(No Model.)

J. BUTCHER.

CYCLOMETER.

No. 356,822. Patented Feb. 1, 1887.

Fig. 1.

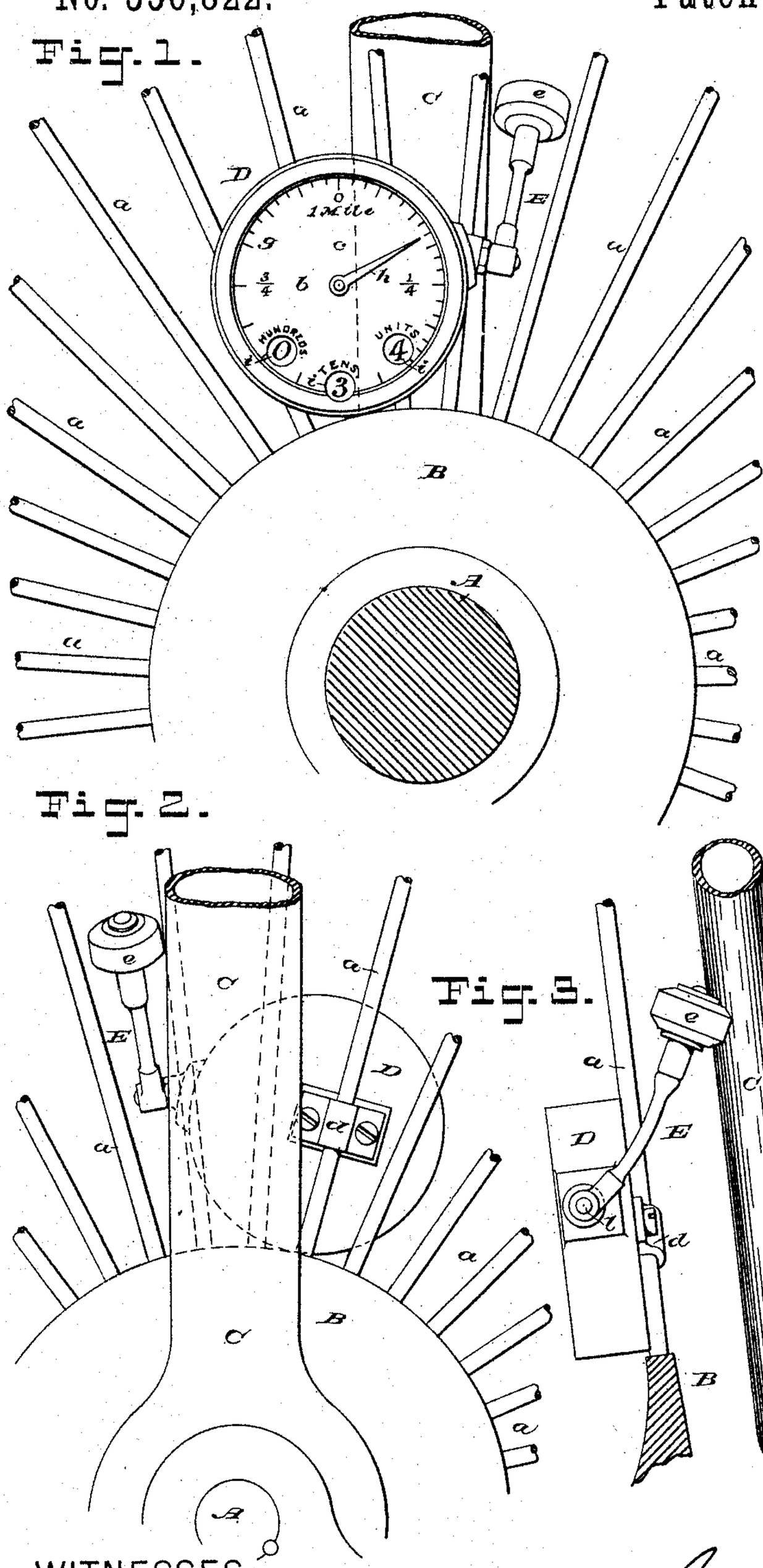


Fig. 2.

Fig. 3.

Fig. 4.

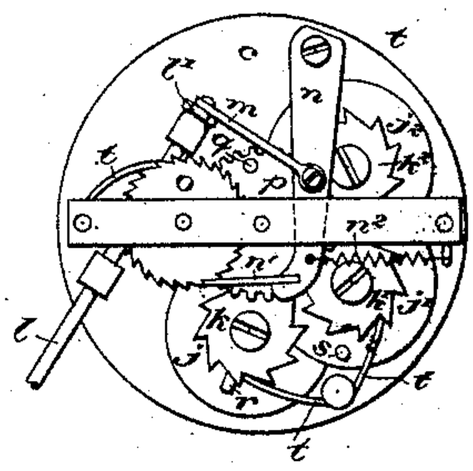


Fig. 5.

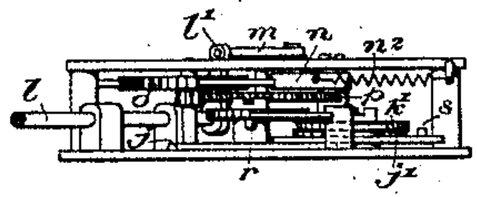


Fig. 6.

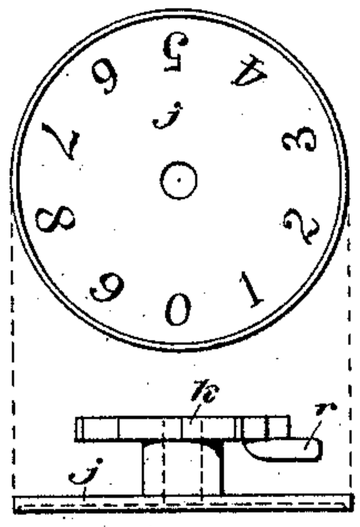


Fig. 7.

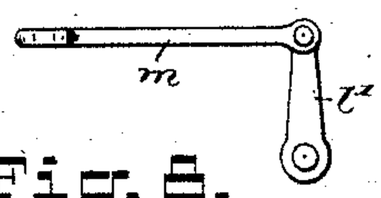
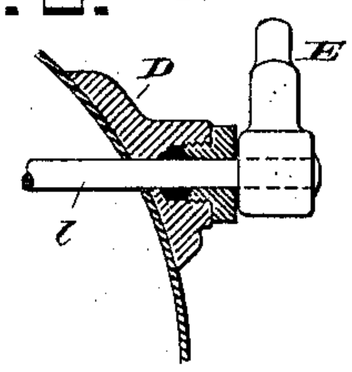


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOSEPH BUTCHER, OF BOSTON, MASSACHUSETTS.

CYCLOMETER.

SPECIFICATION forming part of Letters Patent No. 356,822, dated February 1, 1887.

Application filed May 8, 1885. Serial No. 164,737. (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 Boston, Suffolk county, Massachusetts, have invented certain new and useful Improvements in Cyclometers, of which the following is a specification.

My invention relates to that class of cyclometers which are mounted on and carried around by the wheel of a vehicle. There are several types of these. In one type the cyclometer is mounted on the wheel-hub, and has a longitudinally-reciprocating operating rod or slide, which, at each revolution of the wheel, is moved longitudinally by contact with a cam on the non-rotating axle. A cyclometer of this character is illustrated in the patent of Stevens and Drake, No. 69,504, of October 1, 1867. Another type of this class of cyclometers is secured to the wire spoke of the wheel, and has an operating rock-shaft projecting from its case. On the projecting end of this shaft is fixed a vibrating arm, a stud on the end of which comes in contact with the fork or other fixed part of the velocipede or bicycle at each revolution of the wheel. A cyclometer of this character is illustrated in the patent of C. H. Lamson, No. 320,145, of June 16, 1885.

My invention belongs to this latter class of cyclometers, and my object is to provide a novel and improved means for communicating the vibrations of the operating-arm to the registering mechanism within the case of the cyclometer.

My invention will be hereinafter fully described, and its novel features carefully defined in the claim.

In the drawings which serve to illustrate my invention I have shown the cyclometer as clamped to the spoke of a bicycle-wheel and in its proper relation to said wheel.

Figure 1 is a face view of the cyclometer, a portion of the bicycle-wheel and fork being shown. Fig. 2 is a similar view, showing the back of the cyclometer. Fig. 3 is an edge view of the cyclometer as seen from the right in Fig. 1. Fig. 4 is a back view of the registering mechanism of the cyclometer. Fig. 5 is an edge view of said mechanism. Figs. 6, 7, and 8 illustrate details, which will be referred to hereinafter.

Let A represent the axle or wheel-shaft of a bicycle, B the hub of the wheel, and *a a* the spokes.

I have not deemed it necessary to show all the wheel.

C represents one branch of the fork in which shaft A is mounted.

D is the case of the cyclometer, which contains the registering mechanism. This case I prefer to make circular, as shown, and I usually make it of a cup form, and I place a glass plate or crystal, *b*, in its front, through which is visible the dial *c*, as seen in Fig. 1. On the case D, preferably at its back, is arranged a clamp, *d*, whereby the cyclometer is secured to a spoke, *a*, of the wheel.

E is the arm or lever of a cyclometer, which serves to operate the registering mechanism. On the end of this lever I mount a wheel, *e*, usually made of vulcanized rubber or other similar cushion-like material. This wheel is designed to strike, at every revolution of the bicycle-wheel, a fixed or non-rotative part of the bicycle. In the drawings this part is the branch C of the fork, and as this branch stands conveniently near the spokes of the wheel, I employ it for this purpose. The lever E is attached to the operating rock-shaft which projects into the case D, and connects with the registering mechanism.

The operation is as follows: At each revolution of the bicycle-wheel the roller or wheel *e* engages and rolls over the branch C of the fork, and then, when the fork is passed, the lever is retracted to its normal position by a spring in the movement. Thus each revolution of the bicycle-wheel is registered and these revolutions are communicated to the indicators on the dial through the mechanism which will now be described.

On the dial, Fig. 1, is a graduated circle, *g*, and a hand or index, *h*, which travels around said circle. One revolution indicates a mile. In the dial are three apertures, *i i i*, through which appear figures which indicate units, tens, and hundreds of miles.

In Figs. 4 and 5 the registering mechanism is shown. On the back of the dial-plate are rotatively mounted a "unit-disk," *j*, a "ten-disk," *j'*, and a "hundred-disk," *j²*, each of which has the ten digits marked on its face. The disks are arranged with respect to aper-

tures *i* in the dial in such a manner that each digit will be brought in succession opposite its respective aperture *i* as the disks are intermittently rotated. On the back of each disk is fixed a ten-toothed ratchet-wheel. These are indicated by *k k' k²*.

In Fig. 6 one of the disks and its ratchet is shown enlarged, the upper being a face view and the lower a section.

The rock-shaft *l* is rotatively mounted in bearings on the back of the dial-plate, and the lever E is fixed to its outer end, which projects through the wall of case D. On its inner end is a crank, *l'*, as best seen in Fig. 7, where the feature is shown detached and enlarged. Crank *l'* is coupled by a link, *m*, to the pawl-lever *n*, bearing a pawl, *n'*, which engages the teeth of a driving ratchet-wheel, *o*. A spring, *n²*, serves to retract lever *n*. Oscillation of rock-shaft *l* imparts intermittent and measured rotary motion to ratchet-wheel *o*. A pinion on the under side of the ratchet-wheel meshes with a toothed wheel, *p*, on the axis of which is mounted the index *h*. (Seen in Fig. 1.) The gear-wheels are so proportioned that one revolution of wheel *p* is effected at each mile of travel of the bicycle or other vehicle.

Projecting from the lower face of wheel *p* is a pin or stud, (indicated at *q* in Fig. 4,) and this stud, at every revolution of wheel *p*, engages a tooth of the ratchet *k* on the unit-disk *j* and causes the said disk to make one-tenth of a revolution. Projecting radially from the under side of ratchet *k* on disk *j* is a stud, *r*, which, when disk *j* makes one revolution, engages a tooth on the ratchet *k'* on the ten-disk *j'* and imparts to the latter disk one-tenth of a revolution. Disk *j²* is driven from the ten-disk in the same manner by a stud, *s*, which projects upward from the face of said disk *j'*. To prevent any backward rotation of the several ratchets, and to steady them when the cyclometer is subjected to jolts and jars, each ratchet-wheel is provided with a spring-pawl, *t*, as shown in Fig. 4. In order that the studs which rotate the disks may not conflict and engage with the wrong ratchets, the ratchets *k k' k²* are arranged in different planes, as will be well understood.

To keep out water and dust from the cyclometer-case, I make the latter tight and cement in the crystal *b*, and where the rock-shaft *l* passes out I construct a stuffing-box for it to pass through, as clearly shown in Fig. 8, which is an enlarged sectional view of this feature. As a packing for shaft *l*, I usually employ a mixture of asbestus and tallow.

It will be seen that when the cyclometer is mounted, as shown, it stands inside of the cage formed by the two sets of spokes, and the lever E projects outwardly between the spokes, so as to contact with the fork C. This arrangement protects the instrument from injury to some extent, and to further protect it I prefer to arrange it opposite to the pedal or crank on that side. I also prefer to place the instrument near the hub of the wheel, as shown; but this is not essential to my invention.

The cushion *e* on the end of lever E is made in the form of a wheel, in order that it may roll over the fork C. The spring-pawls *t* are not absolutely essential, as it would be possible to mount the disks and ratchet-wheel *o* to rotate with some difficulty, which would serve the purpose.

Having thus described my invention, I claim—

The combination, with the vibratory operating-lever on the outer end of the rock-shaft, of the said rock-shaft, the crank on the inner end of said shaft, the pawl-lever and its pawl and spring, the link connecting the pawl-lever with said crank, and the ratchet-wheel *o*, engaged by said pawl, all arranged to operate substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH BUTCHER.

Witnesses:

HENRY CONNETT,

ARTHUR C. FRASER.