B. S. CHURCH.
PEDOMETER.

No. 193,224. Patented July 17, 1877.

Fig. 1.

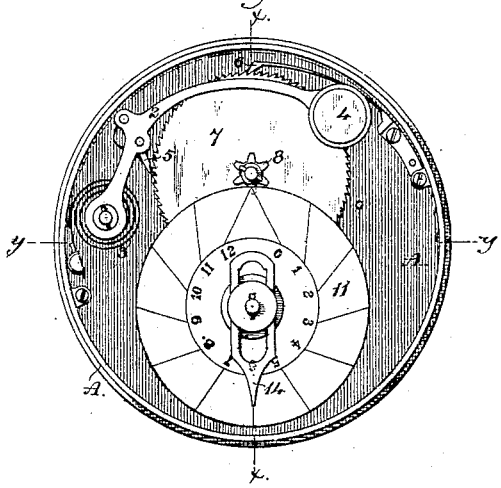


Fig. 2.

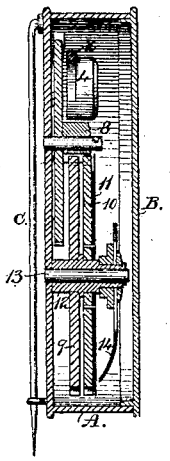


Fig. 3.

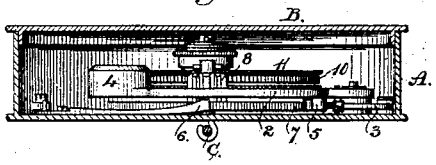


Fig. 4.

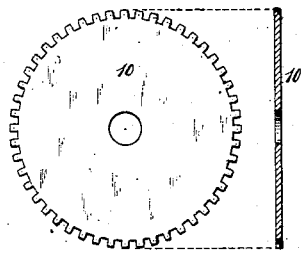


Fig. 5.

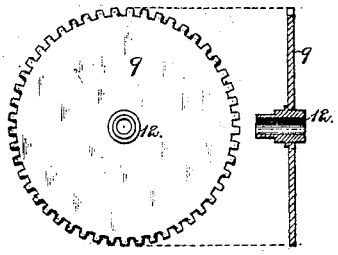
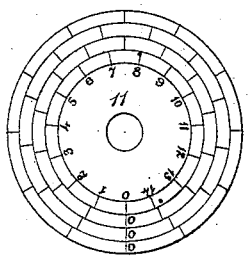


Fig. 6.



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UNITED STATES PATENT OFFICE.

BENJAMIN S. CHURCH, OF SCARBOROUGH, NEW YORK.

IMPROVEMENT IN PEDOMETERS.

Specification forming part of Letters Patent No. **193,224**, dated July 17, 1877; application filed May 25, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN S. CHURCH, of Scarborough, New York, have invented an Improvement in Pedometers, of which the following is a specification:

In the drawings is represented, in Figure 1, a plan view of the instrument with its cover removed; Fig. 2, a vertical section thereof on line *x x* of Fig. 1; Fig. 3, a top view thereof, the case being removed, on line *y y* of Fig. 1; Fig. 4, plan and sectional views of the dial or indicator driving-wheel; Fig. 5, similar views of the pointer driving-wheel; and Fig. 6, a plan view of a dial or indicator.

The object of this invention is to secure a more perfect operation of this class of instruments, whereby distances passed over may be accurately measured and recorded, whether the steps taken in passing over the distance recorded be long or short.

The invention consists in certain constructions and combinations of parts too fully hereinafter pointed out to need preliminary description.

The mechanisms are contained in a cylindrical box or case, A, which is preferably swaged from plate or sheet metal, and closed by a cover, B, which may fit within the box sides, or be hinged thereto. It may, furthermore, be provided with a pin, C, for affixing the instrument to the person, or with a ring or handle by which it may be attached or carried.

The actuating mechanism consists of a lever, 2, weighted at one end, and pivoted at the other upon a stud fast in the back plate of the case, which lever 2 has a counterbalancing-spring, 3, applied to it, so as to overcome the power of its weighted end 4, and always keep it in a raised position, as in Fig. 1. The spring illustrated is a spiral, having one end attached to the case or to a post secured thereto, and the other fast to its hub, through which its sustaining-pivot extends; but it may, obviously, be of any other construction, and otherwise attached to the lever. This lever carries a spring-seated pawl, 5, which engages the teeth of the ratchet-wheel 7, so that at each vibration of the lever 2 said pawl will rotate the ratchet-wheel the distance of one tooth, a detent-lever, 6, preventing any backward movement of it. This ratchet-wheel carries fast upon its shaft a driving-pinion, 8, which is wide enough to gear with both of the toothed wheels 9 10, as in Figs. 2 and 3. The toothed wheel 9 is fast to a hub, 12, as in Figs. 2 and 5, which rotate upon a stud, 13, fixed in the back plate of the case A, and carries the index-hand or pointer 14.

The toothed wheel 10 revolves around the hub 12, and supports upon its face the indicator or dial 11, over which the pointer or index-hand 14 lies, and upon which it indicates the pulsations of the lever 2.

The index-hand or pointer toothed wheel 9 has one or more teeth than the indicator or dial toothed wheel 10, and it therefore follows, since both are simultaneously rotated in one direction by the same pinion 8, that the pointer-wheel 9 will move faster than and gradually gain upon the indicator or dial-carrying wheel 10, and thus be advanced a distance equal to the width of one or more teeth at each revolution of the two.

This instrument will be adjusted upon the body of the wearer, with its lever 2 uppermost, and as each step is taken the concussion produced will overcome the counterbalancing-spring 3, and cause the lever 2 to be vibrated, and, at the same time, through the pawl 5, to advance the ratchet-wheel 7 the distance of one tooth, and the driving-pinion 8 and toothed wheels 9 10 a corresponding distance. The pointer and disk will thus be simultaneously moved onward in the same direction, so that when the wheels 9 10 have each made one revolution the pointer will have gained a certain distance upon the disk or indicator, which distance will be registered by the scale marked thereon, and may indicate a mile or any other distance.

As it is obvious that there are fewer long than short steps taken in passing over a mile of distance, and therefore that the number of pulsations of the lever is decreased accordingly, the instrument is adapted to register the distances traveled over, whether the number of steps taken in each mile be greater or less in number than the average.

Supposing the average number of steps taken in traveling a mile be such as will, through the vibrations of the lever 2, advance the

pointer on the indicator over the distance between two of its outer scale of figures 0 to 12, it follows that a lesser number of steps, (as long ones fewer of which make up a mile of distance,) and consequent decreased number of vibrations of the lever 2, will not carry the pointer onward so great a distance. The indicator is, therefore, provided with varying scales, increasing from the innermost to the outermost scale, and the pointer 14 is made adjustable radially upon its stud 12, so that its end may coincide with any of the scales upon the indicator.

This variation in the scales upon the indicator may be made in various ways, two of which are shown. In one (see Fig. 1) the outer circle is divided into twelve equal parts, each representing one mile, and the inner circle is divided into fourteen equal parts, of which only twelve are used in the scale. The points on the outer and inner circle are joined by lines in succession, from line marked 0 on the dial to line marked 12. Thus a scale is formed wherein the spaces indicating miles are shorter on the inner circle in the number of degrees contained than are the spaces indicating miles on the outer circle.

In the dial illustrated in Fig. 6 the inner circle is divided into fifteen degrees, the next circle into fourteen, the next into thirteen, and the next into twelve, whereby the length of the degrees upon the circles are increased from the innermost to the outermost circle, whereby a number of steps equal to the distance of a mile will be indicated by one degree upon the innermost circle, while the greater number of shorter steps constituting this same distance will indicate the mile traveled by one degree upon one of the circles nearer the periphery of the indicator.

In adjusting this instrument to suit the length of step taken by the user, it is only necessary to determine the distance the point of the indicator will move while the distance of a mile is traveled over, and then adjust the finger or index-hand 14 so that its point shall register upon the circle whose degrees or graduations correspond with the length of movement of the pointer. Upon setting the pointer at 0 on this circle the instrument will correctly register the distance traveled by such user.

Thus by the mechanism employed a uniform movement of the actuating-lever, driving-pinion, indicator, and index-hand will accurately measure and record the distance traveled by any person, whether his step be long or short.

The advantage of a ready adjustment of the index-hand, so that it may record the distance traveled by any length of step, is apparent; but it is to be understood that, though the construction of this index-hand is shown to be a plate recessed so as to slide between a shoulder upon the hub 12 and a disk holding it thereon, other constructions of this device may be made without departing from the invention—for instance, it might slide in a mortise cut through the hub or be adjusted in a screw-threaded hole cut therein.

What is claimed is—

1. The combination, with an actuating-lever, 2, an indicator and index-hand, of moving differential toothed wheels 9 10, and intermediate mechanisms transmitting the motion of one to the other, substantially as described.

2. The combination of an index-hand and an indicator-dial, provided with a varying scale, both of which devices travel in the same direction with a differential movement, whereby the same number of pulsations of the actuating-lever produced by steps varying in length may record the true distance traveled, substantially as described.

3. The combination, with an indicator, provided with a varying scale, of an adjustable pointer or index-hand, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJ. S. CHURCH.

Witnesses:

H. T. MUNSON,

M. B. PHILIPP.