J. K. STEWART.

MAGNETIC SPEEDOMETER.

APPLICATION FILED JUNE 17, 1910.

995,731. Patented June 20, 1911.

Fig. 1.

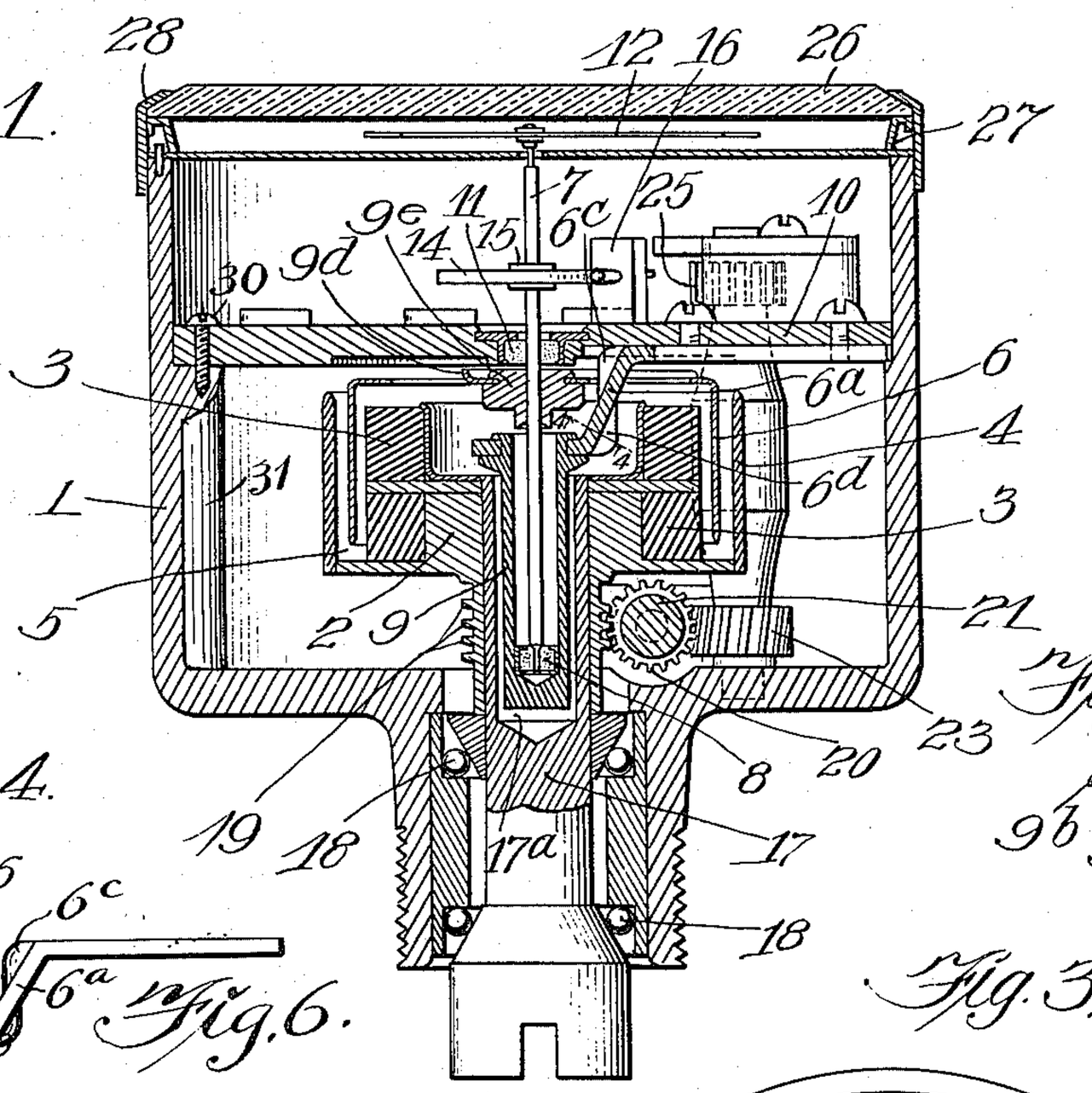


Fig. 5.

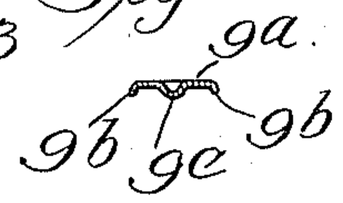
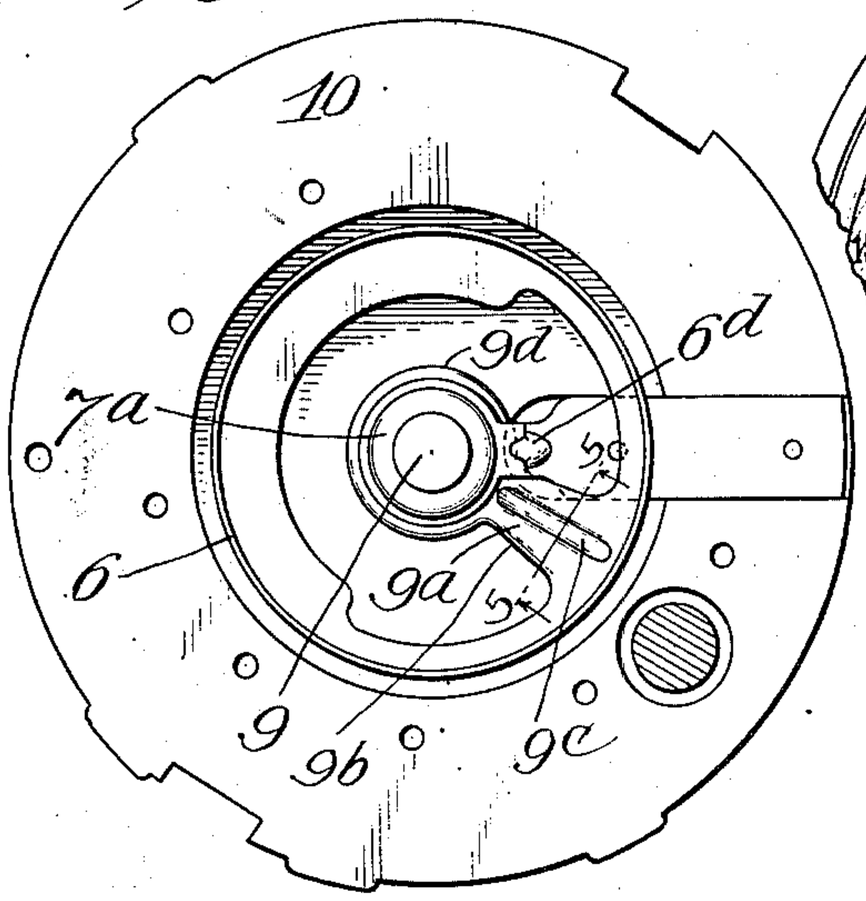


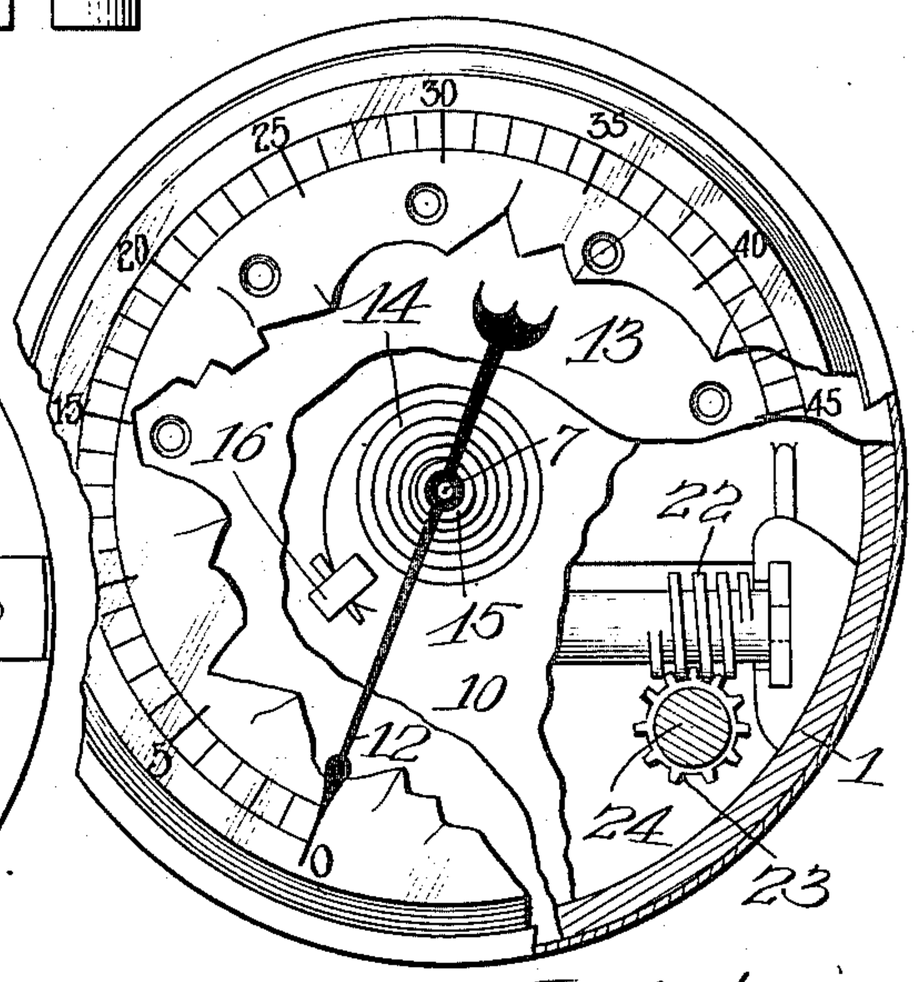
Fig. 4.

Fig. 6.

Fig. 3.

Fig. 2.





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MAGNETIC SPEEDOMETER.

995,731. Specification of Letters Patent. Patented June 20, 1911.

Application filed June 17, 1910. Serial No. 567,420.

To all whom it may concern:

Be it known that I, JOHN K. STEWART, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Magnetic Speedometers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved construction in a magnetic speedometer adapted to secure compactness and simplicity of construction.

It consists in features and elements of construction shown and described as set forth in the claims.

In the drawings—Figure 1 is a vertical, axial section of an instrument embodying my invention. Fig. 2 is a bottom plan view of the disk-carrying plate and parts carried thereby. Fig. 3 is a top plan view having parts broken away to disclose those beneath. Fig. 4 is a detail section of the line 4—4 on Fig. 1. Fig. 5 is a detail section at the line 5—5 on Fig. 2. Fig. 6 is a side elevation of a hanger arm for supporting a step bearing for the spindle of the oscillating disk.

The instrument illustrated in the drawings comprises an inclosing case 1, a rotary element which consists of a magnet carrier 2, a split-ring or horse-shoe magnet 3, mounted on the carrier 2 for rotation therewith, and a soft-iron, annular armature element 4, also mounted on said carrier for rotation therewith, such armature being concentric with the split-ring magnet and encompassing the latter, spaced therefrom by an annular interval 5.

The instrument also has an essential element an oscillatory member, which, as illustrated, comprises a cylindrical metal disk 6, of some non-magnetic metal, such as copper or aluminum, which, for the purpose of positioning it for oscillation in the annular interval 5 between the magnet 3 and the armature 4, is provided with a radial arm 6^a, which, at its inner end, overhangs the center of the magnet carrier, and is there made rigid by means of a collet 7^a with a spindle 7, the lower end of which is stepped in a bearing 8, provided in a tubular hanger 9, which is suspended from the under side of a plate 10, which closes, at the top or front, the cavity in the case in which the magnet carrier and parts thereof are positioned, said plate having a second bearing, 11, at the center, for the upper part of the spindle 7, which extends from the said bearing in the plate and at its upper end carries an index finger 12, which oscillates over a dial plate 13, mounted on the case above the plate 10. A hair spring 14, fastened at its inner end to the hub or collet 15 fast on the spindle 7, has its outer end pinned fast in the split stud 16, which projects up from the plate 10, the purpose of which spring is to bias the disk and index finger to a certain position of rest, and return the disk and finger to such position when deflected therefrom by the magnetic drag of the magnet rotated with the carrier, such drag operating against the resistance of the spring to cause deflection.

The carrier 2 is mounted rigidly on a shaft 17, journaled in the bottom or back of the case and extending out therefrom for connection with any shaft whose speed of rotation is to be indicated by the instrument.

18, 18 represent ball bearings of the shaft in the case. Incidentally, although forming no part of the invention to be claimed herein, the same shaft is arranged to operate an odometer train, which is not shown but is designed to be mounted upon the top of the plate 10. For this purpose, a worm 19 on the shaft 17 meshes with a worm wheel 20 on a horizontal shaft 21, journaled in the case, and having on it a worm 22, which meshes with a worm wheel 23 on a vertical shaft 24, journaled in the case and extending up through the plate 10, and having at its upper end a pinion 25 for actuating the odometer train, not shown, above said plate. The shaft 17 is made hollow or bored from its upper end, forming a deep pocket 17^a, into which the tubular hanger 9 depends from the plate 10 without contact with said shaft.

The tubular hanger 9, which carries the lower step-bearing of the spindle 7, being supported on the plate 10 which has the upper bearing of the spindle, necessarily has the arm which connects it to the plate extending past the horizontal plane of whatever there be of the disk 6 for connecting its cylindrical portion with the spindle; and in order to avoid the necessity of extending the connection between the tubular hanger and the plate entirely around the outer and lower circumference of the cylindrical portion of

said disk 6, and thence up inside the same, to reach the tubular member of the hanger, the disk 6 is cut away as indicated, so as to leave only the arm 6^a, above mentioned, extending from the cylindrical portion to the center for attachment to the spindle 7, and the tubular hanger is provided with an arm 9^a, offset from the upper end of the tubular portion sufficiently to clear the collet or hub 7^a, by which the disk is attached to its spindle 7, and extending thence up past the plane of the arm 6^a to the plate 10, to which it is secured rigidly by its said arm 9^a extending out radially in horizontal plane, and lodged and fitted in a recess on the under side of said plate. With this construction, it will be seen that the disk 6 is limited in its range of oscillation to as much less than 360 degrees as the angular distance occupied by the portion of the arm 6^a, which extends vertically past the plane of the arm 9^a, which, in the construction shown, amounts in the aggregate to about 45 degrees, so that the range of oscillation of the disk is about $\frac{7}{8}$ of a circle. Since it is desirable to reduce the angular space of each of the arms mentioned to the minimum consistent with the necessary rigidity, the arm 6^a may be made relatively quite thick, and, in addition, may be stiffened, forming corrugations 6^c and 6^d at the inner side of the respective angles between its vertical and two horizontal portions. Similarly, in order to stiffen the arm 9^a for making the disk 6 rigid with its spindle 7, said arm has marginal flanges 9^d, turned in one direction, and a middle corrugation 9^b turned in the opposite direction, the flanges 9^d being extended around the central portion to which the collet 9^e is attached for securing the spindle and the corrugation or rib 9^c extending to the collet.

It will be observed that the structure above described is contrived so that the magnet carrier, magnet and armature thereon, with the shaft thereof, can be mounted in the case in a permanent manner, while the plate 10 may have mounted upon it, also in a permanent manner, the remaining parts, comprising the oscillating disk with its spindle, the step-bearing therefor, and the biasing spring, so that all of said more delicate parts can be handled together with the plate 10, and positioned in the case, with which the plate may then be made rigid, as by a screw 30 taking into a lug or post 31 on the interior of the case. The dial plate is then lodged in position upon the upper edge of the case, covering the odometer train not shown, mounted on the plate 10 as stated, after which the index finger may be applied to the upper end of the spindle, and the dial and index finger inclosed in the customary manner by a transparent front 26, spaced from the dial plate by a ring 27, and retained by a ferrule ring 28, secured by pins taking into the periphery of the case near the upper edge.

I claim:—

1. In a speedometer, in combination with a case, a magnet carrier having its shaft journaled for rotation of the carrier within the case, said shaft being axially chambered at one end; a hanger rigid with the case having a depending limb extending rigidly into the axial cavity of the shaft without contact therewith; a non-magnetic disk having a spindle stepped in said depending limb and having a second bearing rigid with the case; and a spring reacting between the disk and the case for biasing the disk toward a predetermined position in its range of oscillation.

2. In a speedometer, in combination with a case, a magnet carrier journaled for rotation in the case and having a shaft protruding therefrom, said shaft being axially chambered at its upper end; a plate fixed with respect to the case above the magnet carrier; a hanger rigid with the plate, having a depending limb extending into the axial cavity of the shaft without contact therewith; a non-magnetic disk having a spindle stepped in said depending limb and having a second bearing carried by the plate; a spring connecting said disk with the plate for biasing it toward a predetermined position, and an index carried by the spindle above the plate.

3. In a speedometer, in combination with a case, a magnet carrier having its shaft journaled in the case, said shaft being axially chambered at one end; a magnet mounted on the carrier for rotation therewith; an armature encompassing the magnet and spaced therefrom; a non-magnetic cylindrical disk interposed in the space between the magnet and the armature, having a radial arm overhanging the chambered end of the shaft; a spindle rigid with said arm at the center; a hanger extending into the axial cavity of the shaft without contact therewith and having an arm extending past the plane of said radial arm of the disk; a support above said plane rigid with the case, to which said arm is rigidly attached, the spindle being stepped in said hanger and having a second bearing in said last-mentioned support, and a spring connecting the disk with said support for biasing it toward a predetermined position.

4. In a speedometer, which comprises, in combination with a case, a magnet and an armature, one of said elements having a shaft and mounted for rotation; a non-magnetic disk interposed between the magnet and the armature, the inner end of the shaft of the rotary element being axially chambered; a hanger rigid with the case extending into said chamber, the disk having a spindle which is stepped in said hanger,

the means for supporting said hanger having a second bearing for the spindle; and a spring for biasing the disk toward a predetermined position of rest.

5. A speedometer which comprises, in combination with a case, a magnet and an armature, one of said parts being rotatable and having its shaft journaled in the case; a non-magnetic cylindrical disk interposed between the magnet and the armature, having a radial arm extending from its cylindrical portion transversely to the shaft of the rotatable element at the inner end of said shaft, said shaft being chambered at said inner end; a hanger depending into said recess, having an arm extending past the plane of said radial arm, and means by which it is connected rigidly with the case above said arm; and a spring for biasing the disk toward a predetermined position of rest.

6. In a speedometer, which comprises, in combination with a case, a magnet and an armature, one of said parts having a shaft journaled in the case and mounted for rotation, the other of said parts being co-axial with the rotating part, encompassing same and spaced therefrom; an oscillatory member comprising a non-metallic disk and a spindle rigid therewith, said disk having a cylindrical portion, which is interposed between the magnet and armature, and having a radial arm extending transverse to the axis of rotation of the rotating element and terminating opposite the inner end of the shaft of the latter, said shaft being axially chambered at said end; a plate rigid with the case at the opposite side of said arm from said chambered end of the shaft; a hanger rigid with said plate, having an arm extending past the plane of the radial arm of the disk, and a tubular limb depending from said arm of the hanger extending into said axial cavity of the shaft, the spindle being stepped in said tubular limb, the plate having a second bearing for said spindle; a spring connected to the plate and to the disk for biasing the oscillatory member toward a predetermined position of rest, and indicating means carried by the oscillatory member.

7. A speedometer comprising, in combination with a case, a magnet and an armature co-axial with each other, one of said co-axial parts having a shaft journaled in the case at one side only of said part, the inner end of said shaft being axially chambered; a plate detachably mounted in the case, extending transversely of the shaft beyond said chambered end; a hanger rigid with said plate, having a depending limb extending into the axial chamber of the shaft, a spindle stepped in said depending limb and having a second bearing in the plate; a non-magnetic disk comprising a cylindrical portion adapted to be interposed between said co-axial parts, and a radial arm extending from said cylindrical portion between the rotating part and said plate and rigid at the center with the spindle; a spring connecting the spindle with the plate for biasing the disk toward a position of rest, and indicating means carried by the spindle.

In testimony whereof, I have hereunto set my hand, this 15th day of June 1910.

JOHN K. STEWART.

Witnesses:

JEAN ELLIOTT,

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