No. 622,639. Patented Apr. 4, 1899.

G. A. SCHEEFFER.

ELECTRIC METER.

(Application filed Jan. 20, 1899.)

(No Model.)

Fig. 1

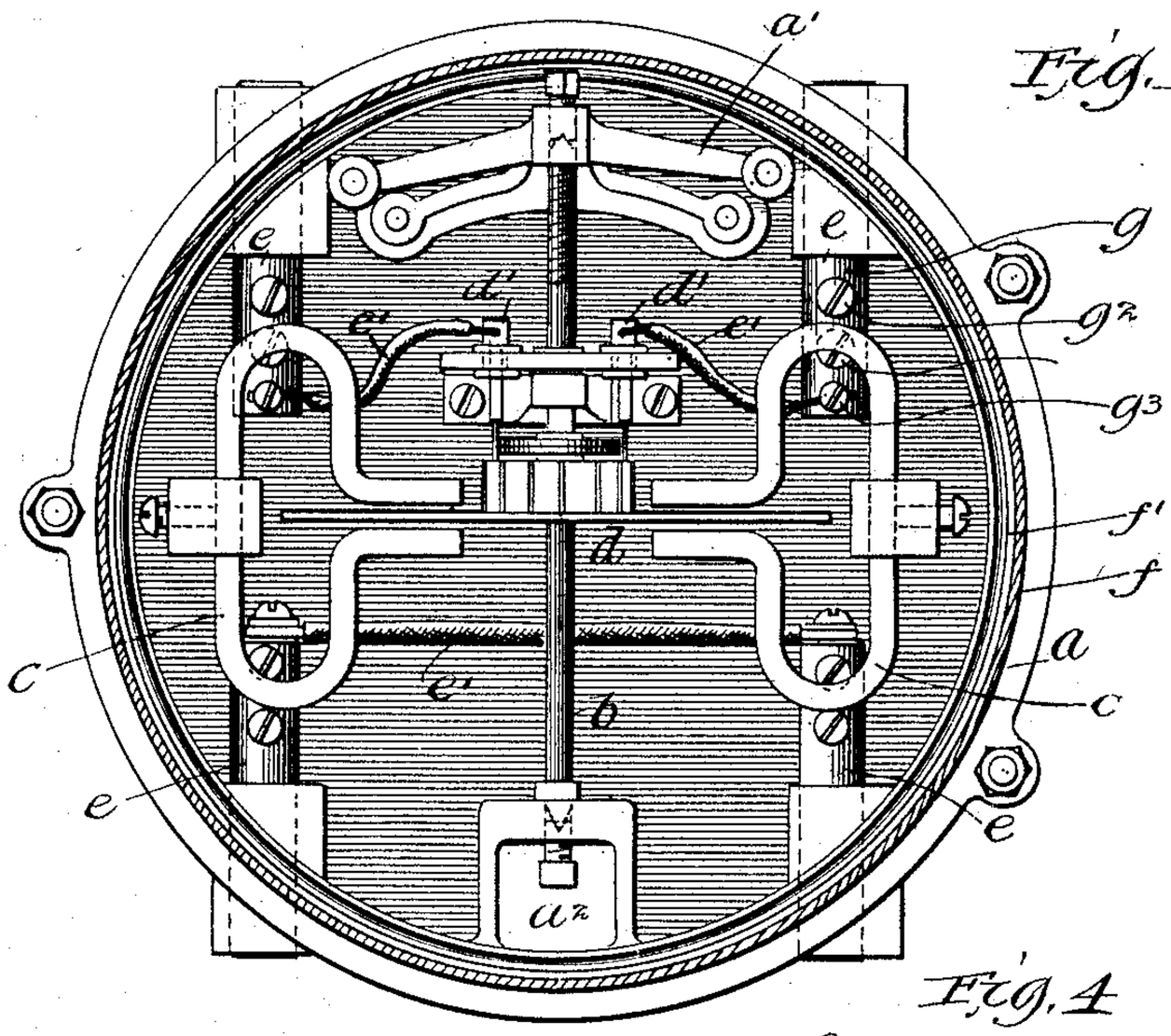


Fig. 2

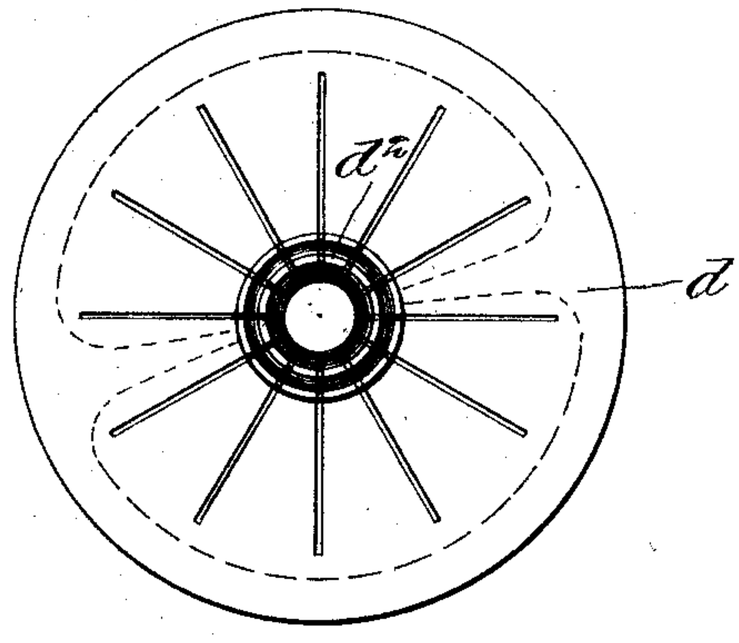


Fig. 3

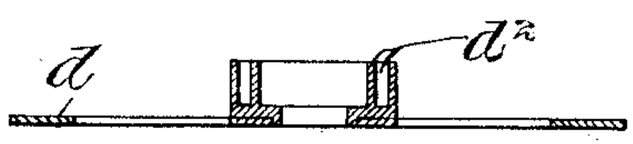


Fig. 4

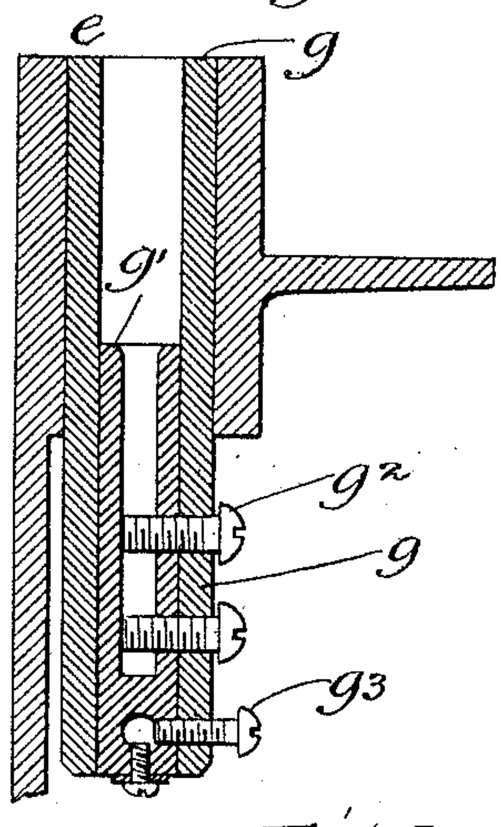
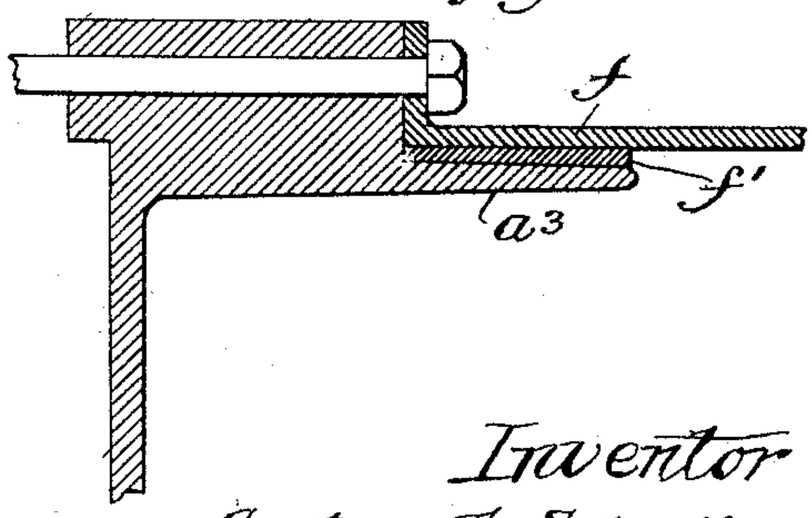


Fig. 5



Witnesses
H. G. Barnett.
Wm. M. Rheem.

Inventor
Gustave A. Scheeffer;
By. Barton & Brown Atty's.

UNITED STATES PATENT OFFICE.

GUSTAVE A. SCHEEFFER, OF PEORIA, ILLINOIS, ASSIGNOR TO THE DIAMOND METER COMPANY, OF SAME PLACE.

ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 622,639, dated April 4, 1899.

Application filed January 20, 1899. Serial No. 702,772. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVE A. SCHEEFFER, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented a certain new and useful Improvement in Electric Meters, (Case No. 10,) of which the following is a full, clear, concise, and exact description.

My invention relates to improvements in electric meters, and has for its object the construction of an instrument of great simplicity and accuracy.

My improvements are directed to various details of construction, which will be explained in connection with a direct-current electric meter embodying my said invention.

I may briefly describe the features of my improved meter, herewith shown as consisting of an annular or disk-like armature, which is provided with centrally-cut slits which, in connection with a mercury contact-making device or commutator, serve to direct the flow of current in said armature, thereby securing its rotation. In order to secure a closure for the meter that is practically hermetic, I have devised two improvements consisting of insulated leading-in plugs situated in the meter-casing to receive the line conductors, the said plugs being provided with conducting-cores, which form air and water tight joints, and, furthermore, I provide engaging faces for the base and removable portion of the meter-casing, which are adapted to form a tight joint when said parts are united, thus completing an effective closure for the contained parts.

My said invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a view in elevation of the meter embodying my invention, the removable casing being removed to show the parts. Fig. 2 is a plan view of the disk armature therein employed. Fig. 3 is a vertical sectional view thereof. Fig. 4 is a detail view in section, showing one of the leading-in plugs; and Fig. 5 is a fragmentary sectional view illustrating the hermetic closure between the casing and base of the meter.

The same letter of reference is employed to designate like parts in each of the several figures of the drawings.

The base *a*, which is preferably maintained in a vertical position, is provided with laterally-extending arms a' a^2, the former of which supports the registering mechanism (not shown in the drawings) and the upper end of the armature-shaft, while the lower carries the end bearing for the armature-shaft *b*. Additional arms support the permanent steel magnets *c*, between the extended poles of which the disk armature *d* of the meter is designed to rotate. The current is led into the meter through the insulating-plugs *e*, disposed within the body of the base *a*, conductors e' serving to connect the plugs within the meter to the brushes d' of the armature. A cylindrical casing *f* is provided, which is adapted to fit down upon a tapering flange or extension a^3 of the base, which serves to close the meter against the entrance of dust, dirt, and moisture. A rubber packing-ring f' preferably is interposed between the engaging faces of the casing and the casing *f* and base *a*, which serves to effect a hermetic seal between the said casing and base. Ears are provided upon the lower rim of the casing, which, being engaged by threaded bolts, serve to secure said casing firmly in position. The means for effecting the closure of the meter are illustrated by the detail sectional drawing designated Fig. 5, the casing and counting-train being removed.

The meter herein described embodying my invention presents the general appearance of Fig. 1. The upper portion of shaft *b* is provided with a worm or other suitable mechanism for communicating motion to the counting-train. Said counting-train is secured upon the upper arm a' behind a glass-covered opening provided in the casing. The disk armature *d*, a plan view of which is shown in Fig. 2, rotates between the poles of two oppositely-disposed permanent magnets *c*, the said armature preferably consisting of a copper disk which is provided with an annular mercury-well d^2, formed of two concentrically-disposed tubular extensions soldered upon the said disk. The disk and the mercury-

well are provided with slits or saw-cuts which extend nearly to the periphery or rim of the disk and divide the same into twelve equal portions or segments. The walls of the mercury-well are also intersected by slits or saw-cuts which divide the disk armature, thereby forming segments of a commutator device, which segments are electrically connected with corresponding segments of the disk. The slits in the walls of the mercury-well are filled with a composition or other suitable insulating material to prevent the escape of the body of mercury disposed therein. Depending wires connect the brushes d' with the mercury in the well. It will accordingly be apparent that the mercury-well, with the attached tubular extensions, forms a commutator, while the segmental disk is, in effect, a drum-wound armature, so that the current led in from the line and through the armature, as indicated by the dotted lines in Fig. 2, is subjected to magnetic fields of force maintained by the permanent magnets, thereby causing the rotation of the meter at a rate corresponding to the current flowing in the measured circuit. The annular mercury-well d^2 is purposely constructed of narrow width, so that the resistance of the mercury therein is relatively very much greater than that of the external circuit through the disk armature, and as a result the current is almost entirely directed in its flow between the brushes through the copper disk, as indicated by dotted lines in Fig. 2.

In Fig. 4 is shown a detail of the improved leading-in plug of my invention, which consists of a fiber bushing g, which fits tightly within the body of base a, the said bushing being closed at its inner end by a brass plug g', fitting tightly within the bushing. The inserted brass plug is longitudinally bored for a portion of its length to receive the line conductor or main, which is held in position within the plug by means of screws g^2. A transverse bore is provided near the inner extremity of the bushing and the inserted plug for the reception of the conductor e' or such other conductors as may be necessary, the binding-screw g^3 serving to hold the latter in position and maintain the electrical continuity of the circuit through the plug.

From a consideration of the above it will be seen that my meter is of extreme simplicity, combining, as it does, very few parts which individually are of simple construction. The means employed therein, moreover, for securing the meter against the entrance of moisture, dirt, and other foreign substances are highly efficient, since it will be seen that the plug and the casing mechanically close all access to the meter when the same are in position. Inasmuch as the latter are necessarily removed at intervals I preferably employ, in connection with the tapered engaging surfaces, a soft-rubber ring to effect the closure of the meter.

It will be understood, of course, that this construction lends itself to any form of meter. Furthermore, the slitted disk armature of my invention may be altered in form to suit requirements—as, for example, it may be shaped to form a cylinder with a continuous lower conducting-rim.

It is obvious that departures may be made from the precise apparatus herein shown and described without departing from the spirit of my invention, and I do not desire to be understood as limiting the same merely to the form of apparatus herein shown and described, but claim the same, together with such modifications as may be made by mere mechanical skill.

I claim—

1. The herein-described motor-armature consisting of a metallic disk or plate provided with radial saw-cuts or slits extending nearly to the periphery of said disk, in combination with a suitable commutator device for supplying current to the individual segments or portions of the said armature.

2. The herein-described armature consisting of a metallic disk or plate provided with radial saw-cuts or slits extending nearly to the periphery of said disk, in combination with a mercury commutator device consisting of conducting-segments electrically connected with the individual segments of the disk, a body of mercury in electrical connection with the former segments and brushes engaging the said armature.

3. An armature for electric-motor devices consisting of a metallic sheet provided with saw-cuts or slits extending to an integral or electrically-continuous rim and a commutator device for supplying current to the separated portions of the metallic sheet, substantially as described.

4. An armature for an electric motor consisting of metallic segments connected to a continuous rim in combination with a commutator adapted to supply current to said metallic segments, substantially as described.

5. In an armature for an electric-motor device, the combination with a disk or sheet of metal provided with a plurality of saw-cuts or slits extending to an electrically-continuous rim and dividing the same into electrically-separated portions or paths for the flow of current, of a body of mercury in electrical contact with the said portions and commutator mechanism for directing the flow of current through the armature, substantially as described.

6. In a device of the class described, the combination with a metallic disk provided with radially-disposed saw-cuts or slits extending nearly to its periphery or rim, of tubular extensions cut by the said slits or saw-cuts, the individual segments thereof corresponding and being electrically connected with the segments of the said disk, a body of mercury disposed between the said tubular extensions and brushes engaging the said mercury, substantially as described.

7. In a leading-in plug, the combination with an insulating-bushing g, of a metallic fitting or plug g' mechanically closing the said bushing and binding-screws provided in the said plug adapted to effect the connection of an electrical circuit at or near either extremity of the plug, substantially as described.

8. The combination in a plug of the class described with a bushing g of insulating material adapted tightly to fit within a bore or opening of a metallic plug g' fitting tightly within the said bushing, said plug mechanically closing the opening in the bushing and being bored to receive electrical conductors at either end of the plug and binding-screws adapted to secure the conductors in position within the plug, substantially as described.

9. In a plug of the class described, the combination with an insulating socket or bushing g, of a conducting-core g' mechanically closing the said bushing and means for connecting the said conducting-core at either extremity of the device with the conductors of an electrical circuit, substantially as described.

10. In an electric meter, the combination with a base a having an extended flange a^3, of a casing f adapted to fit upon the flange, an inclined engaging face being provided between the flange and casing whereby a tight joint is insured between the said parts and means for securing their engagement to effect the hermetic seal of the contained meter, substantially as described.

11. In an electric meter, the combination with a base a carrying the meter mechanism, said base being provided with an extended flange a^3, of a casing adapted to fit upon the flange and inclose the meter mechanism, an inclined engaging face being provided between the flange and casing, a gasket or ring of packing material interposed between the said faces and means for securing the close engagement of the parts whereby the meter mechanism is hermetically sealed, substantially as described.

12. The herein-described meter-closure consisting of an annular flange a^3 provided upon the base of the meter, a casing adapted to be placed over the said flange, an inclined engaging face being provided between the flange and casing, an interposed ring f' of packing material and means for securing the close engagement of the parts whereby the meter is hermetically sealed, substantially as described.

In witness whereof I hereunto subscribe my name this 17th day of January, A. D. 1899.

GUSTAVE A. SCHEEFFER.

Witnesses:
GEORGE L. CRAGG,
A. L. LAWRENCE.