Dec. 10, 1929. J. BERGE 1,738,558

ODOMETER MECHANISM

Filed Nov. 14, 1921

Fig. 1.

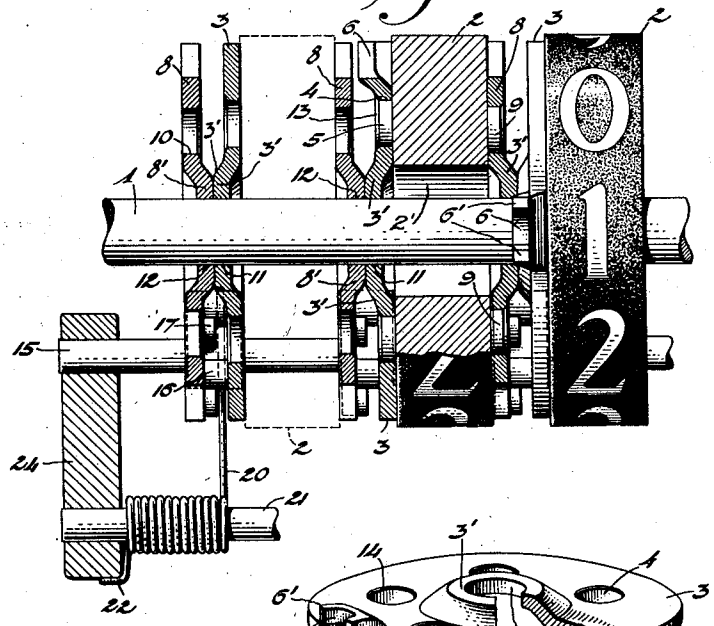


Fig. 2.

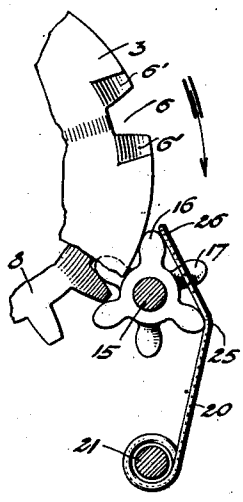
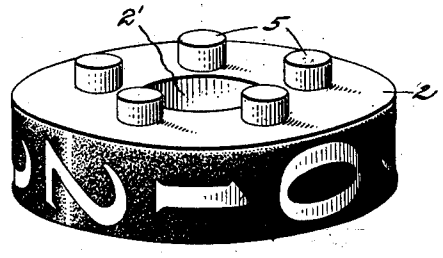


Fig. 3.

Fig. 4.



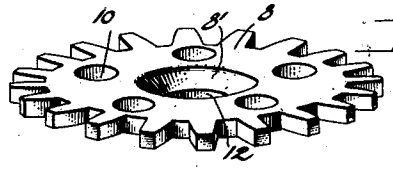


Fig. 5.

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UNITED STATES PATENT OFFICE

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ODOMETER MECHANISM

Application filed November 14, 1921. Serial No. 514,990.

The invention relates to counting or computing instruments, such, for example, as odometers, and more specifically to the construction of counting or number wheels and associated devices for use in such instruments.

One of the objects of the invention is to provide an improved and simplified construction of number wheel embodying transfer and driving elements which elements are capable of being formed from sheet material by stamping or like operations.

A further object is to provide an improved construction whereby the wheels of a train are suitably supported in spaced relation and maintained in proper alignment.

A further object is to provide an improved construction of metal reinforced number wheel or indicating element for use in odometers, or the like.

Other objects and advantages will appear from the following description taken in connection with the accompanying drawings in which Figure 1 is a side elevation, partly in section and with parts omitted, showing a preferred embodiment of the invention.

Figure 2 is an elevation of a portion of the mechanism taken from the right side in Figure 1.

Figures 3, 4 and 5 are perspective views, respectively, of the carry-element, the body or numbered element and the driven element which together constitute one of the number wheels.

1 indicates a shaft carried in suitable bearings and driven by any desired means such as speedometer mechanism, adding machine parts, or the like. This shaft has mounted thereon a plurality of wheels of which the one at the extreme right, in the construction shown, is a unit wheel the others being of higher orders. Each of the wheels comprises a hollow cylindrical body 2 stamped or otherwise provided with the numerals 0 to 9, inclusive, together with a disc-like face plate 3, preferably of metal, perforated as at 4 to receive projections or studs 5 formed on the body, so that the body and the face turn as a single wheel. The face plates 3 are each slitted substantially radially and inwardly from the edge at two points and the portion between the slits is offset from the plane of the disc and cut away centrally to form a single notch 6 having a tooth 6′ on each side thereof, the gear teeth thus formed being offset from the plane of the disk sufficiently to engage both sets of teeth 16 and 17 hereinafter referred to. The wheels at the left differ from the unit wheel in that they are each additionally provided with a face plate 8 toothed throughout its circumference and attached to the body by projections 9, similar to the projections 5, fitting in perforations 10. One or both of the plates 3, 8, have their central portions offset or dished outwardly from the body portion 2, both plates being so shown in the drawing, as indicated at 3′, 8′, thus providing spacing means whereby the number wheels are maintained at the proper distance apart when assembled upon the shaft 1. Both plates are also centrally apertured, as indicated at 11, 12 on the respective plates 3, 8, which apertures are of a size corresponding to that of shaft 1 so that the face plates serve as supporting means whereby the wheels are slidably and rotatably mounted upon the said shaft.

The body 2 is formed with a central aperture, as indicated at 2′, of considerably greater diameter than the shaft 1. The body of the wheel is therefore supported in spaced relation to the shaft, the bearing surface being confined to the metal edges surrounding the apertures 11, 12, in the plates 3, 8, respectively. I eliminate thus the liability of the wheels sticking to the shaft due to accumulations of gummy lubricant, dirt, or other foreign substances, a difficulty which has proved troublesome with odometer wheels of the higher denominations especially, which may not be moved oftener than once in years of service.

The body 2 will be molded preferably of a substance possessing some plasticity when heated, such, for example, as celluloid or other of the nitrated cellulosic derivatives.

In assembling the body portion 2 and the face plates 3 and 8, the plates are forced down over the projections 5, 9, the projections being designed to have a close fit with

the perforations. The ends of the studs or projections 5, 9, may then be spun or riveted over, as indicated at 13, to fit countersinks 14 at the outer ends of the perforations, thus securing the parts of the wheel in assembled relation. When the body portion is of material capable of being easily softened by heat, as one of the plastic compositions above referred to, the spinning over may be easily accomplished by reason of the softening of the material due to mere friction between the projections and the tools, although the latter may be heated if desired.

The wheel of the lowest order, in this case the unit wheel, is secured to the shaft 1 in such a manner as to rotate therewith at the same speed, but the wheel of the higher order is free to turn on the shaft, being normally prevented from such movement by pinions mounted to turn on the shaft 15 and having alternate wide and narrow teeth 16 and 17, preferably three and six in number, respectively, the teeth 16 being adapted to both ride on the circumferential face of the element 3 and engage with the teeth of the element 8, while the teeth 17 are arranged to mesh with the teeth of the element 8 only. For each complete turn of a wheel of the lower order, the wheel of the higher order is given a tenth or fractional turn, in a manner well understood in the art.

It will be noted that the number wheels as disclosed herein are capable of being easily and cheaply produced by simple machine operations. The offset gear teeth 6′ may be formed by being merely stamped from the material of the disk or plate 3, while the spacing and bearing means is similarly produced from the sheet material constituting the disks or plates themselves. Variations in details of construction and processes of manufacture may be made, however, without departing from the spirit and scope of the invention as set forth in the claims.

Inasmuch as there is more or less back-lash or lack of fit between the several parts, it follows that the cumulative movement might be such, in sets of considerable numbers of wheels, as to cause a noticeable lack of alignment of the numbers, in other words, that in the change say from an indication of 9999 to one of 10000. the ten thousands wheel would receive the smallest angular turn, the movement increasing progressively to the initial or units wheel, so that the figures making up the indication of 10000 would appear in a helical line of small pitch. For this reason I preferably provide a spring 20 which may be of the helical type mounted on the pin or shaft 21, or otherwise, and arranged with its end 22 anchored to the support 24 and with its other end normally engaging at 25 and 26 with two of the teeth 16. The form of the spring and the manner of applying it to the pinion are, of course, subject to variation, but the construction shown is both simple and desirable. During the change of indication above noted, the first movement is in the direction of the arrow, Fig. 2, into the helical relation stated, after which a continued drive causes the carry wheel under the spring 20 to turn thereby further tensioning the spring and exerting a drag on the whole set; the turning movement continuing, the rear tooth 16 passes over dead center whereupon the spring 20 snaps the set of wheels progressively forward to finally establish alignment of the numbers. The final engagement of the spring with two teeth, 16, as shown, serves to lock the set against further movement.

I claim:

1. The process of forming a number wheel comprising forming a body portion of a non-metallic plastic composition capable of being softened under the influence of heat with projections extending laterally from the faces of the body, assembling said portion with disks on each side thereof with the projections extending into perforations in said disks, softening the said projections by application of heat thereto and expanding said projections while in softened condition to secure the disks and body together.

2. An indicating wheel comprising an annular body portion having projections integral therewith extending from opposite sides thereof, and two sheet metal disks, one on each side of said body portion and having apertures in which said projections are seated to secure said disks to said body portion, each of said disks having central bearing portions whereby the wheel may be supported upon a shaft.

3. An indicating wheel for odometers and the like comprising a hollow cylindrical body portion adapted to receive indicia and composed of a cellulosic derivative capable of being softened by heat, said body having integral studs projecting from the sides thereof, a sheet metal disk on each side of said body having apertures in which said studs are seated and expanded to retain the parts in assembled relation, said disks having central bearings adapted to support the wheel on a shaft.

In testimony whereof I affix my signature.

JOSEPH BERGE.