

(No Model.)

2 Sheets—Sheet 1.

L. J. BURDICK.
CYCLOMETER.

No. 588,726.

Patented Aug. 24, 1897.

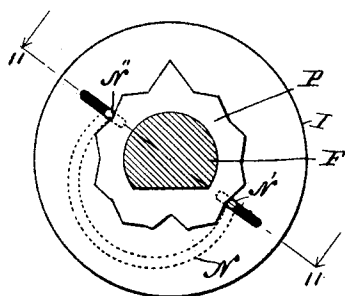
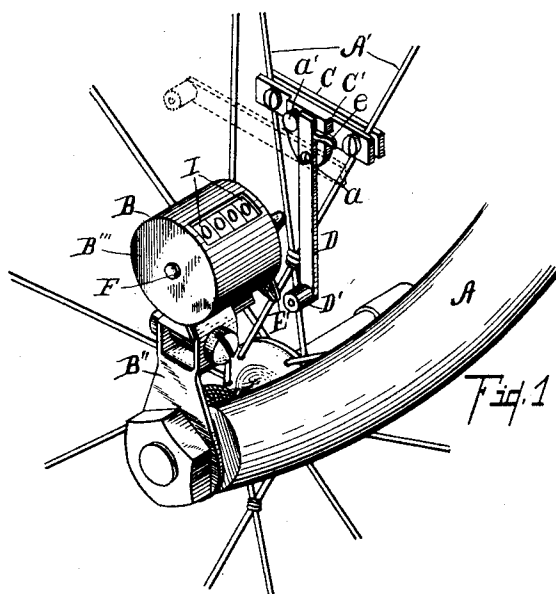


Fig. 10

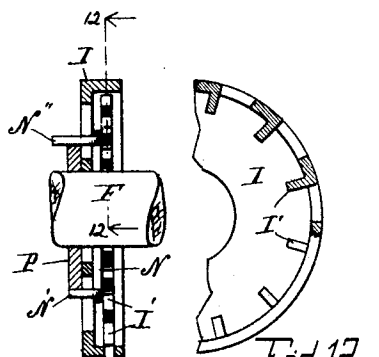


Fig. 11

Fig. 12

Witnesses.

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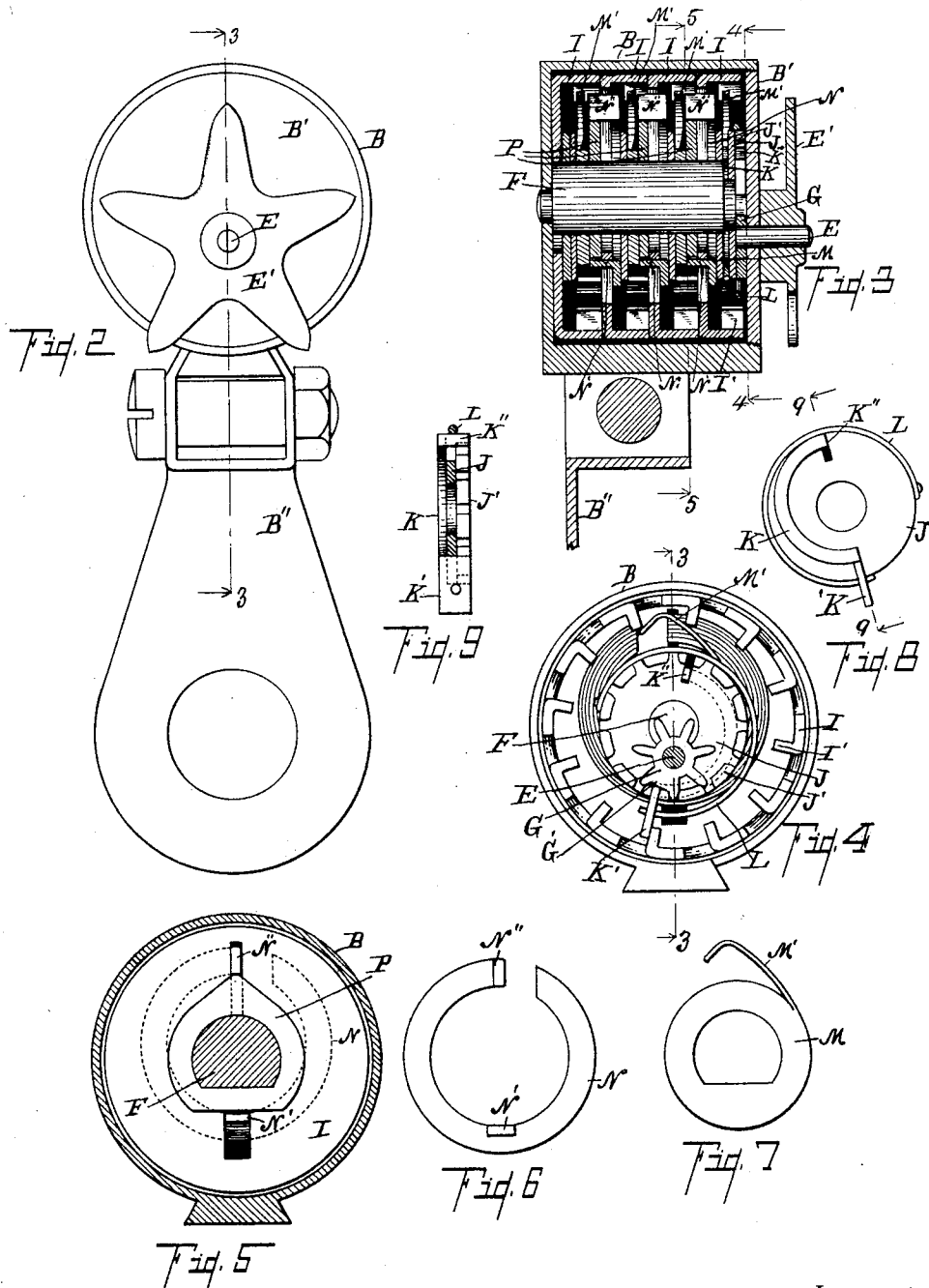
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2 Sheets—Sheet 2.

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W. S. Wood.

Vern E. Chappell.

Inventor.

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UNITED STATES PATENT OFFICE.

LEO J. BURDICK, OF STURGIS, MICHIGAN.

CYCLOMETER.

SPECIFICATION forming part of Letters Patent No. 588,726, dated August 24, 1897.

Application filed February 9, 1897. Serial No. 622,712. (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 village of Sturgis, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Cyclometers, of which the following is a specification.

My invention relates to improvements in cyclometers.

10 The objects of this invention are, first, to produce a cyclometer which shall be simple in construction and very compact; second, to produce a cyclometer that is accurate and will register exactly and definitely the distance traveled; third, to provide in a cyclometer an improved transfer mechanism for transferring the amounts from lower to higher number-wheels; fourth, to provide in a cyclometer an improved mechanism to register the first or smallest space or distance to be recorded; fifth, to provide an improved attachment for the wheel to actuate the cyclometer.

Further objects will definitely appear in the detailed description.

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

30 Figure 1 is a perspective view of my improved cyclometer in position on a bicycle, only a small portion of the bicycle fork and wheel being shown. Fig. 2 is an end elevation of the same much enlarged. Fig. 3 is a vertical longitudinal sectional elevation taken on line 3 3 of Figs. 2 and 4. Fig. 4 is a transverse sectional elevation taken on line 4 4 of Fig. 3, showing the means for securing the registration of the first or smallest space or distance traveled. Fig. 5 is a sectional elevation taken on line 5 5 of Fig. 3, showing the transfer mechanism and its operation for transferring the amount from one number-wheel to the next higher. Fig. 6 is a detail perspective view of the "jumper" or movable cog for actuating the next higher number-wheel from a lower one. Fig. 7 is an enlarged detail view of the spring for stopping or checking the number-wheel in position for proper actuation and to prevent overthrow. Fig. 8 is an enlarged detail view of the wheel J and attached parts for retaining its mov-

able cog in the normal position. Fig. 9 is a detail sectional view taken on line 9 9 of Fig. 8. Fig. 10 is an enlarged detail view of a modification of the transfer mechanism. Fig. 11 is a detail view taken on line 11 11 of Fig. 10. Fig. 12 is a detail sectional view, partially in section, on line 12 12 of Fig. 11.

In the drawings similar letters of reference refer to similar parts throughout the several views, and all of the section-lines 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 represents a portion of a fork and A' the portion of a wheel of a bicycle to which my improved cyclometer is attached. The cyclometer is supported by a standard or arm B'' on the lower end of the fork of the forward wheel of a bicycle. The cyclometer consists of a casing B, within which all of the register mechanism is contained with the exception of a small star-wheel E, which actuates the same, which is exposed to the action of a suitable lug or pin D' upon the bicycle-wheel. This may be a mere lug of the usual form and will operate very satisfactorily. I have shown, however, an improved means for the purpose. My improved actuating means consists of a pair of cross-pieces C C', one of which, C', has a suitable ear, at the bottom of which is a small pivot-screw *a*. On this small pivot *a* is an arm D, having a little roll or pin D' at the bottom for engaging the star-wheel E' of the cyclometer to actuate the same at each revolution of the wheel. This arm D is retained in position by a small stop-pin *a'* and the small spring-catch *e*, which engages the same. When it is desired to throw the pin D' out of engagement with the cyclometer, the spring-catch *e* is depressed and the arm thrown into the position indicated by the dotted lines. Then the wheel can be revolved in either direction when cleaning or oiling without in any way interfering with the registration of the cyclometer. The end B' of the case is made removable. To the opposite end B''' of the case B is fixed the shaft F, which extends nearly to the opposite end B'. On this shaft are carried the number-wheels I and the transfer mechanism.

On the end B' of the cyclometer is carried a star-wheel E' on a suitable pivot E, the same

having a broad facing which bears against the end B' of the case. A small cog-wheel G is secured to the inner end of the pivot E. This cog-wheel has seven cogs, between two of which is a suitable "plug" G', which extends out a considerable distance beyond the bottom of the notches of the remaining cogs. On a reduced end portion of the shaft F is a small wheel J, having an internal gear into which the gear of the wheel G meshes. This gear J has twelve cogs J'. On this wheel J is a movable tooth or cog K'. This is guided in place by fitting into a radial slot in the wheel J and by a lug K'', fitting in a radial slot on the opposite side of the wheel, the lug K'' and tooth or cog K' being connected by a semicircular piece K around the reduced part of the shaft. The tooth K' is held normally in position by the circular spring L, extending through the same. The end of the movable tooth K' when the wheel is in the normal position passes freely around inside of the internal gear-teeth I' of the next number-wheel I.

It will be observed that owing to the numbers of the teeth in the gears G and J—seven and twelve, respectively—the gear-wheel J, actuated from the gear-wheel G, will revolve twelve times before the plugged gear G' contacts with the inner end of the movable tooth K' and forces it out, and when it forces it out it will engage one of the teeth I' of the number-wheel I and actuate it one space. It will also be observed that at every revolution of the bicycle-wheel the star-wheel, which has five teeth, is moved one-fifth of the distance around, so that the first number-wheel I of the series will be actuated one step in sixty revolutions of the bicycle-wheel, and that always with the two gears G and J at the same point. From this it will appear that each sixtieth revolution of the bicycle-wheel is registered and the distance traveled indicated.

A suitable disk M, with a spring M', is placed upon the shaft F and is retained by one side of the shaft being flattened. The spring M' retains a number-wheel in position by settling between the cogs, as clearly appears in Fig. 4. There is a disk M with spring M' for each number-wheel.

Having explained how the first number-wheel is actuated in its separate steps, I will now describe the mechanism and means for actuating the succeeding number-wheels or the transfer mechanism. The means for actuating the same is identical in each case, so one description answers for all. After the first number-wheel the numbers are on the decimal scale, the first being fractions of a mile, the next miles, the next tens of miles, and the next hundreds of miles, and the same could be extended indefinitely in this way. Each of the number-wheels I is formed of sheet metal with an upturned rim, the teeth being cut in from the said rim. The hole at the center of these number-wheels is made round, so that they revolve freely on the shaft

F, which has only one side flattened. Within the rim of each number-wheel I is the circular disk N, having flat radial lug or tooth N' at one side and a lug N'' transverse thereto at the other side, extending through slots extending radially from the center of the number-wheel, as clearly appears in Fig. 5. To the back side of each number-wheel is placed a suitable cam P, one side of which is flattened and the other pointed, which is held rigidly upon the shaft F by being made exactly to conform to the flat side thereof. As the number-wheel I revolves it carries with it the ring N, having its lugs or teeth N' N'', and as it travels around forces tooth N'' out, so that it engages one of the teeth of the next succeeding number-wheel I and actuates it one notch, when the lug N'' drops back out of engagement owing to the cam controlling the same. This structure is repeated between each pair of number-wheels I, and consequently the rotation of each of the lower number-wheels actuates the next higher one notch at each revolution, as there are ten notches on the number-wheel arranged in decimal scale, they consequently indicate the distance traveled.

Springs M' on the fixed disks M are located so that they act to detain each of the number-wheels in their correct relative position after they have been actuated and prevent their being carried too far. Suitable brakes might be used instead of these springs, and springs might be otherwise supported and secure the result. All that is required is to prevent the number-wheels being carried too far at each step of their actuation.

A modified construction of actuating the number-wheels is illustrated in Figs. 10, 11, and 12. In these views the internal gear-teeth I' are very narrow and do not project the full width of the rim of the number-wheel I. A cam P is supported upon the shaft F the same as before. This cam has depressions corresponding to the number of gear-teeth. A single piece of spring-wire having upturned ends to form the tooth N'' and lug N' serves to retain the number-wheels and as a transfer mechanism. Tooth N'', being the longer and the ends being inserted through suitable radial slots in the number-wheel I as it revolves over the notches of the cam P, serves as a stop for the number-wheel, and when the tooth N'' passes over the point of the cam it actuates the next higher wheel by the elongated end of the tooth N'' engaging the modified tooth I' of the next succeeding wheel.

Having thus described my improved cyclometer, I desire to state that it can be greatly varied in its details without departing from my invention. This must clearly appear from my above description. I desire to state that different numbers of cogs may be employed in the gear-wheels G and J and that the cyclometer can be made to operate in any desired scale. The structure and manner of

retaining the cams P in position can be varied, and the cams might be a part of the shaft itself. The cams might be retained upon a perfectly round shaft by being driven on.

5 However, the round shaft with a flat side is an exceedingly convenient structure, owing to the fact that it is very easy to take the cyclometer apart and put it together again. It is not essential that the internal gears used be
10 constructed from sheet metal, as here shown, though that is the preferred construction. Various other changes will no doubt suggest themselves to any one skilled in the art to which my invention appertains.

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

1. In a cyclometer, the combination of a suitable case B, with an arm B'', to support
20 and attach the same; a stop on the bicycle-wheel to actuate the same; a shaft F, flattened on one side and fixed to the end B'', of said case and extending to near the opposite end B', thereof; a star actuating-wheel E', on a
25 pivot E, extending through the end B', of the case; a gear G, on the inner end of said shaft or pivot E, having the space between two of its teeth partially plugged; an internal gear J, supported on the end of the shaft F, and
30 meshing with gear G; a movable tooth K', in a slot in gear J, guided by lug K'', in a radial slot in the opposite side thereof and joined to the tooth K', by a semicircular piece K; a
35 spring L, around said wheel J, and through the tooth K', to hold it normally toward the center of the wheel; a number-wheel I, on said shaft F, with internal gear-teeth I', to be engaged and actuated by said tooth K', when
40 forced out by the plug in gear G; a movable tooth N'', in a radial slot in the number-wheel I, suitably guided by the ring N, and lug N', in a radial slot on the opposite side of said wheel; a cam P, with a projecting point and a flattened or depressed portion opposite fixed on
45 said shaft next to the back side of said number-wheel to force said tooth N'', outwardly at each revolution; a higher number-wheel I', to be engaged by the said tooth N''; and disks M, with springs M', to stop and locate said
50 number-wheels and prevent overthrow all co-acting together substantially as described for the purpose specified.

2. In a cyclometer the combination of a suitable case B, with means of attaching the
55 same; a stop on the bicycle-wheel to actuate the same; a shaft F, fixed to the end B'', of said case and extending to near the opposite end B', thereof; a star actuating-wheel E', on a pivot E, extending through the end
60 B', of the case; a gear G, on the inner end of said shaft or pivot E, having the space between two of its teeth partially plugged; an internal gear J, supported on the end of the shaft F, and meshing with gear G; a movable
65 tooth K', in a radial slot in the opposite side thereof and joined to the tooth K', by a semicircular piece K; a spring L, around said

wheel J, and engaging the tooth K' to hold it normally toward the center of the wheel; a number-wheel I, on said shaft F, with internal
70 gear-teeth I', to be engaged and actuated by said tooth K', when forced out by the plug in gear G, coacting as specified.

3. In a cyclometer a shaft F, with a flattened side; a series of number-wheels I, thereon
75 having internal gear-teeth; a movable tooth N'', in a radial slot in each of the lower number-wheels with suitable means of guiding the same; cams P, with projecting points fixed on said shaft alternately between said
80 number-wheels to engage the movable teeth to force them out to engage the internal gear of the next higher number-wheel and disks M, with springs M', secured to said shaft to stop said number-wheels as specified.
85

4. In a cyclometer a shaft F, with a flattened side; a series of number-wheels I, thereon
having internal gear-teeth; a movable tooth N'', in a radial slot in each of the lower number-wheels with suitable means of guiding
90 the same; cams P, with projecting points fixed on said shaft alternately between said number-wheels to engage the movable teeth to force them out to engage the internal gear of the next higher number-wheel as specified.
95

5. In a cyclometer a shaft F; a series of number-wheels I, thereon having internal
gear-teeth; a movable tooth N'', in a radial slot in each of the lower number-wheels with
100 suitable means of guiding the same; cams P, with projecting points fixed on said shaft alternately between said number-wheels to engage the movable teeth to force them out to engage the internal gear of the next higher
105 number-wheel and disks M, with springs M', secured to said shaft to stop said number-wheels as specified.

6. In a cyclometer a shaft F; a series of number-wheels I, thereon having internal
gear-teeth; a movable tooth N'', in a radial
110 slot in each of the lower number-wheels with suitable means of guiding the same; cams P, with projecting points fixed on said shaft alternately between said number-wheels to engage the movable teeth to force them out to
115 engage the internal gear of the next higher number-wheel as specified.

7. In a cyclometer the combination of a number-wheel with internal gear; a second
wheel parallel therewith with an internal gear;
120 a movable tooth in a radial slot on said second wheel suitably guided; a spring L, to retain said tooth normally toward the center of the wheel; a small external gear-wheel with deep
125 cogs the space between two of which is partially plugged meshing with the second gear-wheel; suitable means of actuating the small external gear so that during its revolutions the plug between the cogs forces out the movable tooth to actuate the number-wheel as
130 specified.

8. In a cyclometer the combination of a number-wheel; a second wheel adjacent thereto with suitable gear-teeth; a radially-

movable tooth on said second wheel projecting through one of the cogs; a third wheel having deep cogs meshing with said second wheel the space between two of which cogs is plugged; and means for actuating the third wheel to cause the plug to push the radially-movable tooth during its revolution to actuate the number-wheel for the purpose specified.

9. In a cyclometer the combination of a number-wheel; a second wheel adjacent thereto having suitable gear-teeth; a radially-movable tooth on said second wheel; a third gear-wheel meshing with said second wheel having a suitable plug to act on the movable tooth of the second 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:
VENE E. CHAPPELL,
WALTER S. WOOD.