No. 780,770. PATENTED JAN. 24. 1905.

J. J. WOOD.

ELECTRIC METER.

APPLICATION FILED MAY 10, 1904.

2 SHEETS—SHEET 1.

FIG. 1.

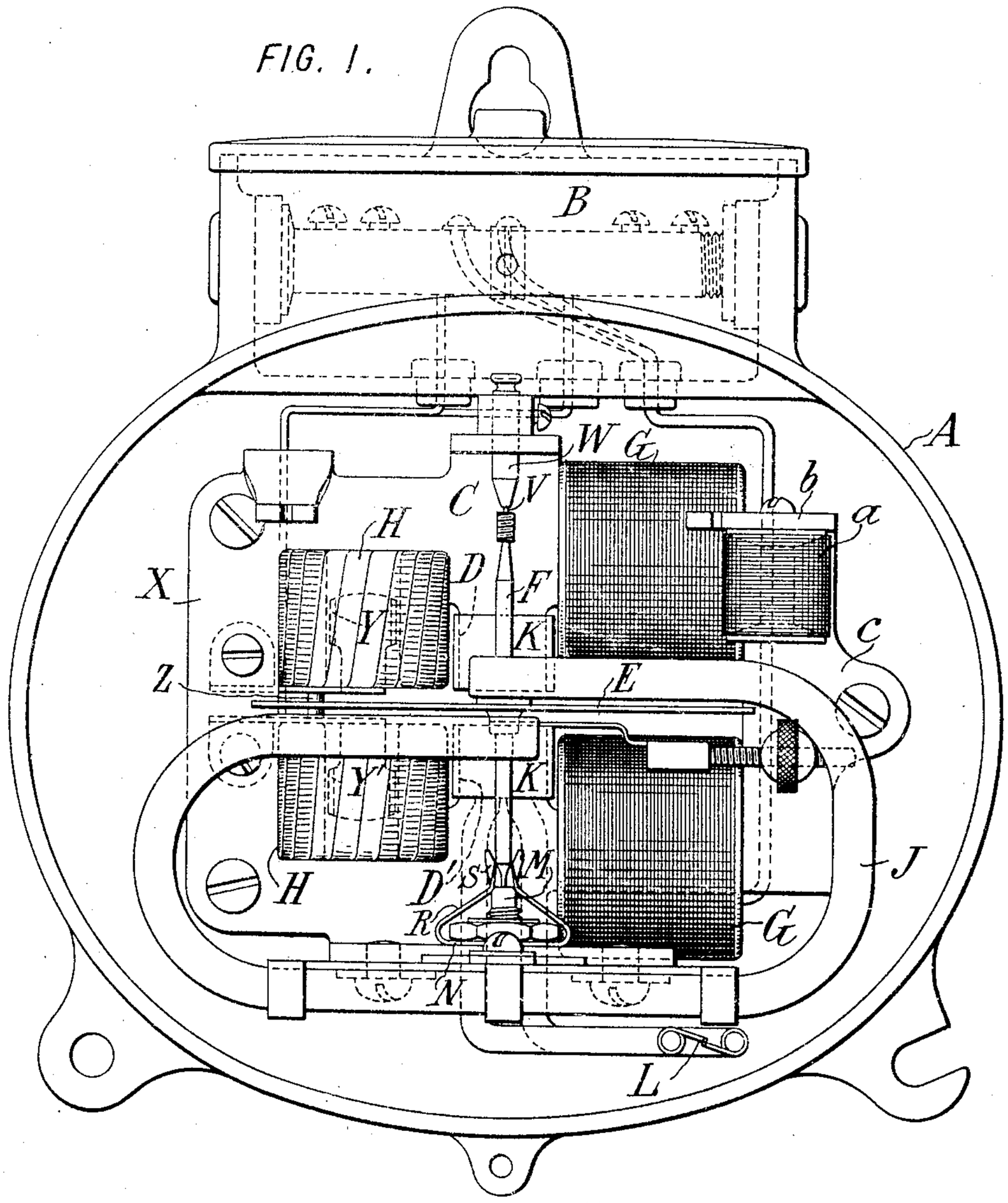
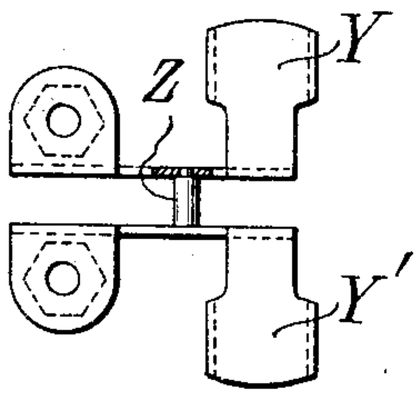


FIG. 3.

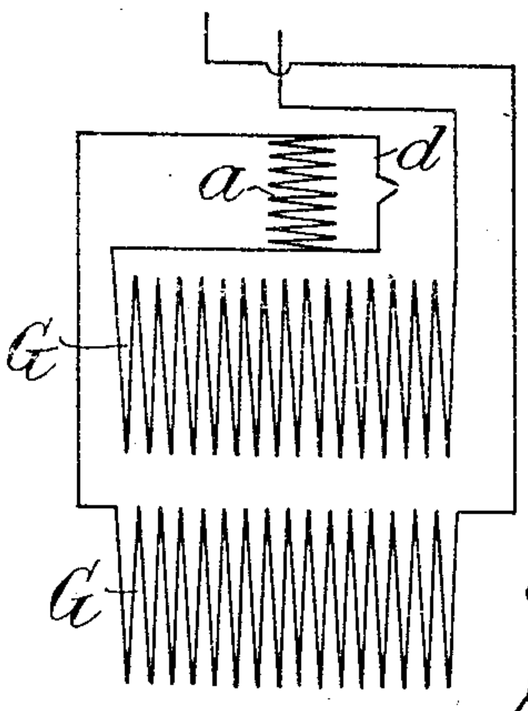


WITNESSES:

Fred Whitty

René Bruine

FIG. 2.



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By Attorneys,

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2 SHEETS—SHEET 2.

FIG. 4.

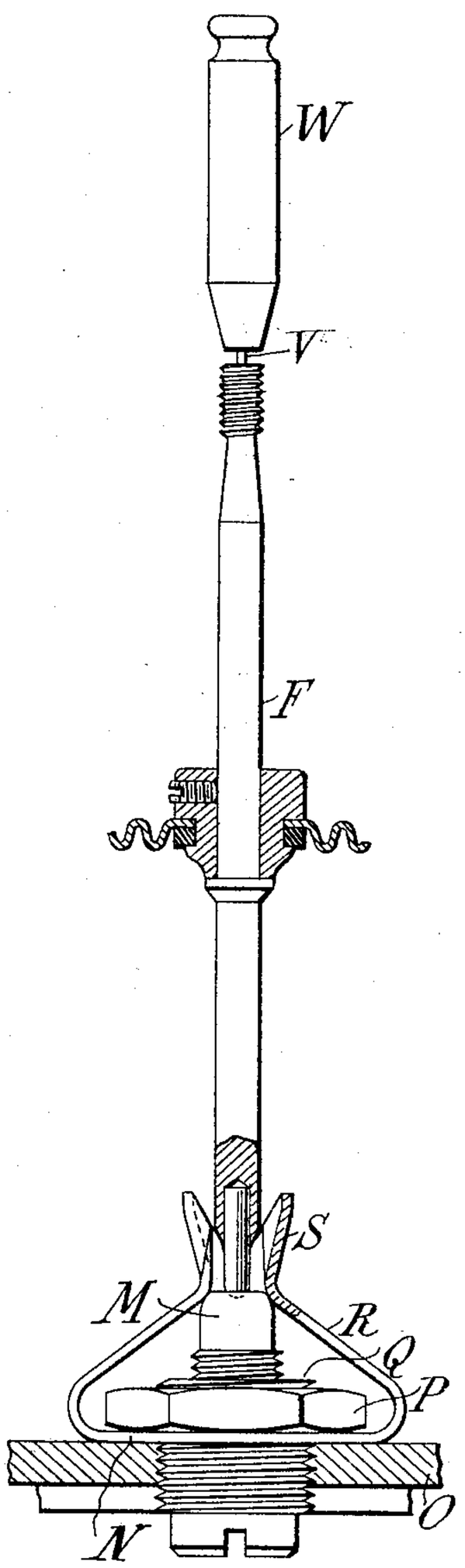


FIG. 5.

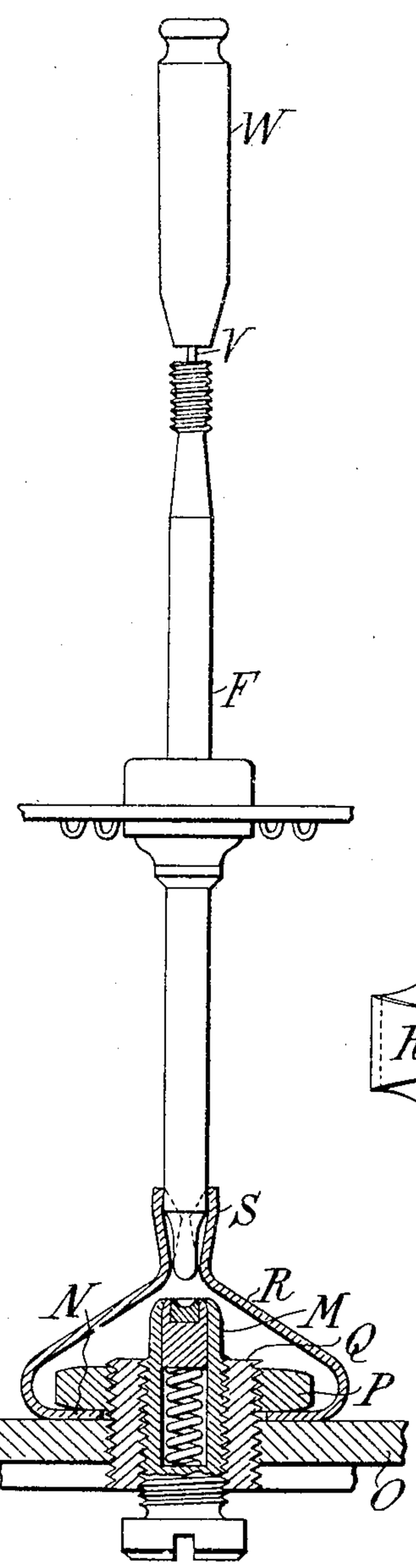
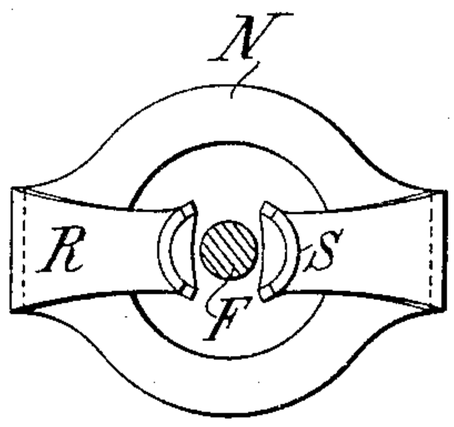


FIG. 6.



WITNESSES:

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No. 780,770. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA.

ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 780,770, dated January 24, 1905.

Application filed May 10, 1904. Serial No. 207,279.

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing in Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Electric Meters, of which the following is a specification.

This invention relates to alternating-current electric meters or wattmeters of the induction-motor type.

The invention aims to provide several features of improvement which are specially applicable to the meter shown in my application for patent filed February 11, 1904, Serial No. 193,210.

The improvements referred to are also applicable to meters of various other styles.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a front elevation with the front shell of the case and the totalizer removed, showing the principal parts of the mechanism. Fig. 2 is a diagram of the shunt-winding of the meter. Fig. 3 is a separate view of the supports for series coils. Figs. 4 and 5 are elevations, partly in section, of the armature-shaft. Fig. 6 is a plan of portions of the lower bearing.

Referring to the embodiment illustrated, the principal parts of the mechanism are included in the casing A. The connection-chamber is shown at B. The core is indicated as a whole by the reference-letter C and has poles D D′ approaching each other, between which rotates the disk-armature E on a shaft F. Shunt-coils G G are arranged on a portion of the core, and series coils H H are arranged adjacent to another portion of the core, all as described in detail in my application above referred to. A damping-magnet is indicated at J and coils at K on the poles of the core, the ends of which are connected at L for adjusting the phase relation between the series and shunt magnetism. These parts and their accessories may be variously designed and arranged, as is well known.

An important improvement is made in connection with the lower bearing for the armature-spindle, comprising means for clamping the lower end of the spindle while it is free from the bearing, said means operating, preferably, by a lateral movement—that is to say, at right angles, or approximately so, to the axis of the shaft. This is preferably a spring clamping means and is arranged so that when the bearing is moved to an inoperative position the spring-clamp moves to its operative position, and vice versa. In the example shown the lower bearing M carries the usual yielding block, with a jewel at its upper end resting upon an internal spring, and upon this jewel rests the lower hardened end of the spindle, the bearing M being arranged for screwing up and down as a whole. The clamping or holding device comprises a spring having a flat portion N, held down on the support O by means of a nut P, screwing onto a sleeve Q, which surrounds the bearing M, said spring being narrowed at its ends and bent up to form arms R, with flaring ends S shaped to clamp the lower end of the spindle F against lateral movement. The spring-arms R press inward, and when the bearing M is lowered the ends S are permitted to engage the tapered lower end of the spindle F and hold it yieldingly against either lateral or vertical movement. When, however, the meter is set up for use, the lower bearing M is screwed up to the position of Fig. 4. The upper end of the bearing M engages the arms R below the end of the spindle F and spreads these arms apart, so as to permit the spindle to rest on the jewel of the bearing. The shape of the ends S of the clamping-springs may be such as merely to hold the spindle against lateral movement, or they may be at such an inclination as to lift the spindle until its upper end engages the rigid bearing-sleeve W. With the disk type of armature shown little or no upward movement is desirable, the spindle being preferably clamped in the same position that it would occupy when resting on the jewel. The lifting effect might be made more prominent where the armature or rotor is a cylinder or cup, as in other types of Wood meters. In meters of the disk type, unless the air-gap in the motor-magnet and the air-gap in the drag or damping magnet are in exactly the same horizontal plane, the pressing up of the spindle may cause the disk to strike one of the

magnet-faces before the other, tilting the spindle and throwing a strain on the upper bearing. An important feature of the present construction is that it completely obviates this defect by holding the spindle at exactly the same height as it is held by the jeweled bearing when in use.

The upper bearing for the armature-spindle may be of any suitable construction. As shown, a pivot-pin V is provided engaging the upper end of the spindle and a bearing-piece W, which latter is fastened by a set-screw in the supporting-frame.

An end of the core is carried by a supporting-plate X, to which are attached supports Y Y′, the free ends of which fit frictionally into the coils H, so as to hold the latter in position. It is important to keep the coils H apart from each other, and to this end a spacer Z is introduced, comprising, preferably, a pin attached to the horizontal arm of one or the other of the supports Y Y′.

It is often desirable to change the frequency of the current, and this changes the phase relation, so as to destroy the accuracy of the meter. For example, it is often desirable to change the meter to adapt it from a one-hundred-and-forty-cycle current to a sixty-cycle current. It is seldom necessary in practice, however, to change from a lower to a higher frequency. In order to adapt the meter for higher frequencies, I may interpose an uninductive coil in the shunt-circuit of such dimensions that when removed it will serve to restore the phase relation which has been changed by a change in the frequency of the current measured from a higher standard to a lower. I then provide a line passing around—that is, across between the ends of—said coil normally open and adapted to be closed to short-circuit said coil to adapt the meter for the lower frequency. Such an interposed coil is shown at *a* in Figs. 1 and 2 mounted upon an arm *b*, projecting from a plate *c*, which supports the core. A line *d* extends around the coil *a* with its ends adjacent, but separated, so that they may be soldered together or otherwise connected when the meter is to be used with the lower of the two standard frequencies for which it is adapted. The line *d* might be arranged on either side of *a*.

Though I have described with great particularity of detail a meter embodying the several features of my invention, yet it is not to be understood thereby that the invention is limited to the specific embodiments disclosed. Various modifications thereof in detail and in the arrangement and combination of the parts may be made by those skilled in the art without departure from the invention.

I claim as my invention—

1. In an electric meter, an armature-spindle, a lower bearing therefor, and laterally-movable means for clamping the lower end of the spindle while free from said bearing.

2. In an electric meter, an armature-spindle, a lower bearing therefor, and yielding laterally-movable means for clamping the lower end of the spindle while free from said bearing.

3. In an electric meter, an armature-spindle, a lower bearing therefor, and a separate spring movable laterally of the spindle for holding the spindle while free from said bearing.

4. In an electric meter, an armature-spindle, a lower bearing therefor, and a separate laterally-movable clamping device adapted to hold said spindle at the same height as in use, when the lower bearing is withdrawn.

5. In an electric meter, an armature-spindle, a reciprocable lower bearing therefor, and a spring tending to engage and hold said spindle, said bearing being adapted to engage said spring and withdraw it from engagement with said spindle when the bearing is lifted to its operative position.

6. In an electric meter, an armature-spindle, a reciprocable lower bearing therefor, and spring-arms R tending to engage and clamp said spindle, said bearing being in position to engage and spread said arms to withdraw them from engagement with the spindle when the bearing is lifted to its operative position.

7. In an electric meter, a pair of coils H, supports R R′ therefor, and a spacer between said supports.

8. In an electric meter, a shunt-circuit having a coil interposed therein, and a line passing between the ends of said coil normally open and adapted to be closed to short-circuit said coil.

9. In an electric meter, a supporting-plate *c* for supporting the core, having an arm *b*, and a coil *a* carried by said arm and interposed in the shunt-circuit.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES J. WOOD.

Witnesses:
A. L. HADLEY,
W. H. CRIGHTON.