(No Model.)

W. R. DUTEMPLE.

CYCLOMETER.

No. 362,883. Patented May 10, 1887.

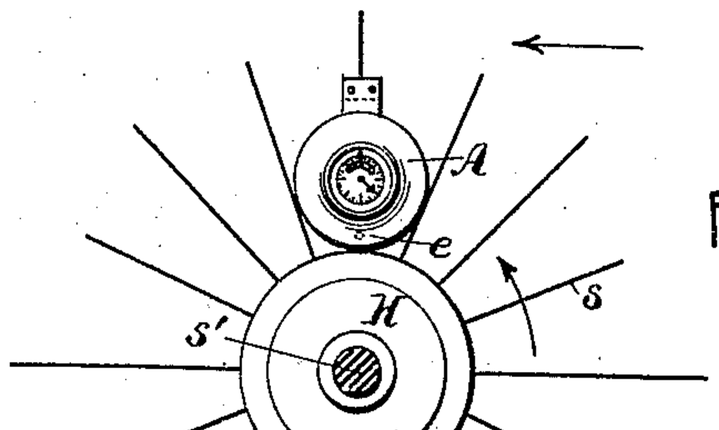

FIG. 1.

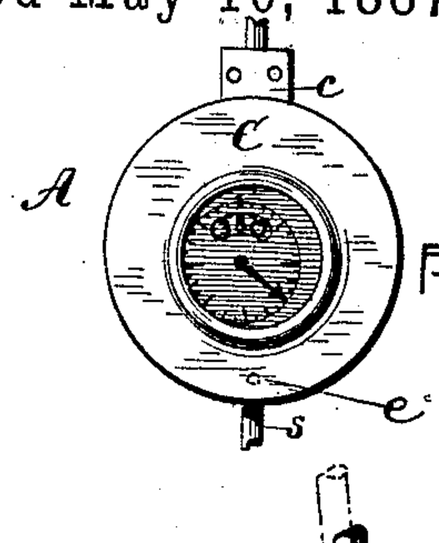

FIG. 2.

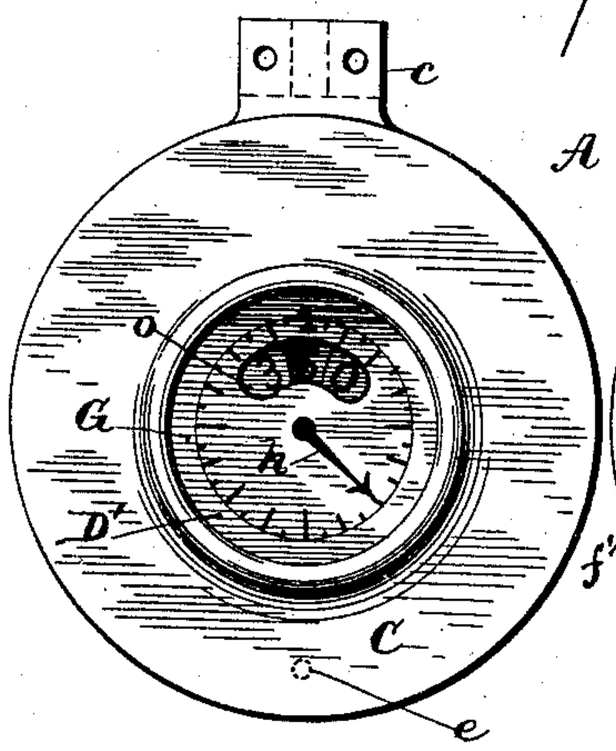

FIG. 3.

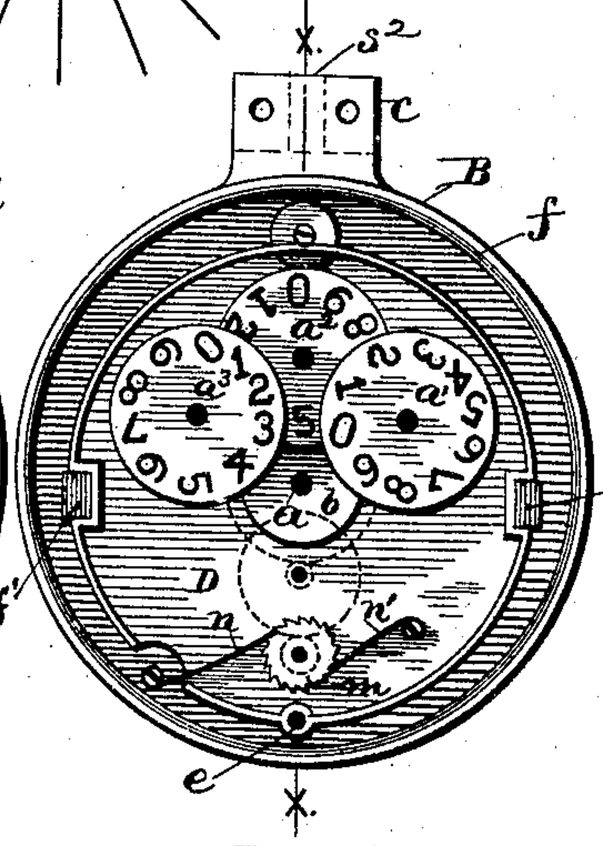

FIG. 4.

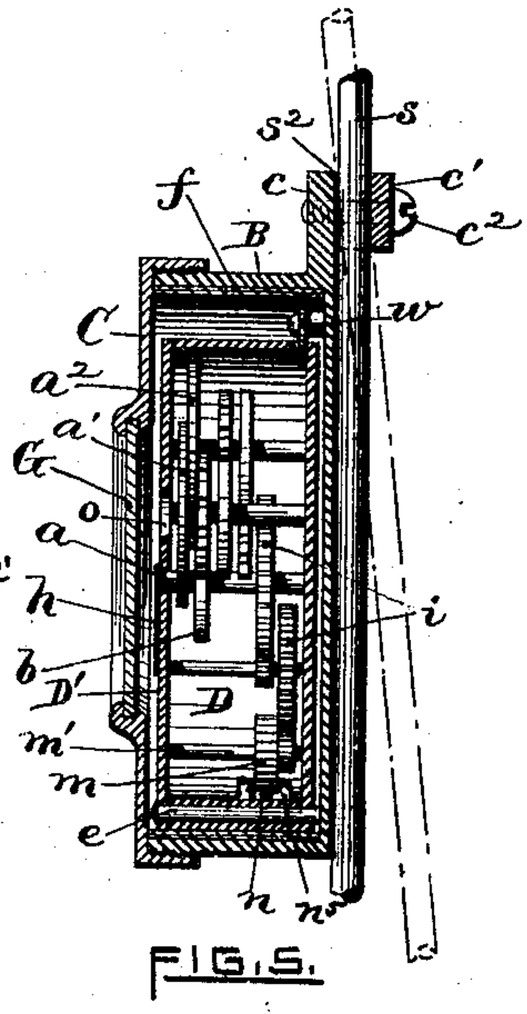

FIG. 5.

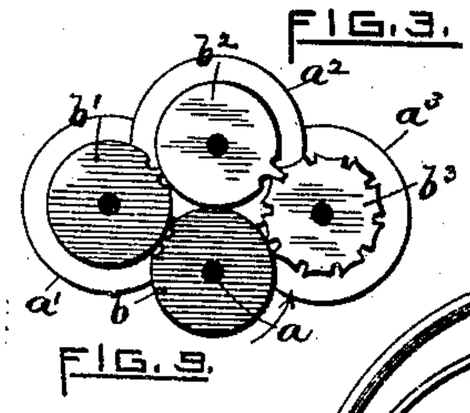

FIG. 9.

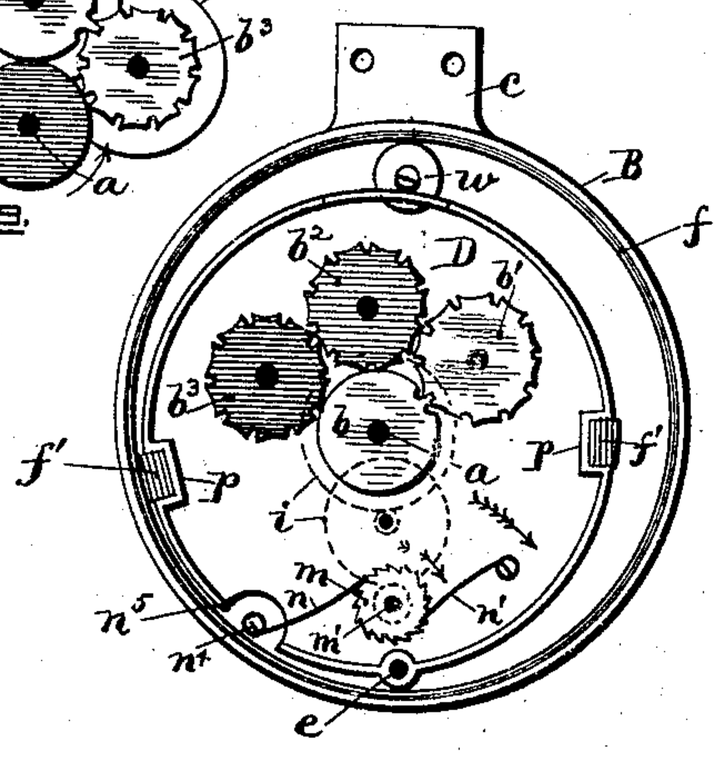

FIG. 6.

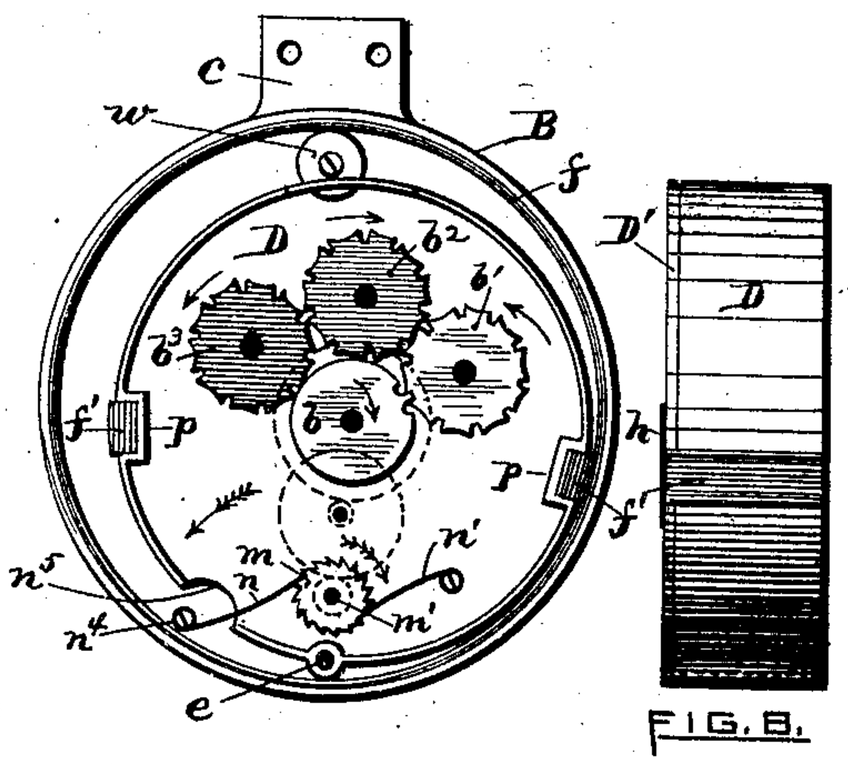

FIG. 7.

FIG. 8.

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CYCLOMETER.

SPECIFICATION forming part of Letters Patent No. 362,883, dated May 10, 1887.

Application filed February 15, 1887. Serial No. 227,754. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. DUTEMPLE, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Cyclometers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to "cyclometers," so called; and it consists, essentially, in the novel construction and arrangement of the registering mechanism and the manner of mounting the same, all as will be more fully hereinafter set forth and claimed.

The object of my present invention is to produce a cyclometer more particularly adapted to be secured to a bicycle-wheel, whereby the latter in its revolutions, whether slow or rapid, causes the registering-train of the cyclometer to accurately indicate the distance traveled.

Heretofore the construction of cyclometers has been such that they are more or less inaccurate in their readings, another disadvantage being that dust, water, &c., enter the interior of the casing, thereby seriously affecting the mechanism and rendering it unreliable in its action, if not wholly inoperative. Again, cyclometers secured to the spokes of a bicycle-wheel have been so constructed that a tangentially-arranged sliding weight is made to engage a ratchet-wheel to actuate the registering mechanism. It is obvious in this latter arrangement that the bicycle, when running at a rapid rate, produces a centrifugal or tangential force which opposes the normal action of the weight, thereby, as stated, rendering its readings or indications unreliable.

It is well known that the hub of a bicycle-wheel is usually not less than five inches in diameter. In view of this fact, and to obtain the best results, it is apparent that a gravity-acting cyclometer, when attached to a spoke of the wheel, as above indicated, should be secured as close to the center of the wheel as possible, a distinguishing feature of my invention herewith being that the fulcrum or pivot on which the registering mechanism is mounted is located at the lower edge of the shell or casing and immediately adjacent to the hub of the wheel. By means of this arrangement the opposing force above referred to is reduced to a minimum; another feature of the invention being that the registering mechanism itself, eccentrically mounted on a pivot secured to the normally stationary case, by means of its weight serves to produce the power necessary to intermittently operate the cyclometer.

In the accompanying sheet of drawings, illustrating my improvements, Figure 1 represents the cyclometer (in reduced scale) secured to the inner right side of a bicycle-wheel, contiguous to the hub thereof, the main shaft or axle being sectionally shown. Fig. 2 is an enlarged view in elevation of the cyclometer detached. The succeeding figures are drawn somewhat enlarged in order to more clearly exhibit the construction and arrangement of the several parts. Fig. 3 is a front view. Fig. 4 is a similar view having the cap and dial removed. Fig. 5 is a vertical sectional view taken on line *x x* of Fig. 4. Fig. 6 is a front view having the cap, dial, and numbered disks removed, and showing the mechanism vibrated to the left limit, said movement, in connection with the stationary spring-pawl, thereby turning the ratchet-wheel one tooth in the arrow direction. Fig. 7 is a similar view of the cyclometer, showing the relation of the parts to the casing and corresponding to the latter half-revolution of the bicycle-wheel, the opposite catch or check-pawl retaining the ratchet-wheel in position, while the free end of the operating-pawl slips over the wheel to engage the next tooth. Fig. 8 is a side view of the inner or pivoted case in which is mounted the gearing, &c.; and Fig. 9 is a detached view showing the rear side of the intermittently-operating wheels which are mounted upon the disk-carrying spindles.

The following is a more detailed description of the invention, including the manner of its operation.

A, referring again to the drawings, designates my improved self-registering cyclometer as a whole, and as adapted to be secured to the spokes of a bicycle-wheel.

B indicates the shell or casing in which the mechanism is mounted, said casing, as drawn,

being cylindrical and made of sheet metal, the bottom and sides or barrel being without external openings. The front, however, is open and adapted to receive the cover or cap C, the two parts being screwed together. To the rear of the casing is secured a short extension, *c*, which is adapted to receive a spoke, *s*, of the bicycle, a plate, *c'*, and clamping-screws c^2, Fig. 5, serving to retain the cyclometer in position upon the wheel. A glass disk, G, is fitted and adapted to be hermetically sealed in an opening formed in the cap C.

D indicates a cylinder mounted within the casing B. *e* is a stud or pivot secured to the lower side or edge of the case B, and on which the cylinder D is mounted to vibrate, as clearly shown. The length of the cylinder is about equal to the inner width of the casing B, the front D' of the cylinder being provided with a graduated face or dial. The two ends of the cylinder D are adapted to receive the arbors or spindles of a gear-train and registering mechanism, the same being mounted so as to be nearly frictionless. To the lower side of the cylinder, near the pivot *e*, a spindle, *m'*, is mounted to revolve, a ratchet-wheel, *m*, being secured to said spindle. A check or retaining-pawl, *n'*, is mounted at the base of the cylinder to engage the ratchet-wheel.

n indicates an oppositely-arranged spring-pawl secured to the casing at n^4, for the purpose of actuating the ratchet-wheel, the latter pawl passing through an opening, n^5, formed in the adjacent side and base of the cylinder.

a indicates the center spindle, on which is secured, exterior of the dial, the index-hand *h*. A train of suitably-proportioned reducing-gearing, *i*, transmits the intermittent rotary movement of the ratchet-wheel to the said center spindle, one revolution of the latter representing a mile or other unit of distance, as may be desired.

Upon the center spindle, *a*, is secured a single-tooth wheel, *b*, which engages a ten-tooth (units) wheel, *b'*, mounted on a spindle, the latter also carrying a single-tooth wheel engaging a ten-tooth (tens) wheel, b^2, mounted on a spindle, which latter in turn carries a similar single-tooth wheel engaging a ten-tooth (hundreds) wheel, b^3, mounted on a spindle at the left of the center. Immediately below the face of the dial D' are secured on their respective spindles the three disks a' a^2 a^3, Fig. 4, numbered and arranged as clearly shown. An elongated opening, *o*, is formed in the dial above the center spindle, through which the "readings" of the cyclometer may be ascertained.

In order to deaden the slight noise produced by the "click" of the pawls, &c., I preferably line the interior of the case with leather, felt, or other suitable material, as at *f*, similar material, *f'*, being secured in oppositely-located pockets, *p*, formed in the sides of the vibrating cylinder adjacent to the touching-points thereof with the case. A washer, *w*, secured to the upper side of the case, extends down through a narrow opening formed in the cylinder, to prevent endwise movement of the latter.

In bicycles as usually constructed the hub of the wheel is of considerable length, terminating on each end in an enlarged flange, into which the wire spokes *s* are secured, said spokes extending therefrom outwardly in an angular direction and unite with the rim of the wheel, the angle of the spokes being indicated by the dotted lines, Fig. 5.

The cyclometer is secured in a substantially vertical plane or position to the inner right-hand side of the bicycle-wheel, close up to the hub thereof, as shown in Fig. 1.

Now, assuming the bicycle-wheel to be revolving on its axis in the forward or arrow direction, Fig. 1, and having the cyclometer A mounted thereon, the operation of the device is as follows: Just prior to passing the upper center the cylinder D, containing the mechanism, stands in the position shown in Fig. 7, the check-pawl *n'* preventing the gear-train from working rearwardly. Now, the forward axial movement of the bicycle-wheel carries the case past the vertical center and downwardly, at the instant, however, that the pivoted cylinder D passes its center of gravity. The weight thereof, together with its attached mechanism, immediately causes it to vibrate on the pivot *e*, to engage the opposite side of the case, and in advance of the speed of the revolving bicycle-wheel, the corresponding position being shown in Fig. 6. During this latter angular movement the ratchet-wheel is forced rearwardly (see arrow) one tooth by reason of its engagement with the end of the stationary spring-pawl *n*. As the bicycle-wheel continues to turn to complete the first half of its revolution, the case and cylinder D then travel in unison until the cylinder is (for the instant) nearly vertical on the lower center. The bicycle-wheel, still turning, carries the case in an upward direction, at which time the case (for the time being) travels faster than the cylinder, the latter at the same time being relatively stationary—that is to say, the case moves away from the cylinder until the rear side of the former engages the corresponding side of the latter, when the two parts again travel in unison. During this latter movement of the parts the ratchet-wheel and check-pawl travel together against the slight tension of the pawl *n*, thereby carrying the ratchet from the stationary pawl and permitting the point thereof to engage a new tooth, the corresponding position of the cylinder being substantially as represented in Fig. 7. The case and cylinder now travel in unison with the bicycle-wheel, as just stated, thus completing a revolution.

It will be noticed that during the complete revolution of the bicycle-wheel the ratchet-wheel *m*, secured to the axis *m'*, has been vibrated only one tooth. It is evident, therefore, that if the periphery of the bicycle-wheel be so proportioned as to require, say, just four hundred and eighty revolutions thereof

to equal one mile, (which would be the case with a forty-two-inch-diameter wheel,) then the spring-pawl *n* will have engaged during the time a corresponding number (four hundred and eighty) of teeth, the number of teeth in the ratchet-wheel *m* and the reducing-train *i* being such as to produce just one revolution of the center spindle, *a*, during four hundred and eighty vibrations of the cylinder D, the hand *h* thereof in its revolution indicating at the same time one mile, said movement, in connection with the one-tooth wheel *b*, &c., also turning the unit-disk-carrying spindle one-tenth of a revolution.

The construction and arrangement of the one-tooth wheels *b* and the ten-tooth wheels b' b^2 b^3 to produce an intermittent registering device are old, the same being substantially the equivalent of the well-known device called the "Geneva stop," the device as drawn being adapted to register nine hundred and ninety-nine. By the addition of another spindle, wheels, and disk, thousands may in like manner be indicated.

It is well known that a rapidly-revolving pivoted body, particularly when attached quite a distance from the axis of rotation, produces a tangential or centrifugal force, which serves to greatly retard, if not to wholly neutralize, the force of gravity, which latter would readily act on slowly-revolving bodies.

The gravity-acting principle is involved in my improved cyclometer when combined with a revolving wheel, the device being practically operative when attached immediately adjacent to the hub of the bicycle-wheel, as shown in Fig. 1. In this position a fifty-four-inch-diameter wheel even may revolve at the rate of a mile a minute and register accurately; but by simply reversing the position of the cyclometer—that is to say, securing it to the wheel so that the pivot *e* is uppermost—then the circle gyration is so large that the apparatus fails to register except at a comparatively slow rate of speed of the bicycle.

It is obvious that by a slight change in the attaching means *c*, &c., the cyclometer may be employed to register the continuous revolutions of shafting. It is also adapted to be used on a vehicle-wheel as a "counter" or "detector." It is further evident that any standard of measurement may be adopted, the graduations and gear-train being a simple matter of calculation. In its adaptation to different sizes of bicycles, tricycles, and other similar traction-wheels, the gear-train is changed according to the corresponding number of revolutions per mile required.

It is obvious that minor changes may be made in the construction of the device herein shown without departing from the spirit of the invention—as, for example, the pivoted mechanism carrying cylinder D may consist of a back plate and the front plate or dial, D', the two being secured together by studs or screws, substantially the same as clock or watch plates are mounted. The attaching-lug *c* (one or more) may be secured immediately to the back of the case B and project sufficiently therefrom to receive a wheel-spoke, *s*.

The glass-covered opening formed in the cap may be located in the exact center thereof, to present a more symmetrical appearance, if desired; and, as hereinbefore stated, the size of the cyclometer may be greatly reduced—in fact, to about one and three-fourths inch in diameter.

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

1. The improved cyclometer or speed-indicator hereinbefore described, consisting of a capped case, a pawl secured therein, a cylinder or framing pivotally mounted within the case near its edge, carrying a gear-train and registering mechanism adapted to be operated by the oscillation of the said cylinder, and means for attaching the cyclometer to a wheel or other revolving mechanism, substantially as set forth, and for the purpose specified.

2. The combination, with a normally stationary case adapted to be attached to a bicycle-wheel, and a pawl secured therein, of a frame pivotally mounted within the case near its edge, and registering mechanism mounted in said frame, consisting of a ratchet-wheel, check-pawl, speed-reducing gear-train, and intermittently-actuated indicating-disks, all arranged and operating substantially as shown, and for the purpose hereinbefore set forth.

3. In a cyclometer, the combination, with the outer case and the registering mechanism carrying cylinder or plate pivotally mounted therein near its edge, of a ratchet-wheel mounted to revolve in said cylinder, a check-pawl engaging the ratchet-wheel attached to and vibrating with the cylinder, and a spring-pawl attached to the interior of the said case, adapted to intermittently actuate the ratchet-wheel in a continuous direction, substantially as shown and described, and for the purpose hereinbefore set forth.

4. The combination, with the pivotally-mounted cylinder or frame D, registering mechanism mounted to revolve therein, a perforated dial having divisions or a graduated circle thereon, and an index-hand, of the outer case adapted to receive and retain said cylinder, and a pawl secured to the interior of the case, adapted to engage a ratchet-wheel of the registering mechanism, substantially as shown and described.

5. The combination, with a bicycle-wheel, of the improved cyclometer A, hereinbefore described, secured thereto, and having the pivot *e* of the cyclometer and its vibrating mechanism mounted adjacent to the hub of said wheel, substantially as shown, and for the purpose specified.

6. The combination of the case B, having a cap or front provided with a glass-covered opening, lining *f*, secured to the interior of the case, the registering mechanism carrying cyl-

inder or frame D, pivotally mounted at its lower edge to a pin secured to the adjacent side of the case, and oppositely-located buffers *f'*, secured to the cylinder, substantially as shown and described, and for the purpose hereinbefore set forth.

7. In a cyclometer, the combination, with the ratchet-wheel *m* and check-pawl *n'*, mounted and adapted to vibrate in unison with the pivotally-mounted registering mechanism carrying cylinder D, of the spring-pawl *n*, attached to the cyclometer-case, adapted to engage a new tooth of the said ratchet-wheel at each vibration of the said cylinder, substantially as shown and hereinbefore described.

8. The combination, with the capped case B, having means for attaching it to a bicycle-wheel, &c., of the mechanism carrying cylinder or frame D, eccentrically mounted within the case on a stud or pivot secured to the lower portion of the case near its edge, and a pawl adapted to engage a ratchet-wheel mounted in the said frame, whereby the oscillations of the frame produce an intermittent rotary movement to the index-hand and indicating-disks, substantially as shown and hereinbefore described.

In testimony whereof I have affixed my signature in presence of two witnesses.

WM. R. DUTEMPLE.

Witnesses:
CHARLES HANNIGAN,
GEO. H. REMINGTON.