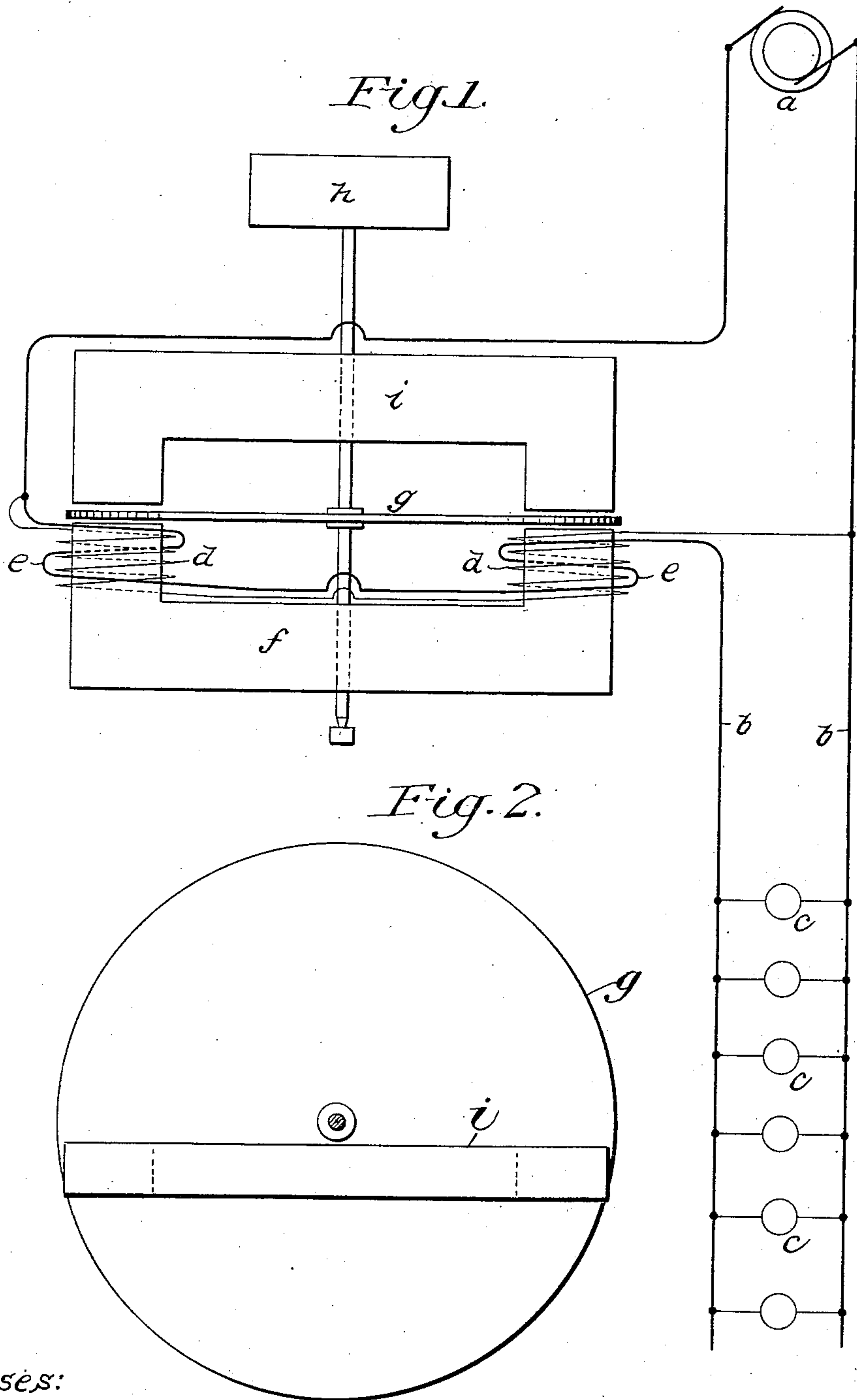
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C. A. BROWN.

PROCESS OF MEASURING WATTS IN ALTERNATING CURRENT CIRCUITS.

APPLICATION FILED NOV. 19, 1900.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES A. BROWN, OF CHICAGO, ILLINOIS.

PROCESS OF MEASURING WATTS IN ALTERNATING-CURRENT CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 750,939, dated February 2, 1904.

Application filed November 19, 1900. Serial No. 36,965. (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 Processes of Measuring Watts in Alternating-Current Circuits, 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 a process for measuring watts in an alternating-current circuit, and has for its object the simplification of the process by producing a single field which produces upon the armature of the meter a torque proportional to the watts.

In connection with this case reference may be had to my copending application, Serial No. 24,654, filed July 24, 1900, in which is described means for carrying out the herein-described process.

In carrying out my process it is not essential that only one circuit should be inductively associated with the armature of a meter; but if two energizing-circuits are both thus inductively related to the armature it is essential that they should be so located that they shall not produce in separate and independent areas in the armature the state of stress which is the cause of rotation. On the other hand, it is essential that the resultant magnetic flux, which is effective upon the armature and which is the result of the conjoint action of the pressure and the current-circuit, shall produce what practically so far as its effect upon the armature is concerned is a single magnetic field.

Heretofore in the process of measuring watts of alternating-current circuits pressure and current windings have been provided which are displaced with respect to each other and serve to produce independent polar regions or magnetic fields which have independent effects upon the movable member and serve to effect its movement. In accordance with the process of my invention pressure and current field-windings are preferably collocated, so that these windings serve to produce by the conjoint effect of their currents a single field or a plurality of fields, according to the number

of coils in which the windings are subdivided. The magnetic field which causes the movement of the armature is due to the conjoint effect of the two circuits, which produce a combined magnetomotive force which is effective to secure rotation, and not, as heretofore, two independently-acting magnetomotive forces due to the two energizing-circuits.

The distinction between the process of my invention herein shown and processes heretofore known and used is that in prior processes each energizing-circuit acts to cause a state of stress in the space occupied by the armature, and that state of stress caused by each of the energizing-circuits is displaced in position with reference to that produced by the other energizing-circuit. In the process of my invention the state of stress in the armature which is the cause of rotation is produced by the magnetic flux due to the conjoint effect of the two windings and operates upon the armature in a single or common area—that is to say, the magnetic effects due to the correlated current and pressure-coils are not effective in different areas upon the armature.

In carrying out my invention by means of the apparatus shown herein one of the windings 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 in which the magnetic flux which is proportional to the current and pressure may be produced by the conjoint effect of the currents in the two windings and directed 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 the supply-mains. I also preferably include the current-winding in series with one of the mains.

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, and Fig. 2 shows the relative position of the disk and field cores.

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 magnetizable 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 illustrated a meter having well-known mechanical characteristics of construction. In the meter shown it is obvious that the effective polar areas do not coincide with the diameter of the armature, but rather coincide with a line across the armature not coincident with its diameter in order that the torques at the poles may be effective in creating rotation.

I have herein shown one means only of practicing the process of my invention; but it is obvious to those skilled in the art that the details of construction and the type of apparatus 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 that it is applicable to the operation of other devices—as, for instance, motors.

Having thus described my invention, what I claim as new is—

1. The process of measuring the power in alternating-current circuits, which consists in creating a single field by the current and pressure in the system, and subjecting a measuring element to the action of the said field, substantially as described.

2. The process of measuring power in alternating-current circuits, which consists in creating component current and pressure fields, combining said fields to form a single field, and subjecting a measuring element to the action of the said resultant field, substantially as described.

3. The process of measuring power in alternating-current circuits, which consists in interposing a measuring element in the path of a magnetic flux between the poles of a magnetic circuit and causing energizing pressure and current windings to act cumulatively at one pole, and opposedly at the other pole, substantially as described.

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

CHARLES A. BROWN.

Witnesses:

GEORGE L. CRAGG,

HERBERT F. OBERGFELL.