

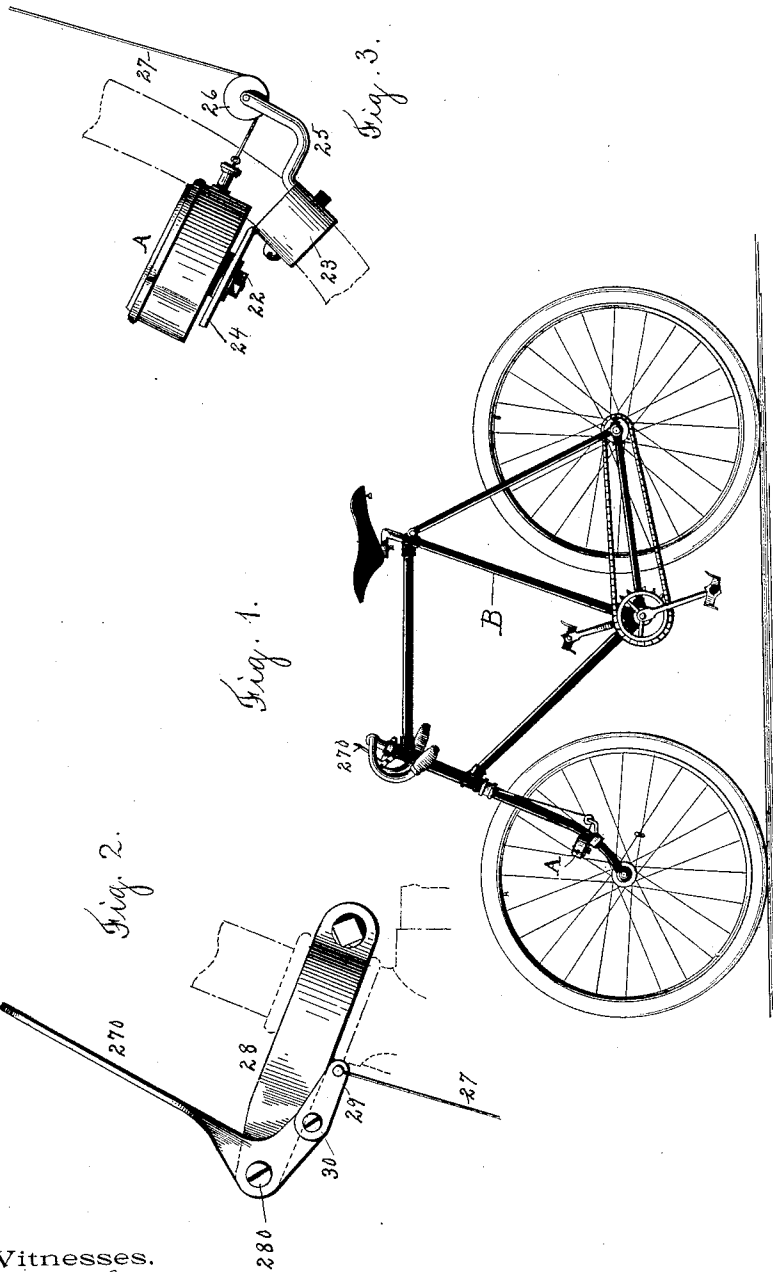
(No Model.)

3 Sheets—Sheet 1.

D. HARRINGTON.  
COMBINED ODOMETER AND CHRONOMETER.

No. 580,047.

Patented Apr. 6, 1897.



Witnesses.

*Chas. F. Fildes*  
*W. J. Baldwin*

Inventor.

*D. Harrington,*

By  
*Southgate, Southgate*  
Attorneys.

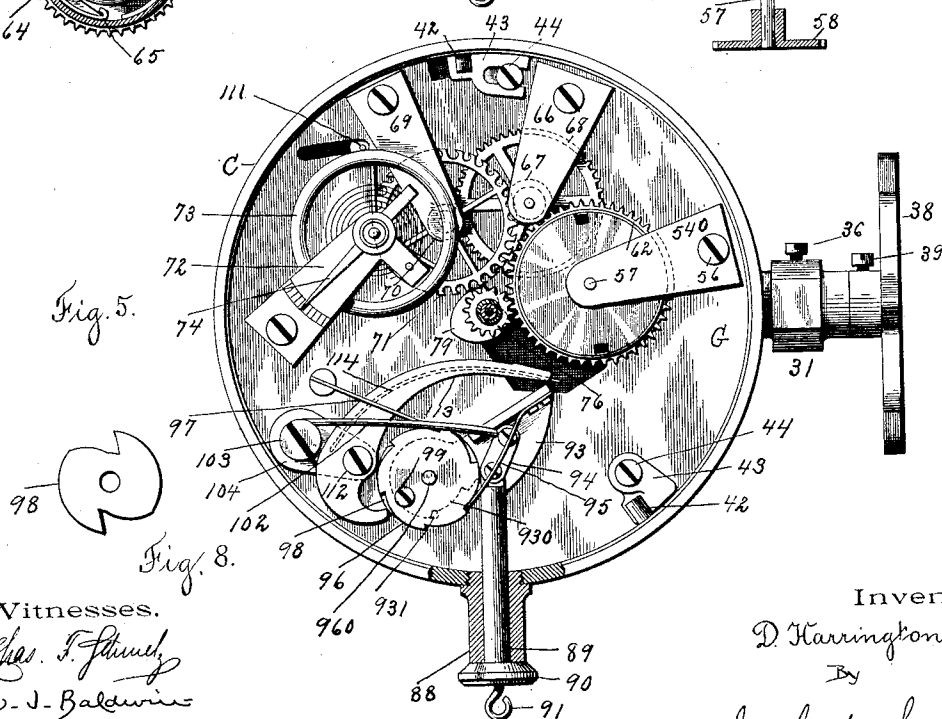
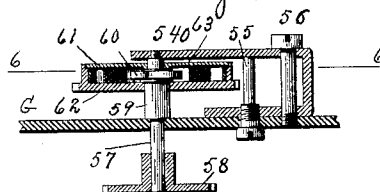
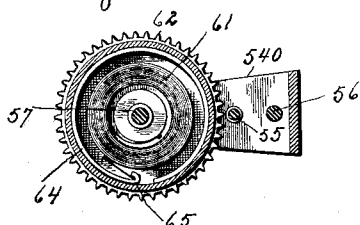
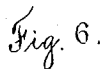
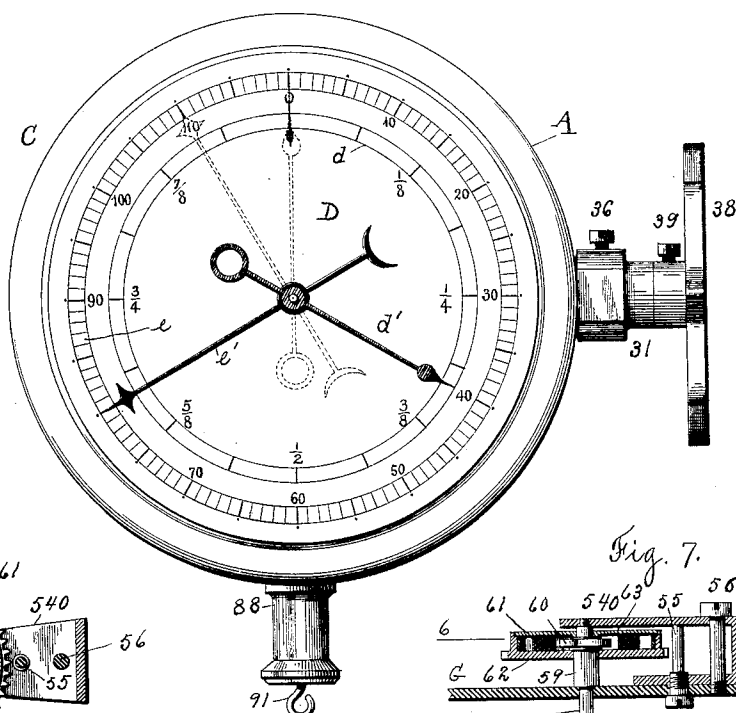
(No Model.)

3 Sheets—Sheet 2.

D. HARRINGTON.  
COMBINED ODOMETER AND CHRONOMETER.

No. 580,047.

Patented Apr. 6, 1897.



Witnesses.

Chas. F. Schmelz  
W. J. Baldwin

Inventor.

D. Harrington,

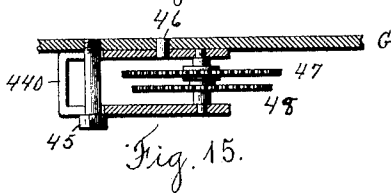
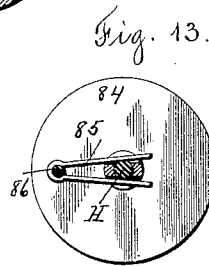
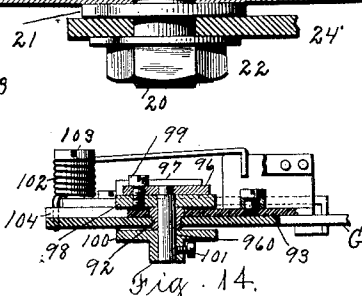
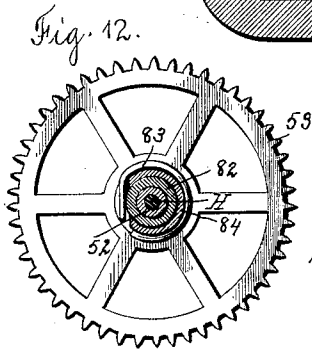
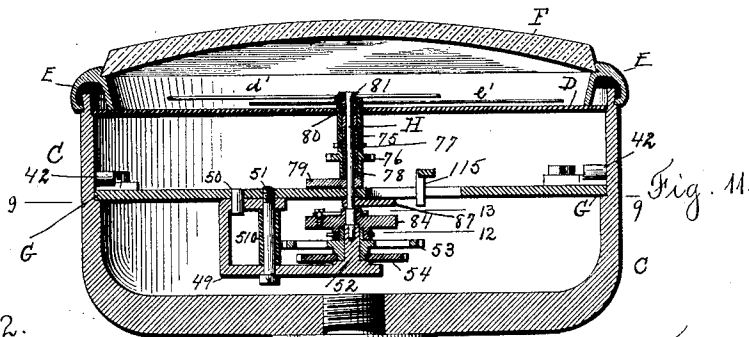
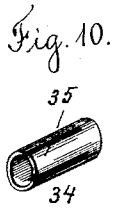
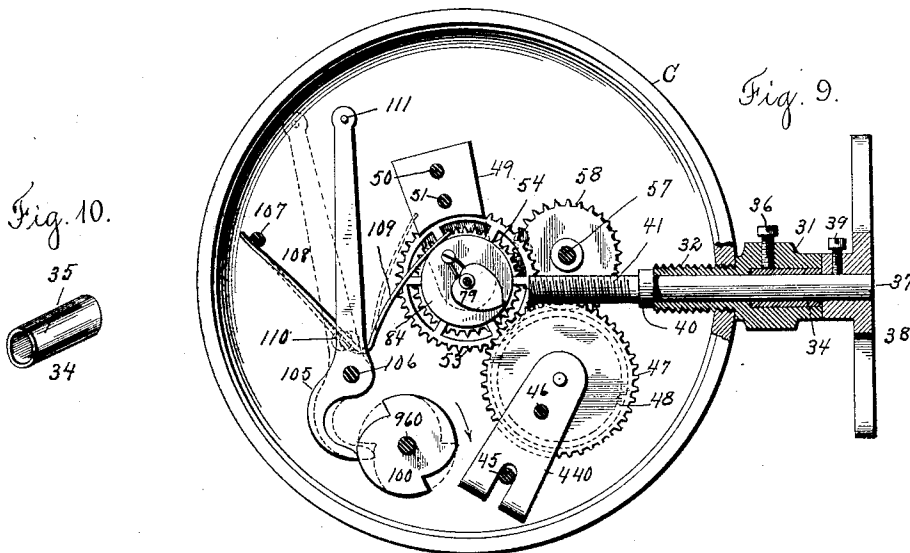
B

Southgate & Southgate  
Attorneys.

D. HARRINGTON.  
COMBINED ODOMETER AND CHRONOMETER.

No. 580,047.

Patented Apr. 6, 1897.



Witnesses.  
*Chas. F. Fitch*  
W. J. Baldwin

Inventor.  
D. Harrington,  
By  
*Southgate & Southgate*  
Attorneys

# UNITED STATES PATENT OFFICE.

DAVID HARRINGTON, OF WORCESTER, MASSACHUSETTS.

## COMBINED ODOMETER AND CHRONOMETER.

SPECIFICATION forming part of Letters Patent No. 580,047, dated April 6, 1897.

Application filed October 4, 1895. Serial No. 564,605. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID HARRINGTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in a Combined Odometer and Chronometer, of which the following is a specification.

The aim of this invention is to provide a combined odometer and chronometer which shall be very simple and effective to accomplish the functions for which it is designed.

My construction has been primarily designed for use in connection with bicycles, so that the rider can accurately compare the distance traversed with the time elapsed, although my invention can be applied to any mechanism in which it is desired to compare its operation with the elapsed time.

My invention consists in a combined odometer and chronometer, in which the indicating-hand of the chronometer and the indicating-hand of the odometer are arranged relatively, so that the indicators of each may be easily compared, of means for actuating the odometer, with connections to automatically wind the chronometer. The chronometer is also preferably provided with a relief device in its mainspring, so that if the mainspring is wound tight an escape or relief will be provided. I also arrange with these parts a starting, stopping, and setting device, by which the device can be started in operation, stopped to ascertain its measurement, and then set to zero position ready for another use. By this construction I provide an efficient device for the purpose stated in which the winding of the chronometer by manual operation is dispensed with.

Referring to the accompanying three sheets of drawings, I will describe my device as applied for use in connection with a bicycle.

Figure 1 is a side elevation of a bicycle with my device applied thereto. Fig. 2 is a detail of the operating-lever which is mounted near the handle-bars. Fig. 3 is a detail view showing the way my device is applied to one of the front forks of the bicycle. Fig. 4 is a plan view of my combined odometer and chronometer. Fig. 5 is a similar view with the hands and graduated disk removed. Fig. 6 is a sectional plan view of the mainspring and relief,

taken on the line 6 6 of Fig. 7. Fig. 7 is a transverse sectional view of the parts shown in Fig. 6. Fig. 8 is a detail view of the cam which is used to actuate the part that sets the hands. Fig. 9 is a sectional plan view taken on the line 9 9 of Fig. 11. Fig. 10 is a detail view of a friction device that I use on one of the shafts. Fig. 11 is a longitudinal sectional view through the center of my device. Fig. 12 is a detail upon an enlarged scale of one of the friction devices, the same being taken on the line 12 of Fig. 11. Fig. 13 is a similar view of another friction device, taken on the line 13 of Fig. 11. Fig. 14 is a sectional elevation through the shaft on which some of the operating parts of the setting mechanism are mounted, and Fig. 15 is a detail of part of the gearing hereinafter referred to.

I will first describe one way by which my device may be conveniently applied and used on a bicycle.

My combined odometer and chronometer is referred to generally by the reference-letter A.

Screwed in the bottom of my device is a stud 20, on which is placed a washer 21 and nut 22.

The bicycle is designated by B, and mounted on one of the forks of the same is a frame 23, which has a projecting arm 24, into which the stud 21 is fitted, and by means of the nut 22 the device is held in place; also projecting from the frame 23 is a yoke 25, which carries a small pulley 26. Extending from the actuating-arm of my device is a wire 27, which passes around said pulley 26. A yoke 28 is secured to the bicycle, on the head thereof, and a bell-crank lever 270 is pivoted thereto by means of screw 280. This bell-crank lever has an extending arm 29, which may be adjusted about a screw 30 as a pivot. The other end of the wire 27 is connected to this extension 29, and by this means the wire may be properly adjusted between the operating-handle or bell-crank lever 270 and my device. This construction is a simple and efficient one, for the rider by touching the bell-crank lever with his thumb can start, stop, or set my device, as desired, and the position of my device on one of the forks is one which enables the rider to see the position of the hands while still on the machine.

I will now describe the detailed construction of my combined odometer and chronometer, and reference to follow this construction should be had to the second and third sheets of the drawings. The parts as shown in these two sheets of drawings are about twice the scale of my device as ordinarily constructed, although, of course, the device may be made of any desired size.

C represents a suitable casing, which may be made out of alumina if lightness of structure is an object. A bush 31 is provided with an extending screw-threaded hub 32, which is screwed into this casing C. A friction-bush 34 is fitted into the bush 31, as shown, and this bush 34 is provided with a lip 35, which is made by cutting two slots in the bush, as shown in Fig. 10. A screw 36 is tapped in the bush 31, and is set to bear on the lip 35 and by means of this adjustment an easily-adjusted friction is provided for the actuating-shaft 37, which is passed through said bushes 31 and 34. A star-wheel 38 is secured on the end of the shaft 37 by means of a screw 39. The shaft 37 is provided with a collar 40, which fits against the end of the bush 31, and with an extending screw or worm 41. A suitable operating tappet or roll is mounted on the wheel, as shown in Fig. 1, so that each revolution of the front wheel will turn the star-wheel one tooth. This shaft 37 constitutes the actuating-shaft for both the odometer and chronometer, as hereinafter described. A disk D is mounted on a suitable ledge in the upper part of the casing, as shown in Fig. 11, and is provided with a graduated circle *d*, which may be used to indicate the distance traveled, and arranged to point on this circle is a distance-hand *d'*. Arranged outside of the distance-circle is a graduated circle *e*, which I term the "time-circle," and a hand *e'* is mounted to indicate on this circle *e*. The hands *d'* and *e'* are preferably arranged on the same center, so that they will be in adjacent comparable relation.

The circle *d* may be divided into fractions of a mile, and the circle *e* may be divided into one hundred and twenty portions, each indicating a second of time, and by this construction if the rider goes at an exact two-minute-to-the-mile gait the two hands will move exactly together. If he goes faster than this gait, the distance-hand will gain on the time-hand, and if he goes at a less gait the distance-hand will lose relatively to the time-hand.

By stopping the device at any instant the exact distance traveled can be compared with the exact time it has been taken to travel that distance. This is one convenient proportion and arrangement, and others may be adopted as desired.

E represents a suitable bezel which is snapped onto the upper part of the casing and which holds the disk D in place beneath the glass cover F.

The casing C is provided with a ledge about

half-way down, and fitting on this ledge is a partition G, which may be held in place under suitable pins 42, riveted in the casing by means of suitable stops 43, which are adjustably held to the partition G by means of screws 44. A bridge 440 is secured to the under side of the partition G, as shown in Fig. 15, and this bridge is made with a top and a bottom arm and a slotted rear portion. Fitting into the slotted rear portion is a screw 45, which is tapped into the partition G, as shown. A pin 46 is secured in the partition G, and the bridge 440 fits this pin.

The construction of bridges used in this device is substantially that which is covered by the claims of an application for patent for chronometric construction filed by me July 12, 1895, Serial No. 555,708, and no claim is made in this application to the details of such bridgework, as I deem the same fully covered by the claims in said other application.

The particular bridge that I have just described is capable of a slight adjustment around the pin as a center, so that proper deepening can be obtained of the gear 47 and the gear 48, which are mounted in the arms of said bridge so as to turn together as one piece. A bridge 49 is also mounted on the lower side of the partition G and is held in place by means of a pin 50, riveted in said partition, and by means of a screw 51, which is tapped into said partition, and surrounding said screw is a bush 510. The lower arm of this bridge carries an upwardly-projecting hub 52, on which is mounted a double gear 53 and 54, made as one piece or so that the two will turn together. A center shaft II is stepped in the upper part of this hub, as shown. The gear 53 meshes with the gear 48, which is driven by the worm-gear.

540 designates a bridge which is secured to the upper side of the partition G and which is held in place by a holding-screw 55 and by a screw 56, which is tapped into the partition G, and by adjusting which the top arm of the bridge may be adjusted relatively to the partition G. The screw 55 is tapped in the lower arm of the bridge, and by tightening said screw the bridge is tightly held on the partition. This screw 55 is also provided with an extending shank, which forms a pivot about which the top arm of the bridge may pivot as the same is adjusted by the screw 56. A shaft 57 is mounted in the upper arm of this bridge and in the partition, as shown in Fig. 7. On the lower arm of this shaft is arranged a gear 58, which meshes with the gear 54, before referred to. This shaft 57 is also provided with a hub 59, as shown, which rests on the partition to form the lower bearing for the shaft. The shaft 57 carries at its upper end a disk 60, to which the mainspring 61 of the chronometer is attached. This mainspring is arranged in a barrel-gear 62, which is mounted on said shaft 57, and the barrel-gear is provided with a cover 63 of the ordinary con-

struction. The end of the mainspring is attached or placed in the bent end 65 of a relief-spring 64, which is mounted in the barrel-gear, as shown in Fig. 6. This construction is substantially like that described in my application referred to, and the parts referred to are so arranged that the friction or relief spring 64 will hold the mainspring until the same has been wound to the capacity of the same which it is desired to use, when the pull of the mainspring will then cause the friction-spring 64 to slip within the barrel-gear. By this means a simple and efficient relief is provided, so that if the chronometer is overwound a relief is provided whereby the mainspring is kept under the proper tension and no part is broken. The barrel-gear drives a chronometric train of any desired construction, the form shown consisting of a bridge 66, mounted on top of the partition G, which bridge carries a pinion 67 and gear 68, the barrel-gear 62 meshing with and driving the pinion 67.

69 designates another bridge mounted on top of the partition G, in which is mounted a pinion 70 and an escape-wheel 71, the gear 68 meshing with the pinion 70.

72 designates a bridge in which a balance-wheel 73 is mounted, and the escape-wheel 71 meshes with any of the ordinary cylinder-escapements used to operate the balance-wheel 73. The balance-wheel may be provided with any of the regulating or setting devices 74. This chronometric train is of the ordinary construction and needs no specific detailed description.

I may use any other desired form of chronometric construction, whether the same employs a cylinder or lever escapement.

The barrel-gear is connected to actuate the time-hand by the following connections: A quill 75 carries a pinion 76, with which the barrel-gear 62 meshes and drives. This quill is arranged upon another quill 78, which projects up from a cam 79, and this quill and cam 79 are arranged on the center shaft II, before referred to, and any suitable friction device, as the ordinary gripping-spring 77, may be arranged between the quill 75 and the quill 78. The cam 79 can be used to set the time-hand, as hereinafter described. The time-hand  $e'$  is provided with an extending hub 80, as shown, which extends down and embraces the quill 78. By this construction the time-hand  $e'$  will be driven and can be set on its quill, as desired, and also the cam 79 can be used to bring the time-hand back to its zero position.

The distance-hand  $d'$  has a projecting hub 81, which fits on the center shaft II.

The driving connections to the distance-hand may be arranged as follows: The gear 53 has a hub 82, and between this hub and a disk 84, loosely mounted on the shaft II, is arranged a friction device 83. This friction device consists of a spring bent around to engage the extending hub of the disk, as shown

in detail in Fig. 12. A cam 87 is mounted on the center shaft II above the disk 84. Between the said shaft and the disk is arranged a friction device which consists of a piece of wire 85, bent like a pair of tweezers and secured in place on the disk 84 by means of a screw 86, as shown in enlarged view in Fig. 13. The little hub projecting up from the disk is cut away, so that the extending arms of the spring bear on the said shaft. By this construction it will be seen that as the gear 53 is turned it will rotate the disk 84, and the rotation of the disk 84 will impart a rotary movement to the shaft II by means of the friction device 85.

I apply a brake device, as hereinafter described, to the disk 84, and when the disk is thus stopped the friction between the gear 53 and said disk will allow the gear 53 to continue its rotation without transmitting motion to the said shaft. The friction between the disk and the shaft is used so that relief is provided when it is desired to set the center shaft and the distance-hand  $d'$  by means of the setting-cam 87.

I will now describe the details of the starting, stopping, and setting mechanism, and reference to follow this description should be had to Figs. 5, 11, and 14.

A hub 88 is screwed into the casing, and arranged in this hub is a pull-shaft 89, which has a collar 90 and an extending hook 91, to which the wire 27 is attached. A hub 92 is secured in the partition G. Journalled on the hub 92 is a pawl-plate 93, having a cut-away portion 930, which coöperates with a pin 931, arranged in the partition G to limit the outward movement of the pull-shaft 89. The pull-shaft 89 is connected to this pawl-plate by means of a suitable link 94, as shown. Mounted on the pawl-plate is a spring-pawl 95, which is adapted to engage a ratchet-wheel 96. I preferably make this ratchet-wheel with six teeth, as shown. A catch-spring 97 is mounted so as to engage said ratchet-wheel and hold the same in position. The ratchet-wheel 96 is mounted on top of a shaft 960, which is journalled in the hub 92; also fitting on said shaft is a cam 98, which is secured to the ratchet-wheel 96 by a screw 99. A cam 100 is set on the lower end of the shaft 960 by means of screw 101. A spring 102 is coiled around a suitable screw 103, as shown, and one end is secured in the partition G, and the other end is secured to the pawl-plate 93, so as to keep the pawl-plate normally in its innermost position. A plate 104 is held to the partition G by means of this screw 103. The cams 98 and 100 are made with two depressions, as shown, arranged at one hundred and eighty degrees to each other and so as to each cover about one-sixth the periphery of the cams. A lever 105 is pivoted on a screw 106, which is tapped into the casing G, this lever being arranged on the under side of the partition G, as shown in Fig. 9. A stud 107 is also secured in the partition G, and a spring

having two arms 108 and 109 is secured to a stud 110, carried by said lever 105. The arm 108 of the spring will keep the lower end of the lever 105 pressed against the cam 100.

5 The other arm of the spring 109 is arranged in position to bear on the disk 84 to form a brake therefor. In the end of the lever 105 is arranged a wiper 111, which projects up through the partition G in position to just

10 touch the balance-wheel of the chronometric train. As the cam 100 is actuated the lever 105 will be vibrated. When the same is in the position shown in Fig. 9, the wiper 111 will engage the balance-wheel and stop the

15 operation of the chronometric train, and the spring-arm 109 will press against the disk 84 and will stop the rotation of the distance-hand. When, however, the cam 100 is turned so that the short end of the lever 105 will fit

20 in the depression therein, the wiper 111 will be moved to positively wipe the balance-wheel to start the oscillation of the same, and the spring-arm 109 will be removed from the disk 84, and by this means the chronometer will

25 be positively started in operation and the brake which stops the rotation of the distance-hand will be moved to its non-operative position. A lever 113 is pivoted on a screw

30 112, which passes through the plate 104 and which is tapped in the partition G. This lever carries at its end a hammer 115, which is adapted to strike both cams 79 and 87. These two cams are made of the usual and ordinary heart shape, so that when the hammer is

35 forced against the same both the time and the distance hand will be brought to the zero position.

With this arrangement the operation of my device is as follows: As shown in full lines in the drawings, the device has just been stopped.

40 The next pull on the shaft 89 will rotate the cams 98 and 100 one-sixth of a revolution in the direction indicated by the arrow in Fig. 9. This will have no effect on the lever 105,

45 but will cause the lever 113 to operate to cause the heart-shaped cams to bring both hands to the zero position. The next pull on the shaft 89 will allow the lever 105 to operate so that the wiper 111 will positively start the

50 balance-wheel and thus the chronometric train in operation, and will relieve the brake on the disk 84, so that the friction between the disk 84 and the center shaft II will act so that the distance-hand *d'* will be rotated.

55 The next pull on the shaft 89 will bring the parts back to the position shown in the drawings and will stop both the odometer and the chronometer, so that the work done and time elapsed can be accurately ascertained and

60 compared. By this means an extremely efficient and comparatively simple device to accomplish the many functions necessary is provided. The chronometric train is made so that the mainspring will wind in the particular use specified, so that the same will indicate a mile in six minutes, a great deal

65 slower than the ordinary speed at which a

bicycle is ridden. In the ordinary use of my device the rider goes much faster than this, and hence the connections from the actuating mechanism of the odometer will quickly wind and keep the mainspring under its desired tension, so that the chronometer will properly act. Thus even at the slow gait of the six-minute mile the mainspring is kept under

70 desired tension. If the rider goes faster than this, as he generally does, the relief will come into play and allow the mainspring still to be kept at the full tension, and, further, when the speed of the bicycle is increased and the mainspring wound the normal tension thereon is not increased to derange the action of the chronometer.

A practical test of my device has demonstrated its great utility, as a bicycle-rider can determine exactly what distance he has gone and in what time and can easily compare such records one with the other.

The details and arrangements herein described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

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

1. In a combined odometer and chronometer, the combination of a casing, means for securing said casing to a bicycle, a hand for registering time, a hand for registering distance, said hands being located in adjacent comparable relations so as to show the speed at which a bicycle is being driven at any time when the instrument is in use, a barrel, mainspring and train for actuating the time-hand, an actuating mechanism for the distance-hand, comprising devices driven from a moving part of the bicycle, connections for automatically winding up the mainspring, a relief for preventing excessive tensions being put upon said mainspring, and a starting, stopping and resetting mechanism for said hands, substantially as described.

2. An indicator for bicycles comprising a cylindrical casing, a time-hand and a distance-hand journaled concentrically with respect to said casing so that said hands may indicate the speed of a bicycle at any time when the instrument is employed, a barrel mainspring and train for actuating the time-hand, an actuating mechanism for the distance-hand comprising a star-wheel and worm, a constantly-operating train of gear-wheels driven by the actuating mechanism for automatically winding up the mainspring, and a relief for preventing excessive tensions being put upon said mainspring, substantially as described.

3. The combination of a time-hand, a mainspring and train for driving the time-hand, a distance-hand, an actuating mechanism for the distance-hand, connections for automatically winding the mainspring, and a starting, stopping and setting mechanism comprising a brake for the distance-hand, a wiper

arranged to positively start and stop the time-train, and means for synchronously operating said brake and wiper, substantially as described.

5 4. In a device of the class described the combination of a time-hand, a mainspring and train for driving the time-hand, a distance-hand and actuating mechanism for the distance-hand, and a starting, stopping and  
10 resetting mechanism comprising a brake for the distance-hand, a wiper arranged to positively start and stop the time-train, and means for returning the hands to the zero position, substantially as described.

15 5. In an instrument of the class described, the combination of a hand for registering time, a mainspring and train for driving said hand, a hand for registering distance, means for actuating the distance-hand, and a starting, stopping and resetting mechanism comprising a brake for the distance-hand, a wiper  
20 arranged to positively start and stop the time-train, a resetting-cam for each of said hands, and a single operating piece or hammer arranged to act upon both of the resetting-cams, substantially as described.

25 6. In a combined odometer and chronometer, the combination of a hand for registering time, a hand for registering distance, a driving mechanism for each of said hands, a frictional connection between each of said hands and its driving mechanism, and a starting, stopping and resetting mechanism comprising  
30 a resetting-cam for each hand, a cam-shaft, a pawl-and-ratchet connection for actuating said cam-shaft, a brake for the distance-hand, a wiper arranged to positively start and stop the time-hand, and a single actuating piece

or hammer for engaging both resetting-cams, said parts being operated from the cam-shaft, 40 substantially as described.

7. In a device of the class described, the combination of a center shaft, a hand secured thereon, a disk mounted on said center shaft, a driving mechanism, a setting mechanism, 45 a brake, means for simultaneously actuating the brake and the setting mechanism, a frictional connection between the center shaft and disk, and a frictional connection between the disk and the driving mechanism, the parts 50 being arranged to cooperate together, substantially as and for the purpose set forth.

8. In a combined odometer and chronometer, a starting and stopping device, consisting of a brake arranged to stop the action of 55 the odometer, a wiper arranged to positively stop and start the chronometer, and means for actuating said brake and wiper synchronously, substantially as described.

9. In a combined odometer and chronometer, a starting, stopping and setting device consisting of a brake for stopping the odometer, a wiper for positively starting and stopping the chronometer, and a setting device to bring the hands to the zero position when 65 both the odometer and chronometer are stopped, and means for operating these parts, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing 70 witnesses.

DAVID HARRINGTON.

Witnesses:

LOUIS W. SOUTHGATE,  
PHILIP W. SOUTHGATE.