March 16, 1926. 1,577,069

J. K. OLSEN

INTERNALLY DRIVEN ODOMETER

Filed June 26, 1922

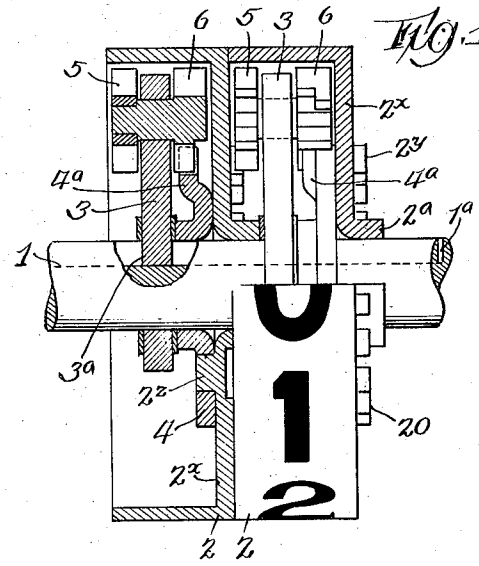


Fig. 1

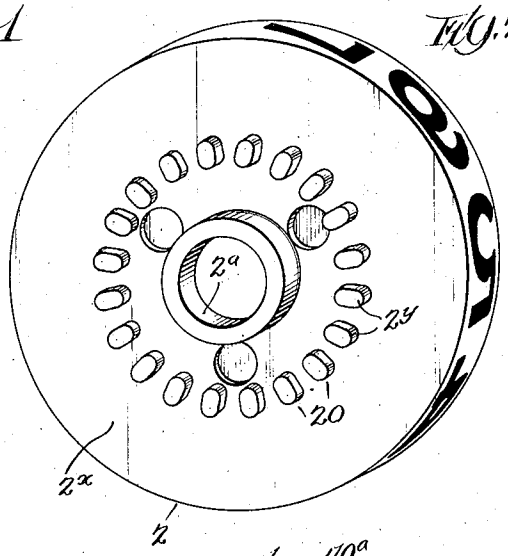


Fig. 2

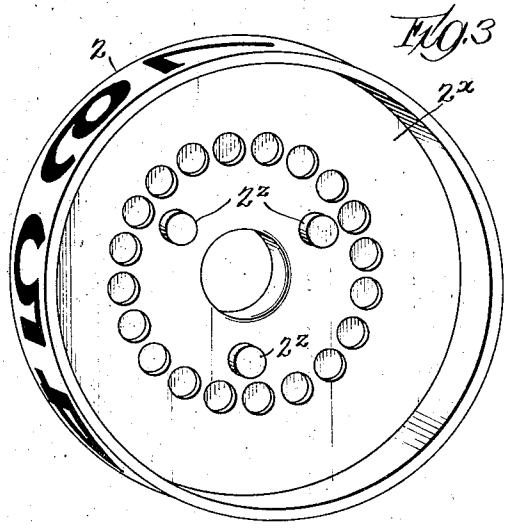


Fig. 3

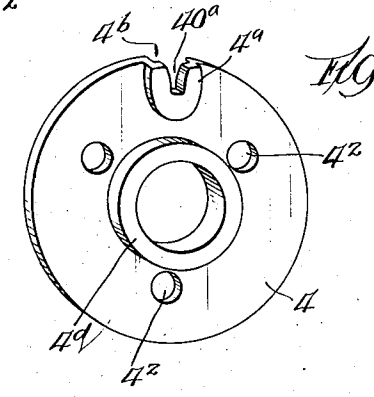


Fig. 4

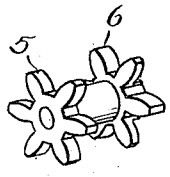


Fig. 5

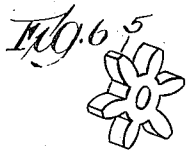


Fig. 6

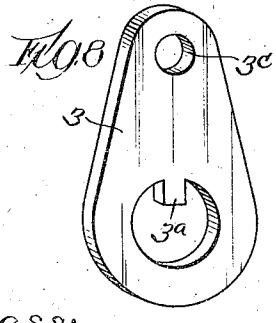


Fig. 8

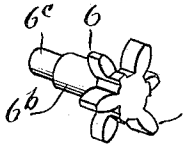


Fig. 7

Witness:
Conrad M. Olsen

Inventor
John K. Olsen
by Burton & Burton Atty's.

Patented Mar. 16, 1926. 1,577,069

UNITED STATES PATENT OFFICE.

JOHN K. OLSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO STEWART-WARNER SPEEDOMETER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF VIRGINIA.

INTERNALLY-DRIVEN ODOMETER.

Application filed June 26, 1922. Serial No. 570,957.

To all whom it may concern:

Be it known that I, JOHN K. OLSEN, a citizen of the United States, residing in the city of Chicago, in the county of Cook and the State of Illinois, have invented certain new and useful Improvements in Internally-Driven Odometers, 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 revolution counting train of the type in which the gears for carrying from dial to dial are enclosed within the dial wheels. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:—

Figure 1 is a partly sectional side elevation of a portion of a revolution counting train of dial wheels embodying this invention, section being made radially through the upper half of the dial wheels and with respect to the lower portion of one of them.

Figure 2 is a perspective view of one of the dial wheels, looking at the outer or right hand side of the web.

Figure 3 is a similar view of the same, looking at the opposite side.

Figure 4 is a perspective view of the mutilated gear member of the dial wheel.

Figure 5 is a perspective view of the carrying pinion, comprising two parts which are separately shown in perspective view Figures 6 and 7.

Figure 8 is a perspective view of the carrying pinion supporting arm.

The structure shown in the drawings is a portion,—comprising only two dials,—of a counter train embodying the invention, without showing of the driving means nor supporting structure, which may be of any form or character described. It may be understood that the initial dial wheels shown in the drawings may be driven in any manner and from any source. This invention is concerned only with the construction of the dial wheels themselves, and the connecting gear mechanism in and part thereof; and this will now be described.

1 is a main axle or shaft upon which the dial wheels, 2, 2, are mounted side by side. Each of the dial wheels in its entirety comprises a driving and a driven gear member, of which the driving gear is a mutilated and the driven gear is an unmutilated or complete gear. The dial wheel in its entirety, comprises further, a web which carries the two gear members above mentioned, and which has a peripheral flange which encloses the entire gear mechanism and which exteriorly has the dial numerals or other marking.

The means for carrying from dial to dial comprises a carrying pinion in each carrying train; and these carrying pinions are each journaled upon a carrying pinion support which extends rigidly from the shaft, 1, within the dial wheel, so that the carrying trains in their entirety, are enclosed within and between the dial wheels.

The detail construction is designed with a view to making the parts of metal stampings as far as possible; and with a view to this method of production, the construction is designed in detail for eliminating as far as possible the back lash or play between the intermeshing parts of the gear train, and thereby insuring, or rendering it possible to insure, correct alignment of the numeral markings of the several dial wheels.

Each dial wheel comprises, as stated, a web, 2^x, having a central aperture by which it is mounted on the shaft, 1; and for the purpose of such mounting and for affording as broad a bearing as possible upon the shaft, this web is flanged around the central opening, as seen at 2^a, such flange being turned outwardly. The mutilated driven gear member of the dial wheel is formed by striking outwardly from the web. 2^x, gear teeth, 2^y, in a continuous circular series, as seen in Figure 2, the entire series being treated as constituting a gear member, as indicated by the numeral 20, and comprising twenty teeth. The driving gear, which is the mutilated gear member of the dial wheel, is formed as a separate piece, shown in Figure 4, being stamped from sheet metal, secured upon the inner face of the web, 2^x, by means of rivet bosses, 2^z, which are struck inwardly from the web for registering it with holes, 4^z, struck out of the gear member, 4. These bosses, 2^z, may be dimensioned for drive fit in the apertures, 4^z, thus dispensing with any heading down for completing the securement of the gear member, 4, to the web, 2^x. Said mutilated or driving gear mem-

ber, 4, has struck laterally from it at a short segment of its margin, two gear teeth, 4^a, the notches, 40^a, being cut in the margin of the disk; and in the process of striking out laterally the teeth, 4^a, as described, there is formed in the zone of the original disk the clearance notch, 4^b, co-operating with the circular periphery of the disk which operates as a delay surface for the delay member of the carrying pinion, as hereinafter described. Said projections are accommodated in said clearance notch in the well understood manner of co-operating mutilated gears. The stamping which constitutes the mutilated driving gear, 4, is flanged around its shaft-accommodating aperture, as seen at 4^a, said flange being turned inwardly with respect to the dial wheel, that is, so as to project in the opposite direction from the flange, 2^a, of the dial wheel web, 2^x; and by this means there is afforded to the said dial wheel an additional length of bearing on the shaft, substantially equal to the bearing which is extended in the other direction by means of the flange, 2^a.

The carrier pinion in each of the dial wheels is carried by an arm, 3, rigid with the shaft, 1, said arm being engaged with the shaft by a spline, 3^a, projecting into the central aperture, engaging a longitudinal groove, 1^a, in the shaft.

The carrying pinion comprises a driving gear member, 5, and a driven gear member, 6, the latter having associated with it the delay member, 7, the latter being star-shaped and consisting substantially of three teeth which are extensions of alternate teeth of the six teeth which constitute the gear member, 6. The entire carrying pinion comprising the parts, 5 and 6, operates as a unit, being rigidly united in operation, but being formed in two parts, as seen in Figures 6 and 7, in order that the entire carrying pinion may have its journal bearing between the two gear members of said carrying pinion; and for this purpose the part, 6, is formed with a centrally projecting axle, 6^b, which is reduced in diameter at its extremity, as seen in 6^c, the unreduced portion being the journal for journaling it as a unit at 3^c, in the carrying arm, 3, the driven gear member, 6, having its central aperture diametered for drive fit upon the reduced gear portion, 6^c, of said axle.

In assembling the carrying pinion as a unit, it is mounted as described on the carrying arm, 3, and this carrying arm is passed onto the shaft through the open side of the dial wheel to bring the driving pinion member into operative relation through the driving and mutilated gear member, 4, the unmutilated gear element, 6, being brought into the plane or zone of the gear segment consisting of two teeth, 4^a, of the driving mutilated gear, 4, and the delay element, 7, with its three teeth being brought into the plane or zone of the disk, 4, whose circular periphery constitutes the delay surface, and whose notch, 4^b, constitutes the clearance for co-operation with the star-shaped delay element of the carrying pinion, in a manner requiring no description.

When thus adjusted within the cavity of the dial wheel, the driven gear element, 5, of the carrying pinion stands within the plane or zone of the driven gear member of the next adjacent dial wheel, that is, in the plane of rotation of the outwardly struck teeth, 2^y, with which the teeth of the gear members, 5, mesh for driving said next adjacent dial wheel.

The co-operation of the mutilated driving gear member, 4, comprising the offset gear segment, 4^a, with the delay element, 7, and the gear element, 6, of the carrying pinion, for communicating rotation to the extent of two teeth of said carrying pinion upon each revolution of the mutilated driving gear member, 4, and for locking the carrying gear against rotation in the intervals of the engagement of the gear segment, 4^a, with the gear member, 6, of the carrying member, will be understood from the drawings without further description, being in accordance with the familiar method of reduced speed transmission by mutilated gear devices. Upon consideration, it will be seen that the construction described makes it possible to form the small dimensioned gear members, not only very economically by stamping and cutting dies, but also very accurately according to the best methods for intermeshing without lost motion, play or back lash, and with the minimum friction at the intermeshing of the gear elements, because the relation of the parts permits the employment of true epicycloidal forms for the gear teeth. Also, it will be observed, that by making the carrying gear in two parts secured together by their drive fit, it is possible in assembling to compensate for whatever lost motion may actually be found to exist in the carrying train, tending to cause misalignment of the numerals upon the dial wheels, by a slight misalignment of the teeth of the members, 5 and 6, of the carrying pin.

I claim:—

1. A revolution counting device comprising a shaft and dial wheels assembled thereon side by side, the dial wheels comprising each a mutilated and an unmutilated gear element in zones lateral with respect to each other, the shaft having carrying pinion supports extending between the dial wheels, carrying pinions journaled on said supports comprising each a driving and a driven gear element for cooperating respectively with the unmutilated and the mutilated gear

elements of the dial wheels, the said elements of the dial wheels being of external gear or peripherally toothed type, and the web of the dial wheels being diametered to extend beyond the pinion gear element; whereby without the internal gear, the dial wheels may have lateral peripheral flanges for the dial markings, encompassing and enclosing all the gear elements.

2. A revolution counting device comprising a shaft and dial wheels assembled side by side there-along, the dial wheels comprising each a mutilated and an unmutilated gear element, and a web which carries said two elements, the shaft having carrying-pinion supports extending between the dial wheels, and carrying pinions journaled in said supports, comprising each a driving and a driven gear element for cooperating respectively with the unmutilated and the mutilated gear elements of the dial wheel, said carrying pinions being journaled on said supports between said driving and driven elements respectively, of the pinion, the web of the dial wheels being between the two gear elements thereon, and said web being peripherally flanged at one side only to enclose the carrying pinions.

3. In a revolution-counting train which comprises a shaft and dial wheels mounted side by side thereon, the dial wheels being of cup form with gear elements for carrying from dial to dial contained within the cup flange, one of the gear elements of the dial wheel being a separate part from and applied and secured on the inner side of the web of the wheel, said web being outwardly flanged around its center hole for the shaft, the interiorly applied gear element being similarly flanged in the opposite direction around the shaft-accommodating hole, whereby the dial wheel obtains a long bearing on the shaft extending both ways from the web.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 21 day of June, 1922.

JOHN K. OLSEN.