(No Model.)

L. J. BURDICK.

CYCLOMETER OR REGISTERING MACHINE.

No. 588,727. Patented Aug. 24, 1897.

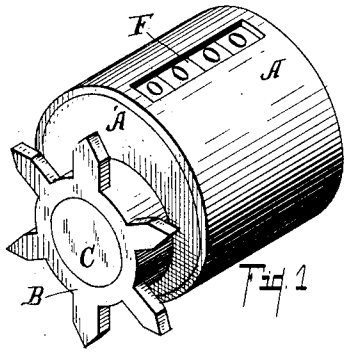


Fig. 1

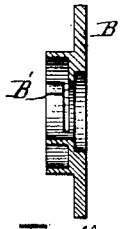


Fig. 11

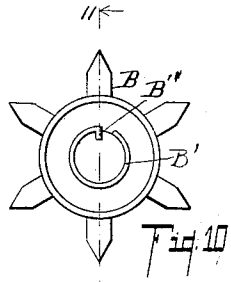


Fig. 10

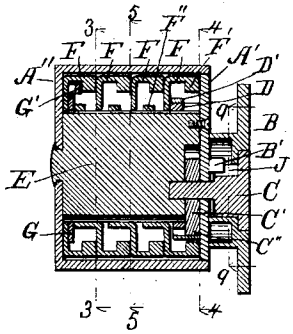


Fig. 2

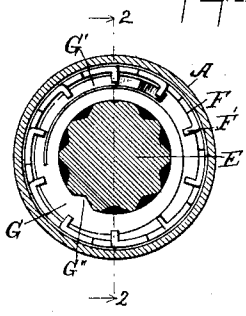


Fig. 3

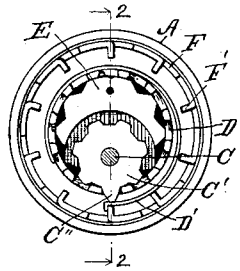


Fig. 4

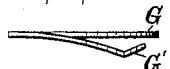


Fig. 8

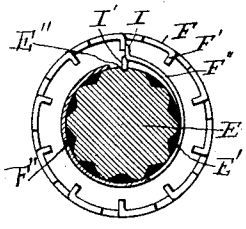


Fig. 5

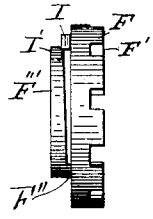


Fig. 6

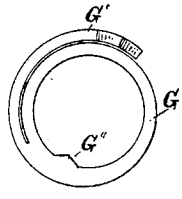


Fig. 7

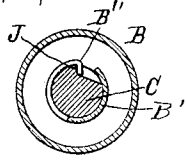


Fig. 9

Witnesses.

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UNITED STATES PATENT OFFICE.

LEO J. BURDICK, OF STURGIS, MICHIGAN.

CYCLOMETER OR REGISTERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,727, dated August 24, 1897.

Application filed February 25, 1897. Serial No. 625,015. (No model.)

To all whom it may concern:

Be it known that I, LEO J. BURDICK, a citizen of the United States, residing at the city of Sturgis, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Cyclometers or Registering Mechanism, of which the following is a specification.

My invention relates to improvements in register mechanism generally.

This invention is an improvement in many particulars over the construction shown in my application bearing date the 9th day of February, 1897, with additional features.

The objects of this invention are, first, to greatly simplify the construction of cyclometers and register mechanism; second, to simplify the transfer mechanism between parallel number-wheels; third, to reduce the number of parts in a cyclometer; fourth, to insure perfect accuracy and exact location of the various number-wheels after actuation, as well as before; fifth, to provide an improved means of actuating the first or lowest number-wheel; sixth, to provide in such construction an improved ratchet mechanism, and, seventh, to provide a simple ratchet for the actuating-wheels.

Further objects will appear definitely in the detailed description.

I accomplish these objects of my invention by the devices, means, and mechanism described in the following specification, pointed out in the claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved cyclometer or register mechanism with the attaching bracket or means omitted. Fig. 2 is a longitudinal vertical sectional view of the same, taken on line 2 2 of Figs. 3 and 4. Fig. 3 is a transverse detail sectional view taken on line 3 3 of Fig. 2. Fig. 4 is a transverse detail sectional view taken on line 4 4 of Fig. 2. Fig. 5 is a transverse detail sectional view of the shaft and number-wheel with the outer casing omitted, taken on line 5 5 of Fig. 2. Fig. 6 is a side elevation of a number-wheel, as shown in Fig. 5. Fig. 7 is a plan of the spring-brake, checking the highest number-wheel of the series. Fig. 8 is a side elevation of the same from the top of Fig. 7. Fig. 9 is a detail sectional view of the actuating-wheel of the register mechanism, taken on line 9 9 of Fig. 2. Fig. 10 is a plan of the same, taken from the inside next the casing. Fig. 11 is a vertical sectional view thereof, taken on line 11 11 of Fig. 10, showing the formation of a spring catch or pawl B'.

In the drawings the same letters of reference refer to similar parts throughout the several views, and all of the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines.

Referring to the lettered parts of the drawings, A is the case of the cyclometer or register mechanism, preferably in the cylindrical form. It contains a fixed head A'' at one end and a removable head A' at the other. To the fixed head A'' is securely riveted or fastened the shaft E, which is of large diameter in proportion to the size of the device. This shaft carries number-wheels and is made with longitudinal notched depressions E', beveled from each side to the center. There are as many depressions E' as there are steps of the movement of the number-wheels, with the exception that one space is filled and has a very slight retaining depression E'', which clearly appears in Figs. 3, 4, and 5.

The number-wheels are preferably made of sheet metal with internal gear-teeth F' struck in therefrom, and each wheel has a projecting hub F'', the entire structure being made of spring metal. A spring F''' is formed from a portion of the hub F'', (see particularly Figs. 5 and 6,) on the end of which spring is formed an inwardly-projecting tooth I' by turning the end in and an outwardly-projecting tooth I by turning a little ear outwardly from the metal. A portion of the metal is cut away between the spring F''' and the body of the wheel, so that the spring may act freely.

There are as many teeth on the number-wheel as there are spaces or steps or numbers upon its periphery, and consequently the number of teeth corresponds to the number of depressions E' and E''. These number-wheels are made alike and are placed upon the shaft E parallel to each other. It will be noted from this that as any number-wheel is rotated its tooth I' will follow in the depression E' on the shaft, passing under the internal gear-teeth of the next higher wheel till it comes to the depression E'', which is very slight for

detaining purposes. Then the spring will be held out and the outer end of the tooth I will engage the tooth opposite on the next number-wheel and actuate the same one step. Thus each revolution of a number-wheel actuates the next higher number-wheel one step, thus transferring its amount to the upper wheel. When the numbers are on the scale of tens, as here indicated, there are ten notches and ten teeth for each wheel.

The last number-wheel or the highest number-wheel of this series does not need to actuate any wheel beyond. Consequently the hub is cut off flat to reduce the size of the casing. To prevent any overthrow during the actuation, a spring-detent is formed consisting of a flat disk G, having an inwardly-projecting tooth G″ to engage a notch E′, and a curved spring G′ thereon having an outwardly-projecting portion to engage between the teeth F′ of this last wheel to retain it and prevent overthrow. The spring is prevented from revolving by the tooth G″ engaging the shaft.

The lowest number-wheel of the series is actuated in a cyclometer by the special device which I will now describe. The head A′ is made removable. Through the same, to one side of the center, is inserted a small shaft C. On the outside end of shaft C is a revoluble wheel B, with projecting teeth for actuation from a pin on a bicycle-wheel or by other means. On the inside end of shaft C is the gear-wheel C′. Supported on the shaft E at this end is a ring D, having perforations therethrough to serve as the teeth of the gear-wheel, forming an internal gear-wheel therewith. Around the outside of this gear-wheel D, which is made of a perforated ring, and embracing the same, is a spring D′, having an outwardly-projecting tooth. The internal gear-wheel D and the external gear-wheel C′ mesh on what is known as a "hunting-tooth" gear principle, the numbers here being "7" and "12," respectively. One of the gear-teeth C″ of the gear C′ is longer than the other and projects through the perforations beyond the periphery of the wheel D. At one point of its circumference the end of the spring D covers one of the apertures through which the gear-tooth C″ projects, and at that point the gear-tooth will force out the spring and cause the external tooth thereon to engage one of the internal teeth F′ on the first number-wheel. This secures the actuation of the first number-wheel at long intervals.

In the operation of the structure here shown it is found that the number-wheels, owing to the presence of the spring F‴ and the tooth, can be revolved in only one direction, like a ratchet—that is, in the direction toward which the spring points. Where the wheel B is fixed upon its shaft, it will be readily understood that any reverse movement—as, for instance, of a bicycle-wheel or similar device—which might be attempted would cause the machine to be broken. This is overcome by forming a spring B′, exactly similar to spring F‴, with an inwardly-projecting tooth B″ to engage a suitable notch on the hub of the axle C, as clearly appears in Fig. 9. This makes it possible to revolve the wheel B in one direction and cause it to engage and actuate the shaft and register, and when it revolves in the opposite direction it will not engage and cause the shaft to effect the register mechanism.

It will be observed that the shaft E acts as a cam guiding the tooth of the spring to actuate the next gear number-wheel a single step during each revolution. It will be also observed that the tooth I′, projecting internally, tends to locate each number-wheel positively in position. It will also be observed that the construction for securing the actuation is very simple. A suitable hollowed-out hub is formed on the wheel G, which gives it a broad surface to rest upon the head A′. The head A′ is easily retained in place by the single small screw *a*. Its tipping to either side is prevented by the shaft C, projecting into its bearings in shaft E. I am aware, however, that great change could be made in these notches and that the teeth can be made to run over them in any direction. I am aware that my improved cyclometer and register mechanism is capable of considerable variation in its details without departing from my invention, and the gears could be otherwise formed. Notches in the shaft serve to locate each number-wheel substantially in its position for actuation, but at only the one point which is really necessary for the transfer where the tooth is supported outwardly from the center. Other changes would no doubt suggest themselves to those skilled in the art to which my invention pertains.

I desire to state that any number-scale can be used in my improved registering mechanism.

By forming the cam in the shaft the shaft is made to serve the purpose of any additional cams and still serves its purpose as a shaft as well, which is impractical with a projecting cam.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a cylindrical case A, having a fixed head A″, and removable head A′; the shaft E, riveted to the fixed head A″, containing longitudinal grooves E′; corresponding to the number of teeth or steps of the movement of the wheel; number-wheels F, supported thereon, made of sheet metal having internal gear-teeth F′, and a projecting hub F″, from which is formed a spring F‴, having an outwardly-projecting tooth I, to engage the gear-teeth F′, of the next higher and an inwardly-projecting tooth I′, to project into the depressions E′ on the shaft E, and pass the gear-teeth F′, and into depressions E″, to engage the next higher wheel, an internal gear-wheel D, consisting of a ring

with perforations revoluble on shaft E; an external gear-wheel C'; meshing with a hunting-tooth gear with wheel D, on shaft C, carrying said wheel C', and an actuating star-wheel B, revoluble on the shaft C, with a ratchet for engaging the same, a spring surrounding the gear D, having an outwardly-projecting tooth; a projecting tooth; a projecting tooth C'', on gear C', to lift the gear-tooth up and engage the first number-wheel to actuate the same a single step all coacting substantially as described for the purpose specified.

2. In a cyclometer or register mechanism the combination of a casing; a shaft containing longitudinal grooves corresponding to the steps of the movement one of which grooves is shallow; number-wheels containing internal gear-teeth mounted revolubly on said shaft; a spring with an inwardly-projecting tooth to engage in the grooves of the shaft and an outwardly-projecting tooth to engage the next number-wheel when passing the shallow depression carried by each of the lower said number-wheels; and suitable means for actuating the lower number-wheels for the purpose specified.

3. In a cyclometer or register mechanism the combination of a shaft containing continuous longitudinal cam-grooves; gear number-wheels mounted thereon; a radially-movable tooth carried by each of the lower number-wheels and guided by the cam-grooves to engage the next higher number-wheel at intervals of its rotation to operate the same for the purpose specified.

4. In a cyclometer or register mechanism the combination of a fixed shaft E, containing longitudinal cam-grooves E', sheet-metal number-wheels having internal gears and projecting hubs F', from which a spring F''', is formed with inwardly-projecting tooth I', and outwardly-projecting tooth I, at its outer end coacting as specified.

5. In a cyclometer or register mechanism the combination of a fixed shaft containing longitudinal cam-grooves; number-wheels mounted thereon containing internal gear-teeth; a spring with an outwardly and an inwardly projecting tooth carried by each of the lower number-wheels in contact with said shaft to serve as a brake and to actuate the next higher wheel of the series for the purpose specified.

6. In a cyclometer or register mechanism the combination of a fixed shaft containing continuous longitudinal cam-grooves; gear number-wheels mounted thereon; a spring with a tooth thereon carried by each of the lower wheels to be actuated by the cam-grooves to engage at intervals of its rotation the next higher wheel at intervals of its rotation for the purpose specified.

7. In a cyclometer or register mechanism the combination of a fixed shaft with cams formed therein; gear number-wheels mounted on said shaft; a movable tooth carried by each of the lower number-wheels to be actuated by the cam of the shaft to actuate, at intervals of its rotation the next higher number-wheel.

8. In a cyclometer or register mechanism the combination of a fixed shaft; number-wheels carried by said shaft; an internal gear consisting of a perforated ring carried on said shaft; a spring embracing the same and covering one of the perforations; a tooth on said spring to engage the lowest number-wheel normally out of engagement therewith; an external gear-wheel carried on a pivot or shaft on the end of the main shaft meshing therewith having a projecting tooth to raise the spring and cause the tooth to engage the number-wheel at intervals of its rotation for the purpose specified.

9. In a cyclometer or register mechanism the combination of an internal gear; an external gear having a hunting-tooth; a tooth on a suitable spring carried by the internal gear to be actuated by the projecting tooth at intervals of its rotation to actuate the number-wheel as specified.

10. In a cyclometer or register mechanism, the combination of a series of number-wheels, having internal gear-teeth; a movable tooth carried by each of the lower number-wheels; a shaft to support said number-wheels containing cam depressions therein, of sufficient depth to allow the movable tooth on each lower wheel to pass the gear-teeth upon the next higher number-wheel, except at transferring-points, where said movable tooth is caused to engage with and actuate the number-wheel adjacent thereto; and means for retaining the said movable teeth in contact with said shaft.

11. In a cyclometer or registering mechanism, the combination of a series of geared number-wheels; a movable tooth carried by each of the lower number-wheels; a cam-formed shaft to support said number-wheels, and guide said movable teeth past the gear-teeth of said number-wheels; except at transferring-points where said movable teeth engage with and actuate the number-wheels adjacent therewith, and means for retaining said movable teeth in contact with said cam-formed shaft.

12. In a cyclometer, or register mechanism, the combination of a series of geared number-wheels; a movable tooth carried by each lower number-wheel; a cam for each lower number-wheel containing depressions to guide the movable tooth thereof past the gear-teeth of the next higher number except at transferring-points where said movable teeth engage and actuate the higher number of wheels adjacent thereto; and means for retaining the movable teeth in contact with their respective cams for the purpose specified.

13. In a cyclometer or register mechanism, the combination of a fixed shaft with cams formed therein; geared number-wheels mounted on said shaft; a movable tooth car-

ried by each of the lower number-wheels; means for retaining each movable tooth in contact with the cams in said shaft so that each tooth shall engage at intervals of the rotation of its number-wheel the next higher number-wheel, so that the wheels can be placed on said shaft and easily removed without obstruction from the cams, for the purpose specified.

14. In a cyclometer or registering mechanism, the combination of a number-wheel, a second wheel adjacent thereto, having suitable gear-teeth, a movable tooth carried by said second wheel; a third gear-wheel meshing with said second wheel, having a suitable projection to act on the movable tooth of said second wheel, to actuate said number-wheel and means for actuating the third gear-wheel for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

LEO J. BURDICK. [L. S.]

Witnesses:
CHAS. A. STURGIS,
EDITH E. PONTIUS.