

No. 606,795.

Patented July 5, 1898.

W. STANLEY & F. DARLINGTON.
ELECTRIC METER.

(Application filed Jan. 13, 1898.)

(No Model.)

Fig. 1.

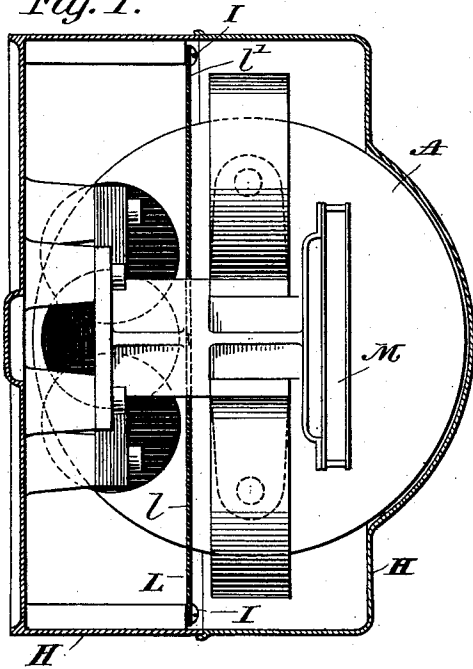


Fig. 2.

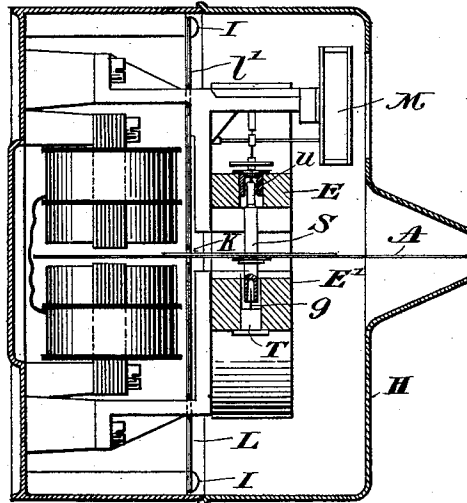
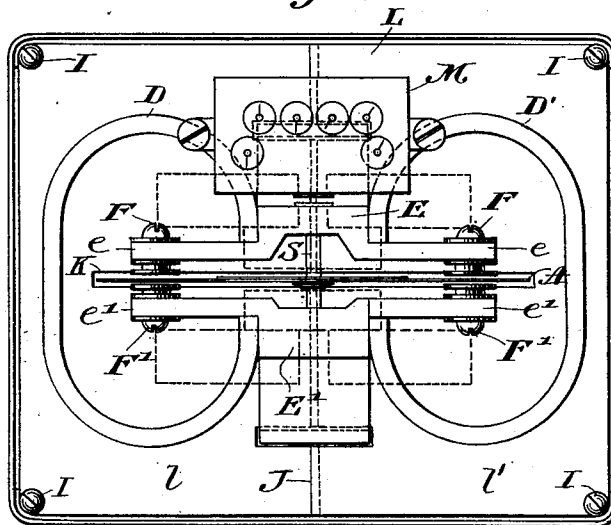


Fig. 3.



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ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 606,795, dated July 5, 1898.

Application filed January 13, 1893. Serial No. 666,520. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM STANLEY, residing at Pittsfield, and FREDERICK DARLINGTON, residing at Great Barrington, Berkshire county, Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Electric Meters, of which the following is a full, clear, and exact description.

Our invention relates to improvements in electric meters, and has for its objects to provide a new and improved construction for magnetically suspending the meter-disk, to provide a new and improved construction for the permanent braking-magnet, and to provide an otherwise improved meter, as hereinafter specified.

The following is a description of a meter embodying our invention, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is a side elevation, partly in section; and Fig. 3 is a front elevation.

Referring first to the improved means for magnetically suspending the meter-disk, A is a disk to be suspended, being preferably a thin aluminium disk. S is a shaft on which it is mounted. This shaft is made of iron or steel and projects above and below into round recesses in the suspending magnetic system D E D' E'. At the lower end it projects bodily for quite a distance into the recess in a portion of E'. At the upper end it is very much reduced in diameter, so that the bulk of it does not enter the recess at all, but only a sufficient amount passes for the purpose of forming a reduced bearing and support for the gear-wheel which engages with the counting mechanism. The lower end of the shaft is held in a central position by the small pin g, passing through the plug T. The upper end is held in a central position by the circular bearing-surface u in the recess in the part E. The magnetic system is such that the part E is of one polarity and the part E' is of the opposite polarity, so that the lines of force will pass from E through the shaft S to the part E'. Inasmuch as the portion of the shaft S which enters the recess in the part E is of small size, substantially all the lines of force

from the part E act directly upon the body of the shaft S and tend to draw it as a whole upward, and when the parts are rightly proportioned, as shown, this tendency is sufficient to lift the shaft S, together with its disk A, so that these parts are entirely suspended, with the result that there is practically no friction. The bearings at the top and bottom act simply to hold the shaft S concentric with the cavities in the parts E E'. Since the lower end of the shaft S enters the cavity in the part E' for quite a distance, the magnetic attraction due to the polarity of the part E' does not exert a downward pull upon the shaft. It will be seen that this construction is at once very simple and can be manufactured with ease and accuracy. In the manufacture of this we may make the upper reduced portion of the shaft S of non-magnetic material, in which case the upward pull due to the polarity of the part E will be stronger for the same proportions.

The magnetic system heretofore referred to consists of the magnets D D' and the connecting parts E E'. These parts have an additional function entirely separate and distinct from that which they perform in connection with magnetically suspending the disk—to wit, the function of supplying a magnetic flux used to dampen the rotation of the disk. Heretofore a somewhat similar magnetic system has been used for dampening purposes. We refer particularly to that shown in patent to William Stanley, No. 590,777, dated September 28, 1897. In that construction, however, there were adjustable projections which could be moved toward and from the disk on which the braking effect was exerted. These projections were screw-threaded into recesses directly in the bodies of the permanent magnets, which are of very hard steel. It was found that in such a construction the difficulty of making and screw-threading these recesses was so great as to offer an obstacle to economical manufacture. In order to remove this difficulty, we have made a construction in which there are permanent magnets D D', having their like poles connected with soft-iron pole-pieces E E', which have projecting arms e e'. Since these

parts are of soft iron, there is no difficulty in drilling and tapping the same to receive the adjustable projecting pieces $F F'$, and yet the advantages of this style of vertical adjustable magnetic brake are preserved. In carrying out this construction it will be seen that the magnets $D D'$ are bolted rigidly to the parts $E E'$ and that the extensions $e e'$ are drilled and tapped so as to receive the shanks of the adjustable iron projections $F F'$, whereby the air-gap in the parts of the magnetic circuit between the projections $F F'$ can be varied and the flux through the disk, together with the brake effect due thereto, correspondingly regulated.

In connection with our experiments with meters of this type we have observed that the stationary permanent magnets and the inducing-coils exert a disturbing influence upon one another. In order to provide against any such disturbance, we have therefore placed between the coils and the permanent magnet a screen L , which is of magnetic material and separates as completely as possible the energizing-coil from the permanent magnet. The effect of this magnetic disk is to prevent any free lines of force from the energizing-coils reaching the permanent magnet and to prevent the permanent magnet from in any way affecting the magnetic system of which the energizing-coils form a part, since all the lines of magnetic force from either part are intercepted and carried off by the shield of magnetic material. This magnetic shield is made of two portions $l l'$, which are screwed to the meter-frame at $I I$, the division being on the line J . Each of these parts contains a slit K , permitting the passage of the disk A . This magnetic shield construction is claimed in our application, Serial No. 681,603, which is a division of this case.

The counting mechanism M is supported

from the upper arm of the meter-framework and is connected with the shaft S by a suitable gearing in the ordinary manner. The whole meter is inclosed in a protecting iron casing H , which, together with the magnetic screen L , forms two chambers, within one of which is a system of actuating-coils, while within the other is the magnetic system, the one being separated from the other.

What we claim is—

1. Means for supporting a rotating body consisting of a permanent magnetic system having polar portions with recesses therein, a cylindrical shaft having its lower end projecting a considerable distance into the lower polar portions of said system, and the body of its upper portion being substantially at the mouth of the upper recess, and means for holding the ends of said shaft concentric with said recesses, substantially as described.

2. In an electric meter, a magnetic brake consisting of a rotating disk mounted upon the shaft to be retarded, and a permanent magnetic system having a permanent magnet provided with a soft-iron pole-piece and adjustable projections engaging with said soft-iron pole-piece, substantially as described.

3. In an electric meter, a braking device consisting of a disk mounted upon the shaft to be retarded, two permanent magnets having their like poles connected by soft-iron pole-pieces, said pole-pieces having projecting arms and adjustable magnetic projections mounted at the ends of said arms, substantially as described.

Signed at Pittsfield, Massachusetts, this 10th day of January, 1898.

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Witnesses:

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