

W. M. BRADSHAW.  
ELECTRICAL MEASURING INSTRUMENT.  
APPLICATION FILED JAN. 26, 1917.

1,289,102.

Patented Dec. 31, 1918.

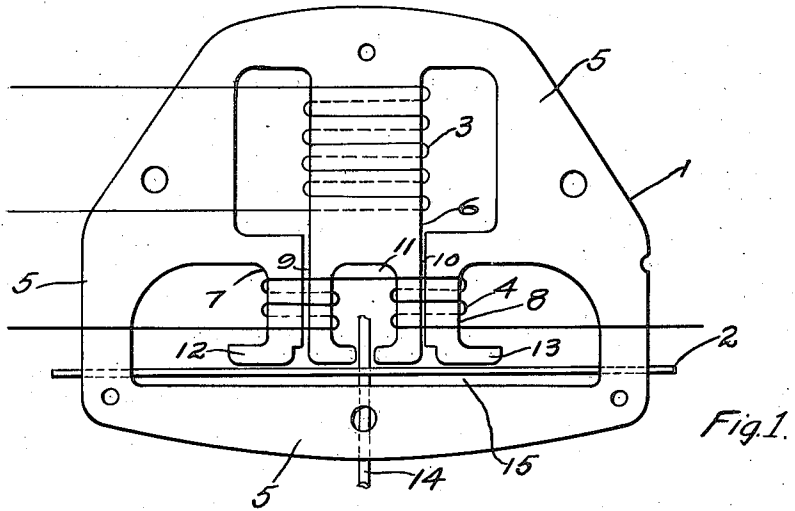


Fig. 1.

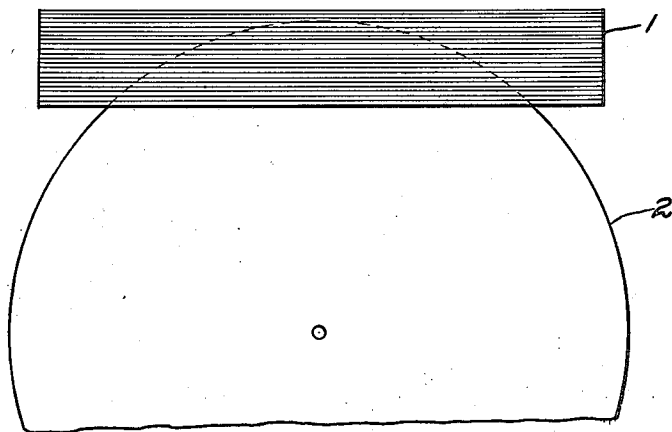


Fig. 2.

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# UNITED STATES PATENT OFFICE.

WILLIAM M. BRADSHAW, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRICAL MEASURING INSTRUMENT.

1,289,102.

Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed January 26, 1917. Serial No. 144,681.

To all whom it may concern:

Be it known that I, WILLIAM M. BRADSHAW, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electrical Measuring Instruments, of which the following is a specification.

My invention relates to electrical measuring instruments and particularly to wattmeters and other similar motor-meters.

One object of my invention is to provide a measuring instrument of the above indicated character that shall be exceedingly simple, compact and light in construction.

Another object of my invention is to provide a measuring instrument of the above indicated character that shall have means for rendering it exceptionally accurate and permanent in its indications.

U. S. Patent No. 1,194,129, granted August 8, 1916 to the Westinghouse Electric and Manufacturing Company upon an application filed March 9, 1912 by William M. Bradshaw and Almon W. Copley, discloses a motor-meter comprising a magnetizable core member having spaced-apart polar projections disposed on one side of the armature. While a motor-meter of this kind gives exceptionally accurate indications over a wide range of fluctuation of voltage and load, there is danger of the keeper becoming displaced with respect to the magnetizable core to thus change the characteristics of the instrument.

In view of the above, I provide a laminated magnetizable core member having a closed-magnetic-circuit outer portion, and inwardly extending polar projections spaced apart at their free ends by air gaps. The armature of the meter is disposed between the polar projections and the outer portion of the core member. By this construction, the return magnetic path is rendered permanent and constant and the absence of air gaps in the outer portion of the magnetizable core member renders the construction relatively more simple and permits the magnetizing current of the potential winding to be decreased.

In the accompanying drawings, Figure 1 is a front elevational view of a motor-meter embodying my invention, and Fig. 2 is a

top plan view of the motor-meter shown in Fig. 1.

The motor-meter embodying my invention comprises, in general, a laminated magnetizable core member 1, an armature 2, a potential winding 3 and a series or current winding 4.

The magnetizable core member 1 is constructed of a plurality of continuous laminations having a closed-magnetic-circuit outer portion 5, a central portion 6 and side portions 7 and 8 that are integral with the outer portion 5 at one end and spaced apart from each other at their free ends by air gaps 9 and 10. A slot 11 is provided near the free end of the central portion 6, and the side portions 7 and 8 are provided with laterally extending horns 12 and 13, respectively. The potential winding 3 is disposed around the central portion 6, and the series or current winding 4 is disposed around the spaced-apart ends of the members 6, 7 and 8.

The armature 2 is mounted on a shaft 14 and is disposed in an air gap 15 between the free ends of the portions 6, 7 and 8 and the outer portion 5. Thus, the outer portion 5 that is adjacent the armature 2 serves as a keeper for the electromagnet.

Since the laminations constituting the magnetizable core member 1 are punched from a continuous piece of metal, the cost of assembling such a device will be materially reduced and the keeper will be maintained in a constant and permanent relation with respect to the other portions of the magnetizable core member and, consequently, the danger of any change in relation between the magnetizable core member and its keeper will be obviated. Since there are no air gaps between the keeper portion of the magnetizable core member and the main portion of the magnetizable core member, it will be understood that the amount of current required to magnetize the same will be materially decreased.

When the windings 3 and 4 are operatively connected to an electrical circuit (not shown) the energy traversing which is to be metered, lines of flux are set up in the central and side portions of the magnetizable core member 1 which pass through the air gap 15 and so cut the armature 2 that the same is caused to turn at a speed propor-

tional to the energy traversing the circuit to be measured. Some of the flux set up by the current traversing the winding 3 traverses the outer portion 5 of the magnetizable core member and thus returns to the inner end of the portion 6 without passing across an air gap in the main portion of the core member. Consequently, the magnetizing current traversing the winding 3 may be relatively small.

While I have shown my invention in its preferred form, it will be understood that various modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. A motor-meter comprising a core member having a closed-magnetic-circuit outer portion, inwardly extending portions separated at their free ends by air gaps, a potential winding surrounding one of the inwardly extending portions and a series winding surrounding the spaced-apart ends of, and the air gaps between the inwardly extending portions.
2. A motor-meter comprising a laminated core member having a closed-magnetic-circuit outer portion, inwardly extending portions separated at their free ends by air gaps, a potential winding surrounding one of the inwardly extending portions and a series winding surrounding the spaced-apart ends of, and the air gaps between the inwardly extending portions.
3. A motor-meter comprising a laminated core member having a closed-magnetic-circuit outer portion, inwardly extending portions separated at their free ends by air gaps, a potential winding surrounding one of the inwardly extending portions, a series winding surrounding the spaced-apart ends of, and the air gaps between the inwardly extending portions, and an armature disposed in an air gap between the free ends of the inwardly extending portions and the outer portion of the core member.
4. A motor-meter comprising a magnetizable core member having a closed-magnetic-circuit outer portion, inwardly extending portions integral with the outer portion at one end and separated by air gaps at their other ends, a potential winding surrounding one of the inwardly extending portions, a series winding surrounding the spaced-apart ends of, and the air gaps between the inwardly extending portions, and an armature disposed between the outer portion of the core and the inwardly extending portions.
5. A motor-meter comprising a core member having a closed-magnetic-circuit outer portion, inwardly extending portions integral with the outer portion at one end and separated from each other at their other ends by air gaps, a potential winding surrounding the inwardly extending portions and a series winding surrounding the spaced-apart ends of, and the air gaps between the inwardly extending portions.
6. An alternating current motor-meter comprising an armature, a magnetizable core having a closed-magnetic-circuit outer portion, a central portion integral with the outer portion at one end, two side portions integral with the outer portion at one end and separated from the central portion at their free ends by air gaps, a potential winding on the central portion and a series winding surrounding the separated ends of, and the air gaps between the central and side portions.
7. A motor-meter comprising an armature, a magnetizable core having a closed-magnetic-circuit outer portion, inwardly extending portions integral with the outer portion at one end and spaced apart at their other ends by air gaps, a potential winding surrounding one of the inwardly extending portions, and series windings surrounding the spaced apart ends of, and the air gaps between the inwardly extending portions, said armature being disposed between the free ends of the inwardly extending portions and the outer portion of the core member.
8. A motor-meter comprising a rotatable armature, a magnetizable core member having a closed-magnetic-circuit main portion, a central and two side portions extending inwardly from the main portion and separated from each other at their free ends by air gaps, a potential winding on the central portions and series windings surrounding the separated ends of, and the air gap between, the central and side portions, said armature being disposed between the free ends of the central and side portions and the main portion of the core member.
9. A motor-meter comprising a rotatable armature, a magnetizable core member having a closed-magnetic-circuit main portion, a central and two side portions extending inwardly from the main portion and separated from each other at their free ends by air gaps, a potential winding on the central portion and series windings surrounding the separated ends of the central and side portions, said armature being disposed between the free ends of the central and side portions and the main portion of the core member.
10. A motor-meter comprising a rotatable armature, a magnetizable core member having a closed-magnetic-circuit main portion, a central and two side portions extending inwardly from the main portion and separated from each other at their free ends by air gaps, a potential winding on the central portion, and series windings surrounding

ing the separated ends of, and the air gaps between, the central and side portions, said armature being disposed between the free ends of the central and side portions and the inner side of the main portion of the core member.

11. A motor-meter comprising a core member having a main portion having no air gaps therein, a central and two side inwardly extending portions integral with the main portion at one end and separated from each other at their free ends by air gaps, a winding surrounding the central portion, and windings surrounding the separated ends of, and the air gaps between, the central and side portions, and an armature disposed between the free ends of the inwardly extending portions and the main portion of the core member.

12. A motor-meter comprising a rotatable 20 armature, a magnetizable core member having a closed-magnetic-circuit main portion, a central portion and side portions joined to the main portion at one end and separated from each other at their other ends 25 by small air gaps, the central portion being provided with a slot in its free end, a potential winding on the central portion, and a current winding surrounding the separated portions of, and the air gaps between, 30 the central and side members, said armature being disposed between the free ends of the central and side portions and the main portion of the core member.

In testimony whereof, I have hereunto 35 subscribed my name this 19th day of January, 1917.

WILLIAM M. BRADSHAW.