

(No Model.)

3 Sheets—Sheet 1.

J. BUTCHER.

ELECTRIC CYCLOMETER FOR VELOCIPEDES.

No. 478,086.

Patented July 5, 1892.

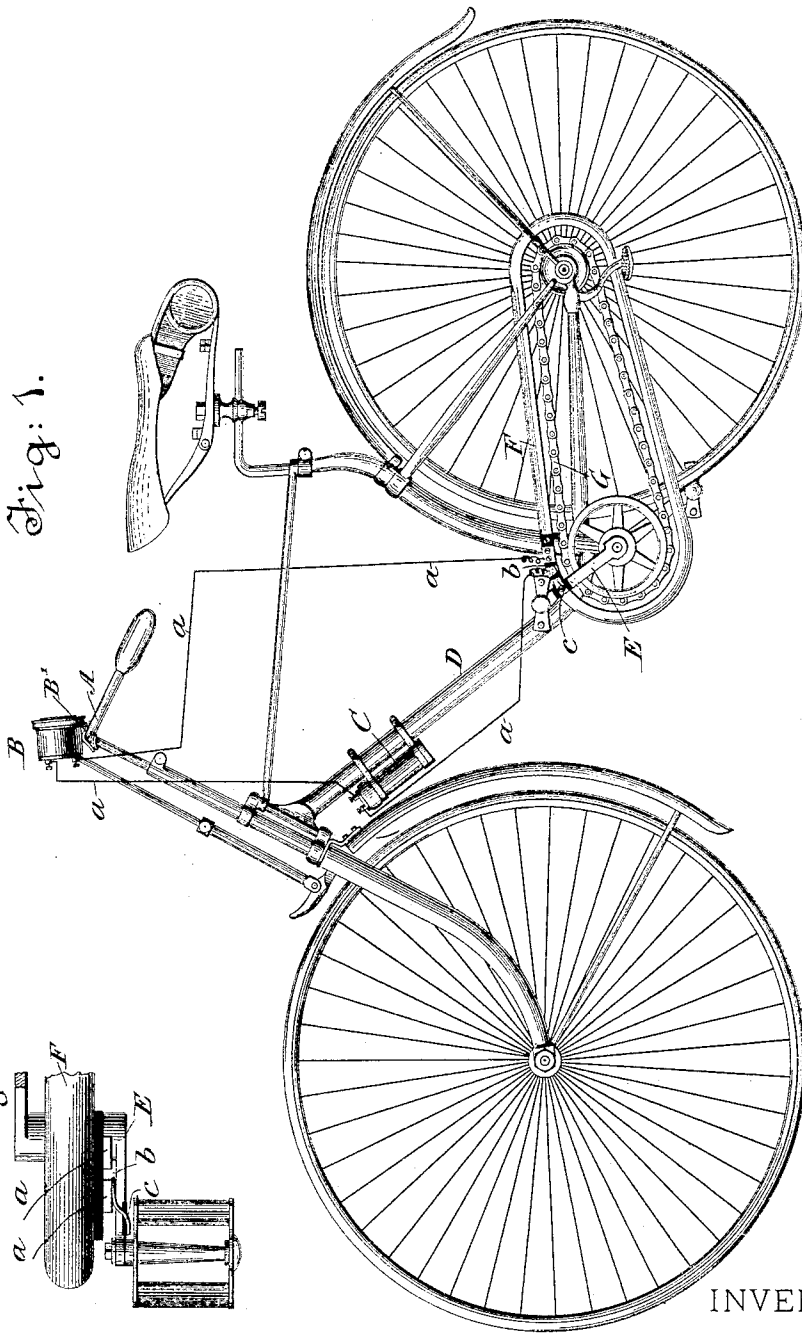
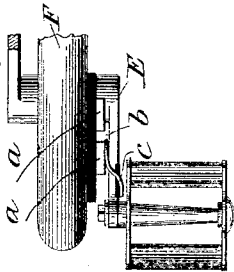


Fig: 1a:



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INVENTOR:

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(No Model.)

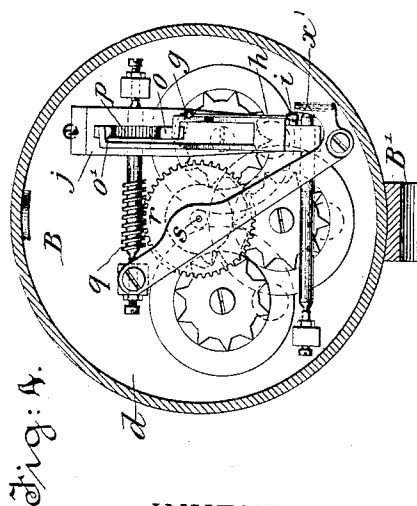
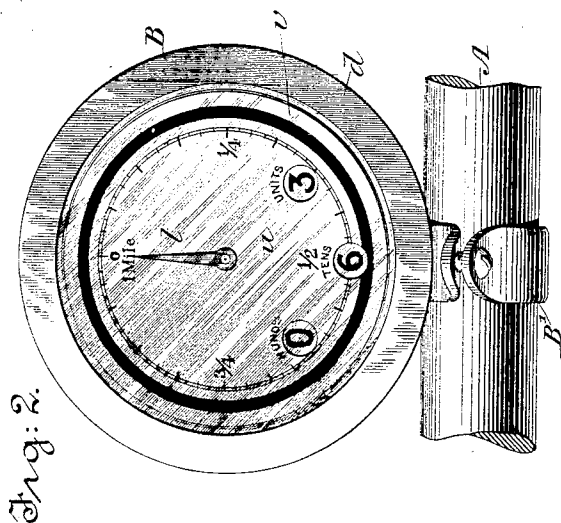
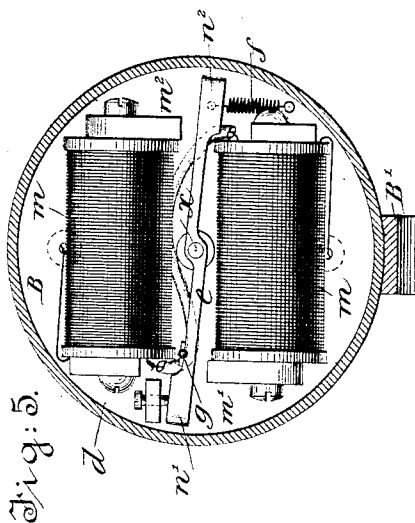
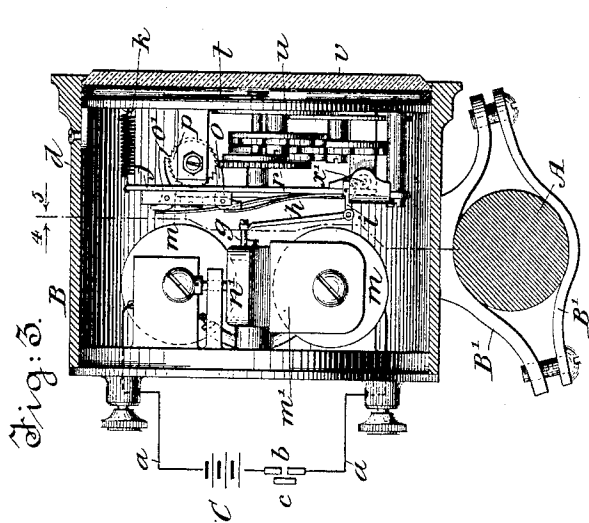
3 Sheets—Sheet 2.

J. BUTCHER.

ELECTRIC CYCLOMETER FOR VELOCIPEDES.

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Patented July 5, 1892.



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(No Model.)

3 Sheets—Sheet 3.

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ELECTRIC CYCLOMETER FOR VELOCIPEDES.

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Fig: 8.

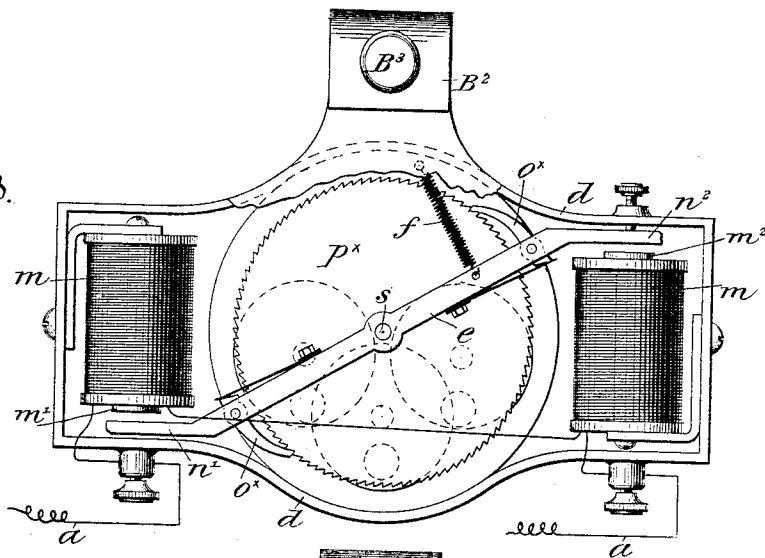


Fig: 6.

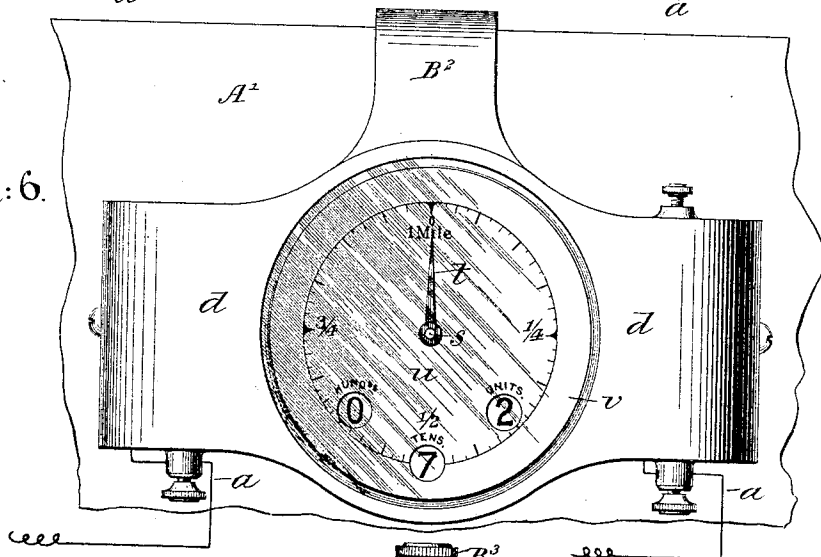
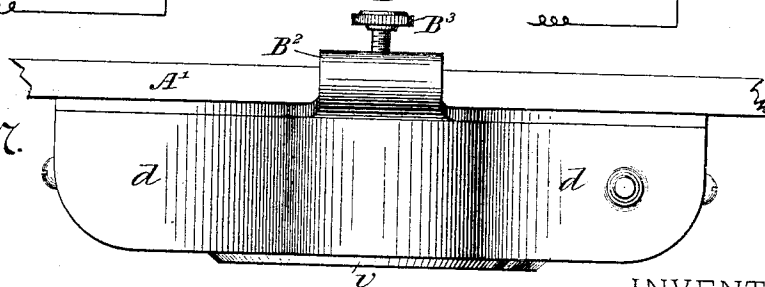


Fig: 7.



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UNITED STATES PATENT OFFICE.

JOSEPH BUTCHER, OF MELROSE, MASSACHUSETTS.

ELECTRIC CYCLOMETER FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 478,086, dated July 5, 1892.

Application filed June 29, 1891. Serial No. 397,785. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BUTCHER, a citizen of the United States, and a resident of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Cyclometers and the Like, of which the following is a specification.

My invention relates to means for registering or noting the distance traveled by a wheeled vehicle—such as a bicycle or tricycle, for example—through the medium of a rotating part of said vehicle, which actuates a registering mechanism by its rotations. Ordinarily these devices, which are commonly called “cyclometers” and “odometers,” are so constructed that at each rotation of a wheel of the vehicle the rotating part acts, through mechanical means on the register, to move a hand or index over a dial, the mechanism of the register commonly embodying a vibrating pawl and a ratchet as its principal feature. These mechanical devices have the disadvantage that in order to be properly and conveniently actuated from the rotating part or wheel the cyclometer must be placed down near said part, and it is usually suspended on the hub of the main wheel.

I am aware that it has been proposed to provide railway-cars, hacks, and livery-carriages with electrically-operated odometers for registering the distance traveled by them; but my invention relates to velocipedes—such as bicycles, &c.—and not to vehicles propelled by horses or steam.

The purpose of my invention is to provide a cyclometer-register which may be placed at any convenient point in the velocipedes and which shall be actuated intermittently by the movement of the crank-shaft of the same one or more times during each rotation of one of the ground-wheels of the velocipede through the medium of an electric current.

The instrumentalities essential to the carrying out of my invention are a cyclometer registering mechanism adapted to be actuated intermittently, an electro-magnet the armature of which by its vibrations actuates said mechanism, a generator, a circuit of which the generator and the coils of the electro-magnet form a part, and a circuit-closer borne by the crank or sprocket wheel of the

velocipede, which closes a break in said circuit at intervals commensurate with the rotations of the said sprocket-wheel.

In the accompanying drawings I have shown 55 an embodiment of my invention as adapted to a “Safety” bicycle.

Figure 1 is a side elevation, on a small scale, of the bicycle so equipped, and Fig. 1^a a plan of the circuit-closer detached. Fig. 2 is a front 60 or face view of the cyclometer, shown clamped on the handle-bar. Fig. 3 is a side or edge view of the cyclometer mechanism, the case thereof being represented in mid-section. Fig. 4 is a sectional elevation of the cyclometer 65 mechanism as seen from the rear, the plane of the section being indicated by line 4 5 in Fig. 3; and Fig. 5 is a similar sectional elevation taken in the same plane, but looking in the opposite direction. Figs. 6, 7, and 8 show 70 a slightly-modified construction of the cyclometer, Fig. 6 being a front or face view, Fig. 7 a plan, and Fig. 8 a rear view with the casing broken away to expose some of the interior mechanism.

Referring to Fig. 1, A represents the handle- 75 bar of a bicycle, and B the registering cyclometer as a whole mounted thereon. The cyclometer may be furnished with a clamp B', as seen in Figs. 2 and 3, for securing it to the bar A. C is a battery or generator, here represented as secured by straps to the inclined connecting-bar D of the frame. The wires *a*, forming the circuit, are represented in Fig. 1 somewhat conventionally and as exposed, in order 85 that they may be seen clearly; but in practice they will, by preference, be inclosed in a protecting-tube, and where the frame is tubular it may be utilized as said tube. It is immaterial to my invention how the circuit-wires are placed or arranged. There is a break *b* in the circuit, adapted to be closed at each rotation of the crank E by means of a metal blade or spring on the crank which forms the circuit-closer *c*. In Fig. 1^a the circuit-closing device is seen in plan detached. 90 The ends of the circuit-wires are connected to two metal plates mounted on the guard F over the chain G and insulated from said guard. These plates are in the path of the circuit-closer *c*, which wipes over them as the crank rotates and connects them electrically. 100

I will now explain the construction of the registering cyclometer herein illustrated, premising that almost any of the known cyclometer movements may be employed, it being only necessary that the mechanism shall be such that it can be intermittently operated by the vibrating movements of the armature of an electro-magnet.

Within the casing *d* of the cyclometer is mounted an electro-magnet the coil of which is in the circuit. I prefer to employ the form of magnet here shown, which consists of two coils *m*, arranged side by side with their pole-pieces *m'* and *m''* oppositely arranged. The armature-lever *e* is pivoted at *x* between the coils, and at its middle so as to be balanced, and at its ends it bears the armatures *n'* and *n''*, arranged adjacent to the respective pole-pieces *m'* and *m''*. The armatures are retracted by a single spring *f*. (Seen in Fig. 5.) When the circuit is closed, the armatures are attracted to their respective pole-pieces, and when the circuit is broken the spring *f* retracts them to the position seen in Fig. 5. On the armature-lever *e* is a stud, pin, or projecting wrist *g*, which is coupled by a link or rod *h* to a short upright or arm *i* on a pawl-arm *j*, hinged at *x'* to the frame of the movement. To the free end of the arm *j* is secured a spring *k*. (Seen in Fig. 3.) The pawl-arm carries two spring-pawls, a push-pawl *o*, and a hook or pull-pawl *o'*, which engage the teeth on the opposite sides of a ratchet-wheel *p*. As herein shown, the pawls are so set that one vibration of the pawl-arm *j* moves the ratchet-wheel *p* to the extent of one tooth only, each of said pawls acting to rotate the wheel to the extent of half a tooth, one pawl acting on the wheel at the backward movement of the lever and the other at the forward movement. Now when the circuit is closed and the magnet attracts the armature *n'* and *n''* the armature-lever acts through rod *h* and arm *i* to pull back the pawl-arm *j* and distend the spring *k*. During this movement the pull-pawl *o'* acts to move the wheel *p* to the extent of half a tooth, and when the armatures are released the spring *f* return the pawl-arm and the push-pawl *o* moves wheel *p* to the extent of half a tooth. The ratchet-wheel *p* may communicate its motion to the register-gearing in any of the well-known ways in common use. As here shown, there is a worm or screw *q* on the same arbor with the wheel *p*, and this screw gears with a worm-wheel *r* on the central arbor *s* of the cyclometer mechanism, and on this arbor is fixed a hand or pointer *t*, which traverses a graduated dial *u*, (see Fig. 2,) placed behind a glass *v* in the casing *d*. The mechanism for registering "units," "tens," and "hundreds" of miles is the same as that commonly found in cyclometers on the market, and as this mechanism has no material relation to or connection with my present inven-

tion it will not be necessary for me to minutely describe it. Indeed any of the well-known devices for effecting this registration will serve.

When the velocipede has a bar in front in the nature of a dash-board, the construction illustrated in Figs. 6, 7, and 8 may be employed. Indeed the form of registering mechanism seen in Fig. 8 may be employed in place of that illustrated in Figs. 2 to 5.

In Figs. 6, 7, and 8 the casing *d* is provided with a hook-like clamp *B*², which is adapted to take over the top of the dash-board *A'*, and this clamp has a screw *B*³ to screw it to the board. The casing *d* also has lateral wings to receive the coils of the electro-magnet, which are thus placed at the respective sides of the registering mechanism. The armature-lever *e* carries two pawls *o*^x, which engage the teeth at opposite sides of a ratchet-wheel *p*^x, fixed directly on the central arbor *s* of the registering mechanism. The attraction of the armatures draws back the pawls, and when the circuit is broken the pawls advance the wheel *p*^x to the extent of one tooth through the medium of the retracting-spring *f*. In this construction the armature-lever *e* vibrates on the central arbor *s*, or on an axis aligned therewith.

Having thus described my invention, I claim—

1. The combination, with the frame, wheels, crank-shaft, cranks, sprocket-wheels, and driving-chain of a velocipede, of a registering mechanism adapted to operate intermittently, its electro-magnet, means whereby its armature-lever in its vibrations actuates said registering mechanism, a generator, a circuit of which said generator and the coils of the electro-magnet form a part, and a circuit-closer carried by one of the cranks of the velocipede and adapted to close a break in said circuit when the crank rotates, said registering mechanism, circuit, and generator being mounted on the frame of the velocipede, as set forth.

2. The combination, with the handle-bar *A*, the inclined bar *D*, and guard *F* of a velocipede, of the registering cyclometer *B*, mounted on said handle-bar, the generator *C*, mounted on the inclined bar *D*, an electric circuit of which the coils of the cyclometer magnet and the generator form a part, the terminals of the said circuit being fixed at *b* on the guard *F* adjacent to one of the cranks of the velocipede, the said crank, and a circuit-closer *c*, mounted thereon and adapted to close said circuit momentarily at each revolution of the crank, as set forth.

3. The combination, with a velocipede and a registering mechanism mounted thereon and adapted to operate intermittently, of the electro-magnet mounted adjacent to the registering mechanism and having pole-pieces *m'* and *m''*, oppositely arranged, as set forth, the armature-lever pivotally mounted at its middle

and having an armature at each end arranged
adjacent to a pole-piece, a spring for retract-
ing the armature, intermediate mechanism
between said mechanism and the registering
5 mechanism, whereby the vibrations of the ar-
mature-lever actuate the mechanism, a gen-
erator, an electric circuit of which the coils of
said electro-magnet and said generator form
a part, and a circuit-closer carried by the crank
10 of the velocipede and adapted to close a break

in said circuit when the crank is rotated, as
set forth.

In testimony whereof I have hereunto
signed my name in the presence of two sub-
scribing witnesses.

JOSEPH BUTCHER.

Witnesses:

HENRY CONNETT,
CHAS. A. WALSH.