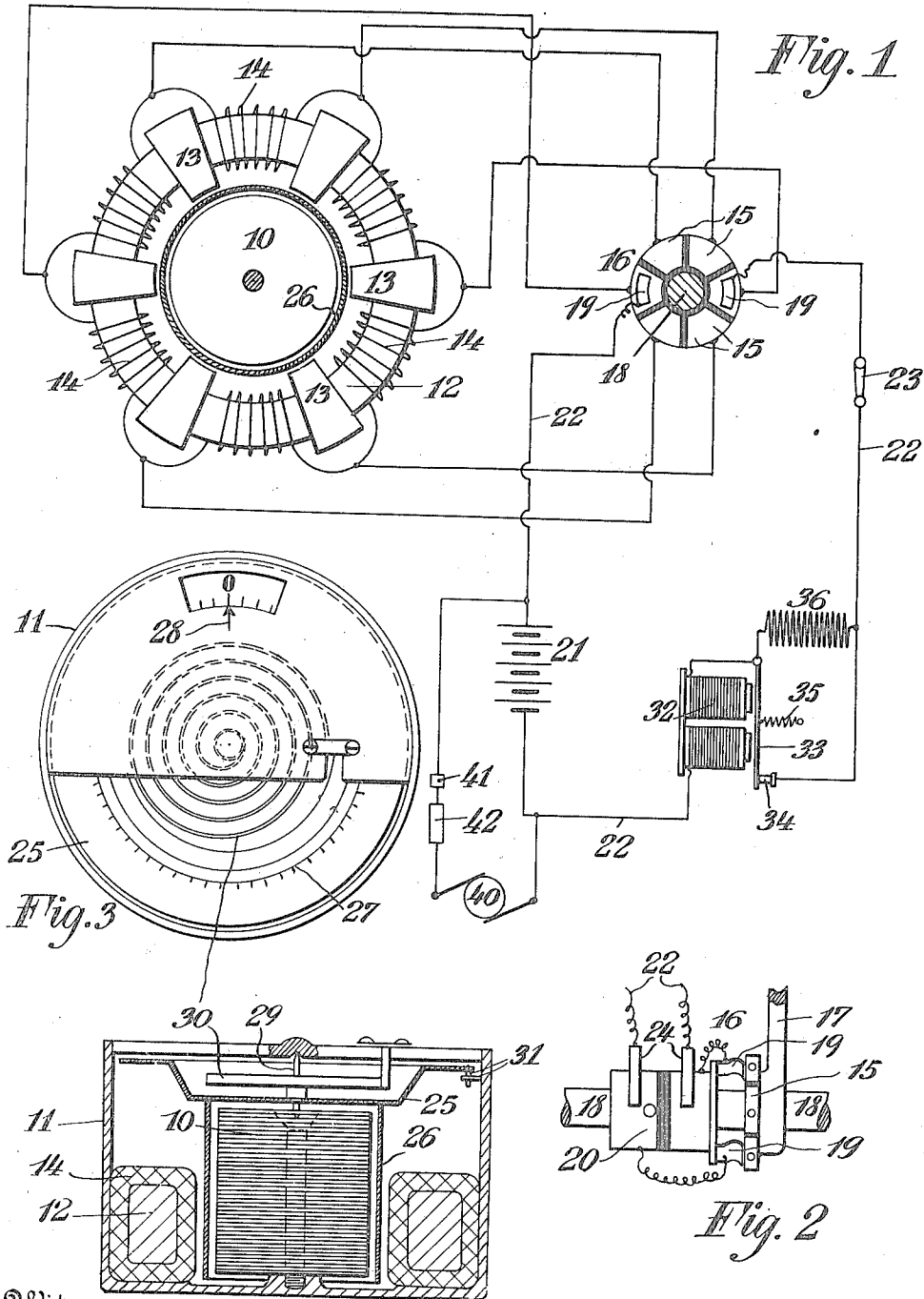


G. S. TIFFANY.
SPEEDOMETER.
APPLICATION FILED OCT. 24, 1914.

1,196,494.

Patented Aug. 29, 1916.



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UNITED STATES PATENT OFFICE.

GEORGE S. TIFFANY, OF SUMMIT, NEW JERSEY, ASSIGNOR TO THE DEVICE TESTING COMPANY, A CORPORATION OF CONNECTICUT.

SPEEDOMETER.

1,196,494.

Specification of Letters Patent.

Patented Aug. 29, 1916.

Application filed October 24, 1914. Serial No. 868,364.

To all whom it may concern:

Be it known that I, GEORGE S. TIFFANY, a citizen of the United States of America, and a resident of Summit, Union county, New Jersey, have invented certain new and useful Improvements in Speedometers, of which the following is a specification.

This invention relates to improvements in electrically operated mechanisms or apparatus, such as speedometers for instance, and the object of the invention is to provide certain improvements in combination with the speedometer or other apparatus whereby to simplify the operation thereof and to eliminate certain disturbing influences or factors with a view of rendering the speedometer or other apparatus dependable and certain in its functions and operations.

With this and other objects in view, all of which will be pointed out as this specification proceeds, the invention is embodied in and comprises the elements arranged and combined with a speedometer as hereinafter set forth and as shown in the accompanying drawing which illustrates an electrically operated speedometer improved according to my invention and in which drawing—

Figure 1 is a wiring diagram illustrating the invention. Fig. 2 is a detail view of the commutator. Fig. 3 is a plan view of the speedometer, and Fig. 4 is a substantially central sectional view of the speedometer.

The speedometer as herein described and illustrated comprises an electromagnet wound to provide a rotating magnetic field having a centrally disposed non-rotatable armature between which and the electromagnet there is mounted a movable indicating element in inductive relation to the magnet. Suitable means are provided for supplying current to the electromagnet.

Referring to the drawing the numeral 10 indicates the armature of soft iron laminæ suitably mounted within a casing 11 of non-magnetic material. Surrounding the armature 10 there is provided an electromagnet comprising the core 12 and the poles 13 between which are wound the coils 14. The latter are connected serially to the segments 15 of a commutator 16 which is suitably secured to a bracket 17 which may form a bearing for the shaft 18 the speed of which is to be measured.

19, 19 are brushes mounted in a brush holder 20 which is secured so as to rotate

with the shaft 18. The brushes are connected across the battery 21 or other source of electrical energy by the battery circuit 22, 22 in which 23 represents a controlling switch. Current is supplied to the brushes 19 by way of sliding contacts 24 in an obvious manner.

From this description it is apparent that during the rotation of the shaft 18 a rotating magnetic field is produced between the armature and the electromagnet.

The speed indicator 25 of aluminum or similar material is mounted to rotate between the armature and the electromagnet 12—14 so as to cut the magnetic lines of force between these two elements. For this purpose the indicator is provided with a skirt or cylinder 26 which surrounds the armature as shown. The indicator is provided with a scale 27 which is read with reference to a fixed mark 28 on the cover of the casing 11. The pivot 29 of the indicator has its bearings in the cover and in the armature as shown.

30 is a hair spring which tends to keep the indicator at zero position and 31 represents stops for limiting the movement of the indicator.

The rotating magnetic field produced when the shaft 18 is rotated and the battery circuit is closed imparts a rotative tendency to the indicator in the direction of rotation of the magnetic field and in direct proportion to the rotative speed of the shaft, such rotative tendency being opposed by the spring 30 in such a proportion with respect to the magnetic effect created by the electromagnet as to cause the indicator to revolve to an extent in direct proportion to the speed of the shaft 18, and hence when said indicator is properly calibrated, the exact speed of the rotation of the shaft will be indicated in the graduations of the scale 27 with reference to the mark 28. The stops 31 prevent the indicator from making more than one revolution as will be understood.

From the foregoing it will be clear that the speed of the shaft 18 may be read directly by means of the scale 27 in the indicator because the movement of the latter is in direct proportion to the speed of the shaft. This condition, however, exists only while the strength of the rotating magnetic field remains practically constant. Variation therein, which is due to variations in

the voltage of the current, influences the movement of the indicator as is obvious and the latter does not then correctly indicate the speed of the operating shaft 18. An increase in voltage beyond that for which the apparatus is designed causes a strengthening of the magnetic field and the indicator will move too fast and a weakening of the magnetic field causes the indicator to move too slow.

It is one of the objects of this invention to provide means to eliminate from the operation of the speedometer the disturbances caused by variations in the strength of the rotating magnetic field due to an increase or decrease in voltage in the circuit from that for which the apparatus is designed. To this end there is inserted in the battery circuit 22, 22 an electromagnet 32 having a pivoted armature 33 which is kept in contact with a contact 34 by means of a spring 35. A resistance 36 is connected between the armature 33 and the circuit 22. The spring 35 and the electromagnet 32 are so proportioned that when the voltage in the circuit is normal or equal to that for which the apparatus is designed, the electromagnet is not strong enough to overcome the force of the spring. The contact of the armature at 34 remains closed, and the operating circuit is traced through the electromagnet 32, the armature 33, the contact 34 and through the wires 22 to the speedometer. At a higher voltage, the electromagnet 32 overcomes the resistance of the spring 35 and attracts the armature 33 which puts the resistance 36 in the circuit so that the voltage for the speedometer is not increased.

When the battery is the sole source of current supply it is preferably overcharged so that it will discharge current at a higher voltage than required for the proper operation of the speedometer in which case the resistance 36 will be a part of the circuit at the start of operation but will be automatically cut out when the voltage drops to normal. Frequently, however, a generator 40 is connected serially with the battery

to charge the latter in which case the resistance will be put into or cut out of the circuit automatically and in response to variations in the voltage, but will not necessarily be in the circuit at the start of the operation of the speedometer.

41 represents diagrammatically a speed controller switch and 42 a reverse relay such as are usual and well known in the art for the proper operation of the generator.

Thus it will be seen, that whether the circuit commences to operate at a too high voltage for the speedometer or at normal or required voltage which thereafter varies, the voltage for the speedometer is automatically regulated to that required for its proper operation.

From the foregoing it will be seen that means have been provided whereby the operation of the speedometer is automatically regulated with respect to variations in voltage and that the disturbing influence of the latter is eliminated.

While I have described the invention with reference to a specific form of speedometer and embodied the principles of the invention in certain specific elements, I do not wish to be understood as limiting my invention to the embodiment illustrated and described, but claim all such modifications which properly come within the scope of the appended claim.

I claim:—

The combination of a speed indicator, a shaft, electric means for operating said indicator and controlled by the speed of said shaft, said electric means including a circuit, mechanism for compensating changes of voltage in said electric circuit and comprising an electromagnet and armature connected in said circuit and a resistance connected to the latter and the said armature.

Signed at New York, N. Y., this 23d day of Oct., 1914.

GEORGE S. TIFFANY.

Witnesses:

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