Feb. 5, 1924. 1,482,597

J. BERGE

SPEEDOMETER

Filed April 14, 1919

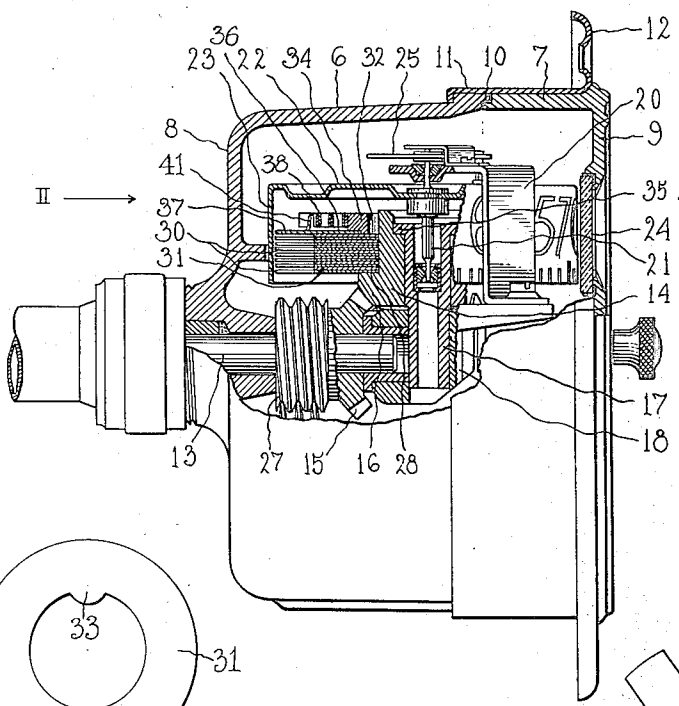


Fig. 1

Fig. 5

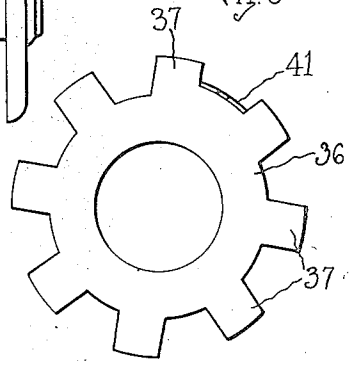


Fig. 3

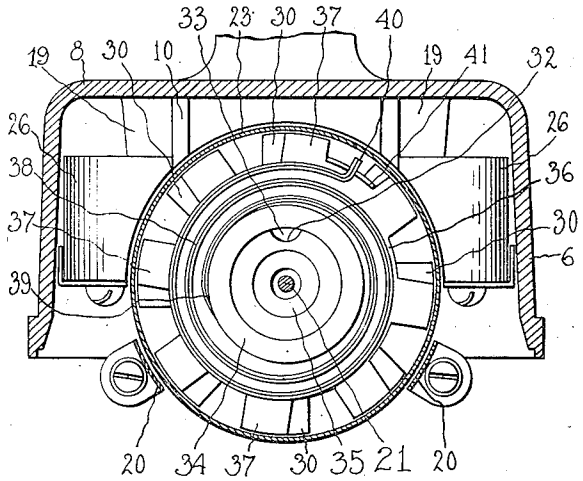


Fig. 2

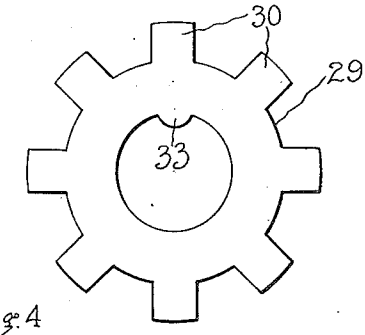


Fig. 4

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UNITED STATES PATENT OFFICE.

JOSEPH BERGE, OF FLINT, MICHIGAN, ASSIGNOR TO A C SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A CORPORATION OF MICHIGAN.

SPEEDOMETER.

Application filed April 14, 1919. Serial No. 289,824.

To all whom it may concern:

Be it known that I, JOSEPH BERGE, a citizen of the United States, and resident of Flint, Genesee County, State of Michigan, have invented certain new and useful Improvements in Speedometers, of which the following is a specification.

My invention relates to magnetic speedometers designed for use with and to show the rate of movement of a self propelled or other vehicle, the device being driven from a wheel of the vehicle and the operation thereof being dependent upon an armature rotating in a magnetic field established by a suitable magnet, and which armature acts to drag along a light weight and delicately supported metallic speed indicating member also located in said magnetic field, the rotary or angular movement of the speed indicating member or speed cup being dependent upon the speed at which the armature is driven, and such movement being opposed by a spring operatively connected therewith.

The invention to which this present application relates concerns the rotating armature of magnetic speedometers of the class above referred to, and the objects thereof are to provide certain improvements in and relating to the structural features of the armature, and certain improvements in and relating to thermostatically controlled compensating means co-operating with the armature to maintain the correctness of the instrument throughout the range of temperature variation likely to be met with when the same is in use.

With the above and such other objects of invention in view as will hereinafter appear, my invention consists in the improved armature construction and features illustrated in the accompanying drawing, described in the following specification, and particularly claimed at the end thereof, and in such variations and modifications of the construction illustrated and described as will be obvious to those skilled in the art to which my invention relates.

In the drawing accompanying and forming a part of this specification and wherein the preferred embodiment of my invention is illustrated:

Figure 1 is a view partly in side elevation and partly in section upon a vertical centrally located plane extending longitudinally of the instrument, and showing a magnetic speedometer equipped with my invention;

Figure 2 is a view showing a section upon a horizontal plane indicated by the line II, II Figure 1, the casing being sectioned upon a lower and parallel plane located at about the center of the instrument.

Figure 3 is a view showing the thermostatically controlled disc of the armature;

Figure 4 is a view showing one of a plurality of discs which collectively form the main body of the armature wherein my invention consists, and

Figure 5 is a view of one of the spacing rings employed in forming the armature.

Referring now to the drawing, the external casing of the speedometer equipped with my improved armature may be of any form, as the invention to which this application relates is in no way concerned with the casing of the instrument or with the form and arrangement of the various other mechanism which co-operate with the armature to form a magnetic speedometer. The casing shown, however, comprises two cup-shaped casing sections 6, 7 annular in cross-section whereby a cylindrical hollow casing having end walls 8, 9 is provided, and within which the mechanism of the device is contained, the open ends of the casing sections abutting along a joint at 10, and the said sections being secured together by an annular band or sleeve 11 forced onto the casing and overlaying the said joint, and having a flange 12 whereby the instrument may be secured in place in an opening in a dash or instrument supporting board of a vehicle.

The main driving shaft 13 of the speedometer is rotatable in a bearing supported by the wall 8 and drives a hub 14, which forms a part of the armature, through bevel gears 15, 16 carried by said shaft and formed upon the lower end of the hub, the said hub being rotatable upon a tubular stud shaft or bearing 17 extending at right angles to the driving shaft, and the same being supported by a support or bracket 18 detachably secured to the ends of pedestals 19 extending from the end wall 8.

The bracket 18 supports a yoke 20 having a bearing for the upper end of a vertically arranged shaft 21 which supports the speed indicating member or speed cup 22 of the instrument, and which speed cup has a de-

pending peripherally extending rim or wall 23 upon which characters to indicate the speed of the vehicle are placed, and which may be seen through a transparent member 24 held in place in the end wall 9.

The armature of the instrument is located within the speed cup, as shown, and acts to impart angular movement thereto when the instrument is in use, the extent of movement thus imparted to the speed cup being dependent upon the rate at which the armature is driven, and such movement being opposed by a hair spring 25 operatively connected with the speed cup.

The magnetic field within which the armature and speed cup operate is established by a magnet the poles 26 of which lie adjacent the peripheral wall 23 of the speed cup, and opposite the periphery of the armature of the instrument which is within said cup, and the driving shaft 13 carries a worm gear 27 whereby odometer mechanism not shown, but which is located within the casing section 7, is operated. The inner end of the driving shaft is shown as supported in a bearing carried by the removable bracket 18.

The hub 14 of the armature is provided with a flange or shoulder 28 at its lower end, and the main body portion of the armature is made up of a plurality of superposed soft iron toothed discs 29 surrounding said hub and supported by said shoulder, the teeth 30 of successive discs being arranged in alignment and one directly over another, and successive toothed discs are separated from one another by interposed rings 31 arranged in alternation with the discs and the peripheries of which lie adjacent the bases of the teeth, so that the teeth of adjacent toothed discs are separated from one another distances corresponding with the thickness of the intervening spacing rings.

The hub 14 is shown as having a longitudinally extending key way or groove 32, and each of said discs as having a lug or key 33 extending into the opening thereof provided to receive the hub, to thereby insure that the teeth of the several toothed discs will come in alignment with one another when the parts are assembled, and to prevent rotary movement or displacement of the discs about the hub whereby they are carried. All the discs of the armature are held in place upon the hub thereof by a ring 34 surrounding the upper end of the hub and secured thereto, and the upper end of the bearing within the hub is enlarged to accommodate a flange 35 at the upper end of the stud shaft or bearing 17, to thereby prevent vertical movement of the armature, as will be appreciated.

The teeth 30 are spaced apart from one another as above explained in order to reduce the driving effect of air trapped between successive circumferential teeth of the armature (that is between successive armature teeth each made up of a plurality of disc teeth arranged one above another) upon the delicately suspended speed cup and which air, being carried around by the armature, obviously acts as a force independent of the currents of electricity set up in the peripheral wall 23 of the speed cup by the rotating armature and tending to rotate the speed cup about its axis. The spaces between vertically disposed teeth 30 obviously permit the teeth to move through the air without imparting rotary motion to the air between successive armature teeth, thus to a considerable extent permitting the air to remain at rest, although there will of course be some rotary motion imparted to the air in question. The spaces between the teeth, however, materially lessen the driving effect of the air upon the speed cup, and at the same time reduces the Foucault currents established in the armature and secures the operation thereof at a lower temperature than would otherwise be the case, because of the cooling effect of the air flowing between the teeth.

Located at the upper end of the armature and looselv held in an annular rabbit formed upon the under side of the holding ring 34, and resting upon the uppermost of the toothed armature discs 29, is a compensating member 36 similar in form to the armature discs 29, and having teeth 37 corresponding in number with the teeth 30 upon said armature discs, and the reference numeral 38 designates a coiled thermostatic member one end of which is connected with the fixed holding ring 34 at 39, and the free end 40 of which enters a hole provided in an upwardly extending lug 41 carried by the angularly adjustable compensating disc 36.

The arrangement and adjustment of the temperature compensating elements is such that at normal temperatures the teeth 37 of the movable compensating disc 36 lie partly over the armature teeth formed by the teeth 30 of the fixed armature discs 29, collectively considered, and partly over the spaces between successive armature teeth, as best shown in Figure 2. When now the temperature becomes higher the thermostatic member 38 will expand, and the teeth 37 of the movable disc 36 will be moved into a position in which greater portions of the area of said teeth will overlie the armature teeth made up of the teeth 30 of the several armature discs, while a fall in temperature will contract the said thermostatic member and rotate the compensating disc in a reverse direction, thus moving the teeth thereof over the spaces between the successive circumferentially arranged armature teeth. The distribution of the magnetic flux through the armature as a whole being obviously varied as the position of the teeth

upon the compensating disc relative to the armature teeth is changed, it follows that the said flux may be regulated by the thermostatically controlled disc in such a manner that the instrument will indicate the speed at which the vehicle is moving correctly, notwithstanding such variations in temperature as are commonly met with when the instrument is in use.

Having thus described and explained my invention, I claim and desire to secure by Letters Patent:—

1. In a speedometer of the class described, a rotating armature having a plurality of teeth upon its periphery, and a thermostatically controlled compensating member carried by said armature and movable relative to the teeth thereof and adapted to vary the magnetic flux flowing therethrough; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

2. In a speedometer of the class described, a rotating armature having a plurality of teeth spaced about its periphery, a compensating disc carried by said armature and movable relatively thereto, and having teeth corresponding with the teeth of said armature, and a thermostat carried by said armature and operatively connected with said disc, and adapted to vary the position of the teeth of said disc relative to the teeth of said armature; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

3. In a speedometer of the class described, a rotating armature having a plurality of teeth upon its periphery; a compensating disc carried by said armature and rotating therewith, and which disc is movable about the axis of rotation of said armature and is provided with teeth corresponding in form and number with the teeth of said armature; a coiled thermostat carried by said armature, one end of said thermostat being held in fixed relation to said armature and the other end thereof being operatively connected with said compensating disc; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

4. In a speedometer of the class described, a hub having a flange at its lower end, a plurality of toothed armature discs carried by said hub and supported by said flange, and which discs are arranged one above another with their teeth in alignment, a plurality of spacing rings arranged one between each two successive toothed discs, a holding ring secured to the upper end of said hub, a compensating disc held in place between said ring and the upper of said armature discs, and which compensating disc is movable about the said hub and is provided with teeth corresponding in number with the teeth of said armature discs, and a coiled thermostat located above said compensating disc and one end of which is connected with said holding ring, and the other end of which is operatively connected with said compensating disc.

5. In a speedometer of the class described, a rotating armature; thermostatically controlled means carried thereby for regulating the flow of magnetic flux through the said armature; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

6. In a speedometer of the class described, a rotating armature provided with a plurality of poles; thermostatically controlled means carried by said armature for changing the relation of said poles relative to one another; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

7. In a speedometer of the class described, a rotating armature having a plurality of radially extending poles at its periphery; thermostatically controlled means carried by said armature and angularly movable about the axis of rotation thereof for varying the magnetic flux flowing through said poles; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

8. In a speedometer of the class described, a rotating armature; thermostatically controlled means carried by said armature and movable relative thereto for varying the flow of magnetic flux therethrough; and a stationary magnet the poles of which are located adjacent the periphery of said armature.

In testimony whereof I affix my signature.

JOSEPH BERGE.