C. E. NORTON.

ELECTRICAL MEASURING INSTRUMENT.

APPLICATION FILED MAR. 7, 1913.

1,195,712. Patented Aug. 22, 1916.

Fig. 1.

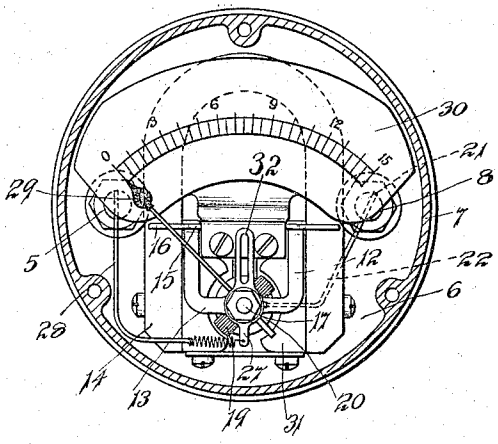


Fig. 2.

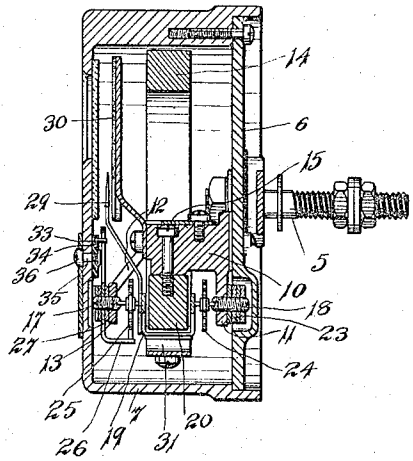


Fig. 3.

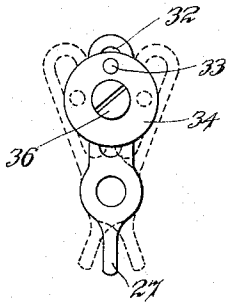
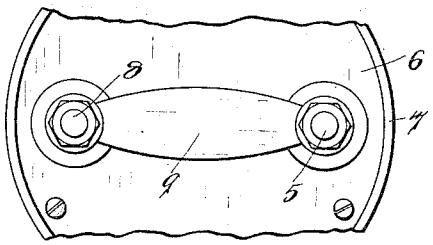


Fig. 4.



Fig. 5.



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ELECTRICAL MEASURING INSTRUMENT.

1,195,712. Specification of Letters Patent. Patented Aug. 22, 1916.

Application filed March 7, 1913. Serial No. 752,673.

To all whom it may concern:

Be it known that I, CHARLES E. NORTON, a citizen of the United States, and a resident of Manchester, in the county of Hartford and State of Connecticut, have invented a new and Improved Electrical Measuring Instrument, of which the following is a specification.

My invention relates to the class of devices above named, and an object of my invention, among others, is to provide a device of this kind that shall be simple in construction, and especially one in which the danger of injury in the setting up or manipulating of parts shall be reduced to a minimum.

One form of device embodying my invention, and in the construction and use of which the objects above set out, as well as others, may be attained, is illustrated in the accompanying drawings, in which—

Figure 1 is a view in front elevation of my improved instrument, the case being cut in section to show construction. Fig. 2 is a view in cross section through the same. Fig. 3 is a detail view showing the operation of the adjusting lever. Fig. 4 is a detail view illustrating the magnet supporting plate. Fig. 5 is a detail rear view of a portion of the instrument.

In the accompanying drawings the numeral 6 denotes a base plate constructed of any suitable material and of any desired shape, preferably of metal and circular as to form, and a case 7 is secured to the base plate to inclose the operative parts of the structure, the base plate having binding posts 5—8, constituting positive and negative terminals for the instrument, extending from the back of the base plate.

A support 10 for the operative parts of the device is secured to the base plate as by means of screws projecting through the base plate, and insulated therefrom, into this support. An arm 11 projects downwardly from the crosswise center of the support, and a frame consisting of side parts 12 and a cross bar 13, preferably integral with the support, projects obliquely downward therefrom, as shown in Fig. 2 of the drawings. A magnet 14 is secured to this support, its legs straddling and closely fitting the support on opposite sides thereof, a magnet retaining plate 15 having forked ends 16 being secured to the top of the support and the legs of the magnet being located within the forked ends of said plate.

The cross bar 13 constitutes the forward support for one end of an oscillating spindle, that is supported in a recess in a stud 17, screw threaded to fit a screw threaded hole in the cross bar 13, and the arm 11 affords a support at the back for the opposite end of said spindle located in a recess in a stud 18 screw threaded into said arm. The spindle is separated into two parts that are connected by an armature or rotor 19 extending around a core 20 secured to the support 10 and constituting a stator. The core 20 is located between the pole pieces 31 secured to the support 10, the legs of the magnet 14 being secured to the pole pieces.

A shunt 9, common to devices of this kind, connects the binding posts 5 and 8. The general operation of this shunt in connection with the instrument is well known and detailed description is therefore unnecessary herein, and the shunt may be employed in any of the various ways common to devices of this class. In the operation of the device it is found that a shunt having its cross-sectional area unvaried from end to end frequently becomes objectionably heated, but I have demonstrated that by increasing the cross-sectional area at a point or points between the terminals that this heating is lessened to a material degree. In the preferred form of construction and as shown herein the cross-sectional area is greatest midway between the terminals, the increase being disposed on curved lines, but it is not essential to the invention that it shall be so formed or located.

The electric current is conducted from the positive terminal post 8 by the positive wire 22 to an anchoring piece 23 supported by the stud 18, the wire 22 being secured to one end of the anchoring piece, the opposite end of which is secured to the outer end of a coiled spring 24, the inner end of said spring being secured to the oscillating spindle on one side of the rotor while the inner end of a similar spring 25 is secured to said spindle on the opposite side of said rotor, the outer end of said spring being connected with the foot 26 of an adjusting lever 27 mounted upon and supported by the stud 17. A negative wire 28 conducts the current from the spring 25, through the foot 26, to the negative binding post 5. An indicating hand or pointer 29

is secured to rotate with the spindle, its outer or indicating end overlying a dial 30.

The general construction and operation of the parts herein described are old and well known, my invention, as to this part of the mechanism, consisting in the form and manner of mounting and arranging the parts.

Various means have heretofore been applied for moving the adjusting lever 27 to properly locate the hand or pointer with respect to the dial 30 by means of an adjusting member located outside of the case. Such prior means have not, however, according to my knowledge, been provided with any means for preventing an excessive throw of such adjusting lever to the detriment of the parts. My improved mechanism herein shown provides means whereby any injury to the parts in the operation of the adjusting member is avoided. In carrying out this part of my invention the adjusting lever 27 is provided with a slot 32 into which a crank pin 33 projects from a disk 34 secured to an adjusting screw 35, the head 36 of which is located outside of the case. It will be noted from this construction that in turning the disk 34, by means of the screw 35, when a certain amount of throw has been imparted to the lever 27, which will not be sufficient to disarrange or injure the parts, a continued turning movement of the screw 35 will move the lever in the opposite direction, and that the arrangement is such that a continued movement of the screw 35 will result in moving the lever backward and forward to its fullest extent without disarrangement or injury to the parts.

The plate 15 having its ends forked or recessed to retain the magnet 14 in an upright position constitutes another feature of my invention together with the supporting base having the downwardly projecting arms in which the armature is mounted. The shunt gradually increasing from its point of connection to its lengthwise center for the purpose of reducing the heating qualities also forms an important part of my invention.

It will be understood that a device need not be constructed in exact accordance with that herein shown to embody my invention, and that, therefore, said invention will be present in devices constructed differently from that herein disclosed.

I claim—

1. In an electrical measuring instrument, a base plate, a supporting base secured to said plate, a magnet retaining plate removably attached to said supporting base and having forked ends, a magnet supported by said supporting base and having its legs received within the forked ends of said retaining plate, and an armature mounted on said supporting base.

2. In an electrical measuring instrument, a base plate having a recess, a support removably secured to the base plate and having an arm located opposite said recess, a supporting frame projecting from the front of said supporting base and having a cross bar located opposite said recess, a stud located in said arm and projecting into said recess, an armature spindle supported at one end in said stud and at its opposite end in said cross bar, an armature supported by said spindle, and a magnet supported with said armature located between its ends.

3. An electrical measuring instrument including a base plate, a supporting base removably secured to the base plate, an arm projecting from the supporting base, a frame located at the front of said supporting base and projecting obliquely therefrom and having a cross bar located opposite said arm, an armature rotatably supported on said cross bar and arm, a magnet retaining plate removably secured to said supporting base and having forked ends to support a magnet, and the magnet supported by said supporting base and having its arms located in said forked ends of the retaining plate and with its lower ends located on opposite sides of said armature.

4. In an electrical measuring instrument, a base plate, a supporting base secured to said plate, said supporting base having a frame projecting therefrom, and the whole forming a unit removably secured to the base plate, a magnet retaining plate removably attached to said supporting base and having forked ends, a magnet supported by said supporting base and having its legs received in the forked ends of said retaining plate by which it is retained in an upright position, bearings on said supporting base, an armature supported in said bearings, and an indicator connected with the armature.

5. In an electrical measuring instrument, a negative and a positive conductor, and a shunt extending between said conductors and having a gradually increased cross-sectional area between the points of its connection with said shunt.

6. An electrical measuring device including a positive and a negative conductor, and a shunt connecting said conductors and having a gradually increased cross-sectional area between its terminals.

7. In an electrical measuring instrument, positive and negative terminals, and a shunt extending across said terminals and having a gradually increased cross-sectional area between said terminals.

8. In an electrical measuring instrument, positive and negative terminals, and a shunt extending across said terminals and having its cross sectional area gradually increased from the points of connection with each terminal toward the lengthwise center thereof.

9. An electrical measuring instrument in-

cluding a supporting base, a frame including side parts secured to and projecting from said base, a cross bar located at the outer ends of said side parts, an armature rotatably supported at one end by said bar, means for supporting the opposite end of said armature, a pointer projecting upwardly from said armature and between the side parts of said frame, and a magnet having its ends located on opposite sides of said armature.

10. An electrical measuring instrument including a supporting base, a frame projecting from said base and having side parts and a cross bar, the latter being offset from that part of the frame that is attached to said base, an armature rotatably supported at one end by said bar, means for supporting the opposite end of the armature, a pointer projecting upwardly from said armature and between the side parts of said frame, and a magnet having its ends located on opposite sides of said armature.

11. An electrical measuring instrument including a supporting base, a frame, including side parts and a cross bar, projecting in an oblique direction from the front of said base, an armature rotatably supported at one end by said bar, means for supporting the opposite end of the armature, a pointer projecting upwardly from said armature and between the side parts of said frame, and a magnet having its ends located on opposite sides of said armature.

12. An electrical measuring instrument including a base plate, a supporting base removably secured thereto and having an arm projecting therefrom, a frame including side parts and a cross bar and projecting in an oblique direction from the front of said supporting base, an armature rotatably supported at one end in said arm and at its opposite end in said frame, a pointer projecting upwardly from said armature and between the arms of said frame, and a magnet having its ends located on opposite sides of said armature.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."