

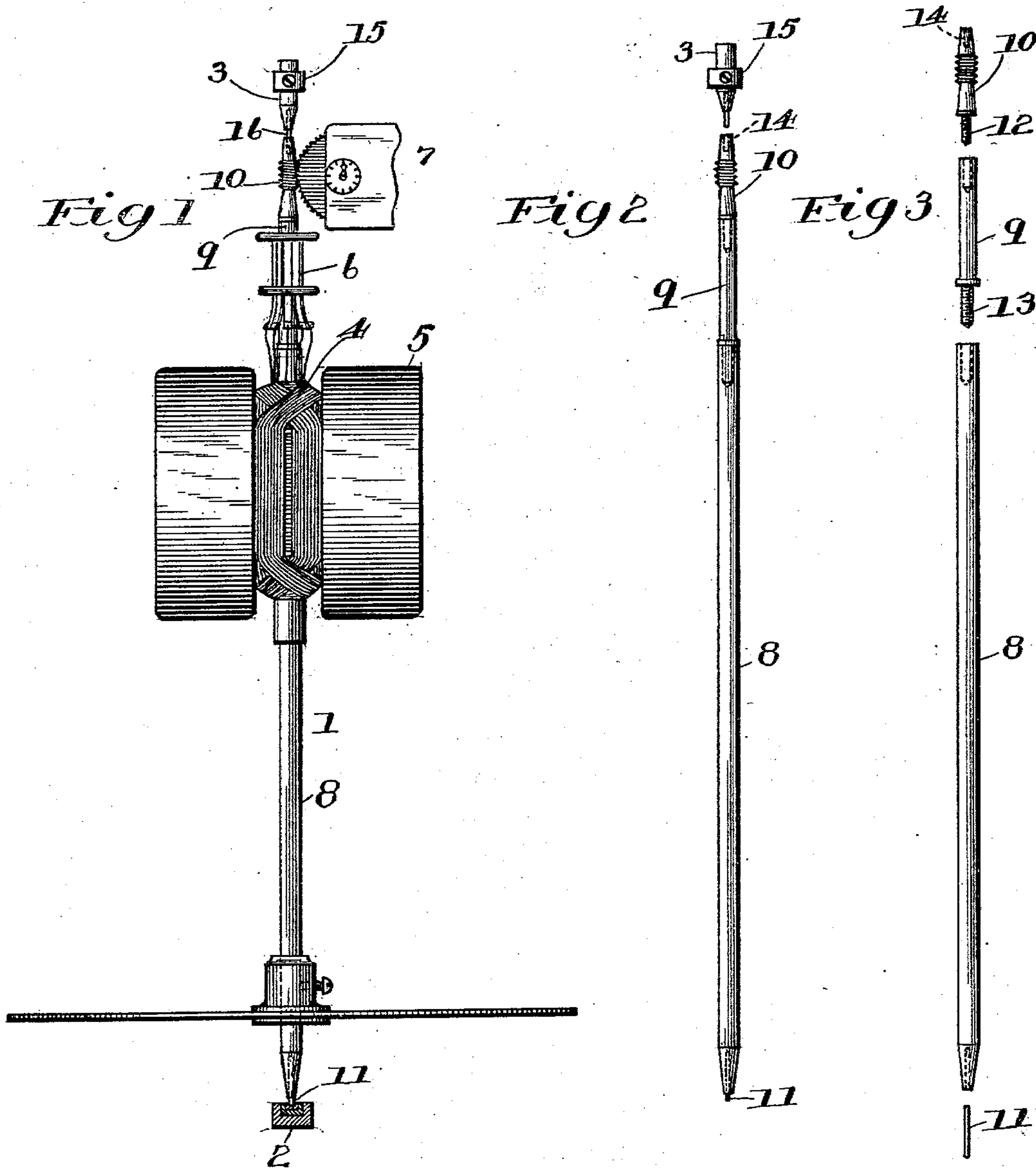
No. 753,193.

PATENTED FEB. 23, 1904.

T. DUNCAN.
ELECTRIC METER.

APPLICATION FILED OCT. 23, 1903.

NO MODEL.



Witnesses:
Carl H. Crawford
Leon Stroh.

Inventor:
Thomas Duncan
by G. L. Cragg
his Attorney

UNITED STATES PATENT OFFICE.

THOMAS DUNCAN, OF LAFAYETTE, INDIANA.

ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 753,193, dated February 23, 1904.

Application filed October 23, 1903. Serial No. 178,248. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DUNCAN, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, have invented a certain new and useful Improvement in Electric Meters, 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 motor-meters, and has for its object the provision of an improved construction of the revoluble elements thereof, to avoid expense, delay, and trouble hitherto attendant upon the repair of such elements, and to facilitate the assembly of the component parts of such elements.

One feature of my invention relates to the construction of a shaft or spindle bearing point, and is of particular service in the formation of the lower spindle-bearing. As is well known, the friction of the lower spindle-point upon its jewel produces a wearing or roughening of the surfaces of both, causing the meter to depart from correct speed. This result frequently necessitates both a new jewel and a new lower spindle-point. In meters as at present constructed the spindle-point is screwed into the lower end of the body of the spindle and requires, as a rule, a special tool for its removal. In my present invention I form the lower end of the shaft with a smooth axially-disposed recess and insert therein a hardened point or pin, preferably formed of metal and having a diameter very nearly the diameter of said recess, so as to form a fit which while fairly close is not so tight as to prevent the point or pin from being plucked from the spindle-body by the fingers or tweezers. This pivot-point may be held in place by putting a little oil or other liquid packing upon it, so that said point may be held in place by suction. As said point is smooth, it will cooperate with the smooth wall of the recess and the liquid packing in thus being kept in position. I most desirably, however, form said separable pivot-point of steel piano-wire and magnetize it, said point thus being held in place by magnetic attrac-

tion, as the spindle-body portion in which the point is inserted is most desirably made of steel, which may also be magnetized.

A second feature of the invention resides in making the portion of the meter-spindle upon which the armature is mounted in a section distinct from the portion of the spindle upon which the worm is formed and also preferably distinct from the section of the spindle upon which the commutator is mounted.

A third feature of the invention resides in making the portion of the spindle having the worm formation in a section distinct from the section carrying the armature and also preferably distinct from the section carrying the commutator—that is, in the preferred embodiment of my invention the meter-spindle is preferably constructed to have all of the characteristics described in connection with the second and third features of the invention. The section carrying the armature is preferably caused to have separable union with the section carrying the commutator by providing a threaded stem upon one of these sections and a threaded recess upon the other section to effect such separable union. The worm portion of the spindle is preferably caused to have separable engagement with the balance of the spindle in a similar way. Thus in the preferred embodiment of the invention the armature, commutator, and worm are each provided upon a spindle-section of its own. By this construction many advantageous results are secured. It frequently happens that the commutator becomes damaged by lightning, handling, or may be grounded to the spindle after the meter has been put into service. In such event it was hitherto necessary to remove the entire revoluble element, including spindle, armature, worm, &c., and return the same to the factory for repair, causing delay and expense. By means of my invention it is only necessary to remove the section of the spindle supporting the commutator and replace this section by a new section carrying a commutator, or a new commutator may be placed upon the old portion of the old commutator, repaired, and again placed in position. The worm upon the spindle also becomes damaged at times, hitherto

necessitating an entirely new spindle and occasioning extra expense in the removal of the damping-disk, commutator, and armature and their relocation upon the new spindle. By means of my invention it is only necessary to unscrew the portion of the spindle having the damaged worm and substituting a new section for that removed. This feature of the invention is also serviceable, as the worms frequently become rusty, making it desirable to repolish the same unless the rust has cut too deep and in the latter event to replace the worm altogether, the invention enabling the balance of the spindle and its associated parts to be saved undisturbed.

Another feature of my invention resides in improving the construction of the upper bearing of the meter. In the construction of this portion of the meter now adhered to the upper portion of the spindle is reduced in size to constitute a bearing-pin integral with the balance of the spindle. It frequently happens that this upper spindle-pin, being thus an integral part of the spindle, becomes bent and often broken off, in which case an entirely new spindle has to be provided. Even when the pin becomes bent in present meters it often breaks off in the effort to straighten it. In accordance with my invention I provide a smooth bore or recess in the upper end of the spindle and insert a bearing-pin therein, that is held in place in any suitable manner. This pin is preferably though not necessarily separably secured to an adjustable head or bearing-plug, said pin being desirably afforded fixed engagement with said head by having screw-threaded engagement therewith. If preferred, however, the pin may be pressed into the head. The head itself is adjustably held in place, preferably, by means of a set-screw passing through a stationary frame or bracket portion of the meter structure. The pin, which is most desirably of metal—phosphor-bronze or brass being preferred—may be readily removed and replaced within the head or plug if it should become bent or broken, or a new head provided with a new pin may be used.

My invention will be more fully understood by reference to the accompanying drawings, in which—

Figure 1 is a view in elevation of the rotating element of the spindle constructed in accordance with the invention, a field-winding subdivided into two field-coils being illustrated. Fig. 2 is a view in elevation of the meter-spindle stripped of the parts it carries. Fig. 3 is a view similar to Fig. 2, excepting that the sections of the spindle are separated.

Like parts are indicated by similar characters of reference throughout the different views.

The meter-spindle 1 is shown in association with its lower and jewel bearing 2 and its up-

per bearing 3. The armature 4 is shown upon the spindle within the field-winding subdivided into coils 5 5. The commutator 6 for the armature is in this instance shown above the armature, the armature being mounted upon the body portion 8 of the spindle, while the commutator is mounted upon the spindle-section 9, having separable engagement with said body portion. The worm that drives the counting-train (only one wheel 7 thereof is indicated) is provided upon a third spindle-section 10. The spindle-sections 10 and 9 are in this instance provided, respectively, with reduced threaded stems 12 and 13, that enter correspondingly-threaded recesses in the sections 9 and 8, respectively, this being the preferred way of securing separable connection between the spindle-sections.

I provide the improved pivot-point 11, that is preferably located at the lower end of the spindle. This pivot-point is preferably made of metal and is desirably made very smooth and of a diameter very close in measurement to the diameter of a recess formed in the lower end of the spindle for the reception of the spindle-point. Said recess is sufficiently shallow to prevent all of the point from being contained in the shaft, a portion projecting from the shaft to engage the lower bearing. Oil or other liquid packing may be used to hold the point in by suction, or magnetic suction may be had by making the point of steel and magnetizing it, the shaft, being also of steel, securing the point in position.

The upper end of the spindle is provided with a recess 14, which is preferably smooth and which separably receives a smooth bearing-pin 16, preferably made of hard drawn phosphor-bronze carried by the bearing-plug or head, that is adjustably secured within the bracket or frame portion 15.

It will be unnecessary to recapitulate the advantages of the construction just described, as the same will be readily understood from the introduction.

It is obvious that changes may readily be made without departing from the spirit of my invention, and I do not wish, therefore, to be limited to the precise construction shown; but,

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. In a motor-meter, the combination with the armature thereof, of a commutator for the armature and a spindle for the armature and commutator, said spindle being formed of three separable sections, one carrying the armature, another, the commutator and the third the worm for operating the measuring element, substantially as described.

2. In a motor-meter, the combination with the armature thereof, of a commutator for the armature, and a spindle for the armature and commutator, said spindle being provided with

a worm for operating the measuring element and formed of separable sections, one carrying the commutator and another the worm, substantially as described.

5 3. In a motor-meter, the combination with the armature thereof, of a spindle therefor provided with a worm, and formed in separable sections, one section carrying the armature and the other the worm, substantially as described.

10 4. In a motor-meter, the combination with the armature and commutator of the meter, of a spindle therefor divided into separable sections, one carrying the armature, and the other the commutator, substantially as described.

15 5. In a motor-meter, the combination with the spindle thereof, formed of magnetic material, of a magnetized bearing-pin therefor, a recess being provided in one end of the spindle in which the pin is removably received, substantially as described.

20 6. In a motor-meter, the combination with the spindle thereof formed of magnetic material, of a magnetized bearing-point therefor removably held upon the spindle by its magnetic attraction, substantially as described.

25 7. In a motor-meter, the combination with the spindle thereof formed of magnetic material, of a bearing-pin therefor having mag-

netic material in its formation removably held 30 in position upon the spindle by magnetic attraction, substantially as described.

8. In a motor-meter, the combination with the spindle thereof, provided with a recess in one end, said recess having a smooth interior, 35 of a bearing-pin with a smooth exterior held within said recess by suction, substantially as described.

9. In a motor-meter, the combination with the spindle thereof provided at its upper end 40 with a recess, of an upper bearing-pin stationarily and adjustably mounted and projecting within said recess, substantially as described.

10. In a motor-meter, the combination with the spindle thereof provided at one end with 45 a recess, of a bearing-pin held in said recess by suction, substantially as described.

11. In a motor-meter, the combination with the spindle thereof provided at its upper end 50 with a recess, of an upper bearing-pin stationarily mounted and projecting within said recess, substantially as described.

In witness whereof I hereunto subscribe my name this 23d day of September, A. D. 1903.
THOMAS DUNCAN.

Witnesses:

CHARLES JONES,
BLANCHE A. MILLER.