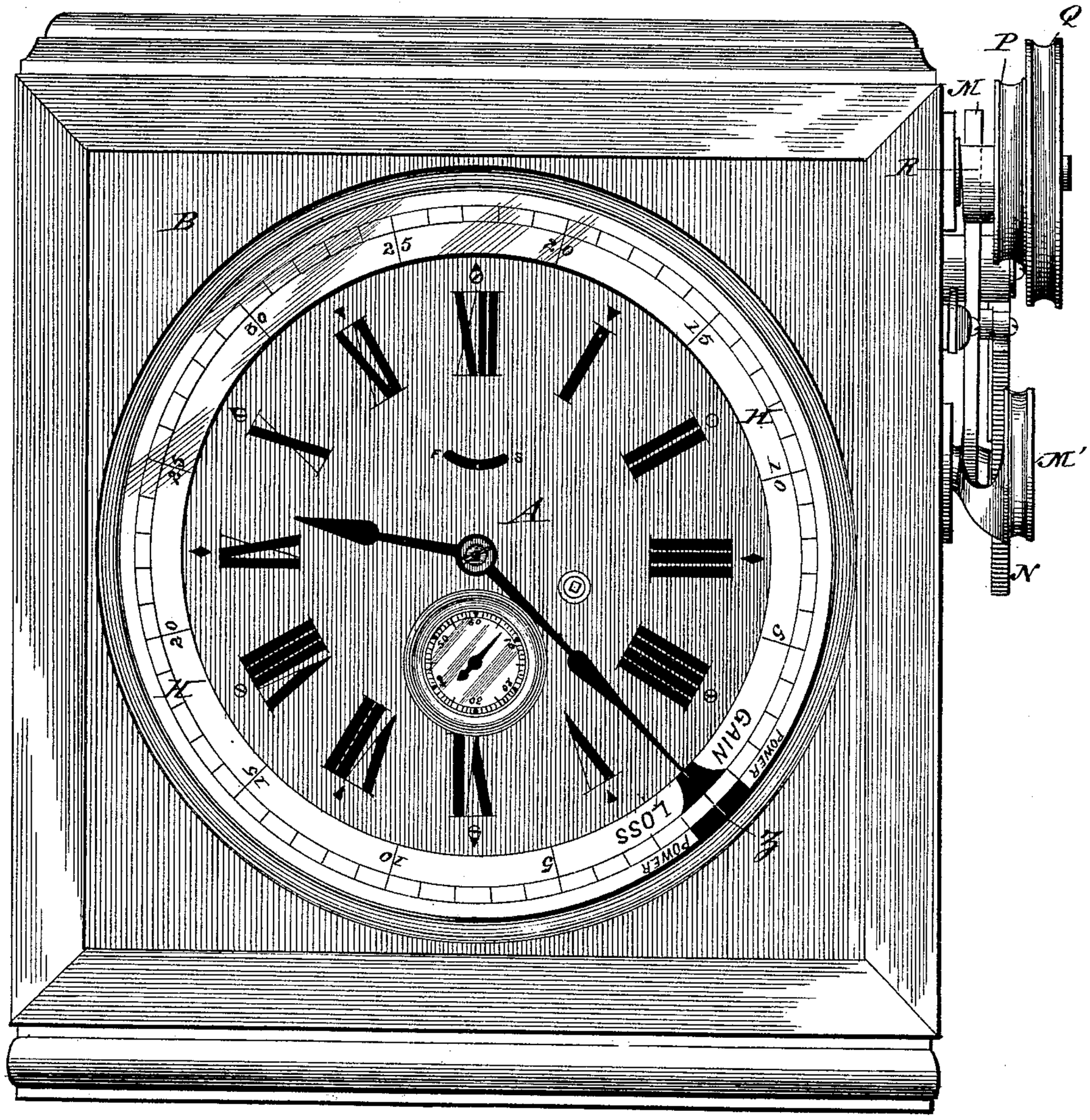
(No Model.) 4 Sheets—Sheet 1.

A. R. SHERMAN.

SPEED INDICATOR.

No. 405,437. Patented June 18, 1889.

Fig. 1.



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ATTORNEYS.

(No Model.) 4 Sheets—Sheet 2.

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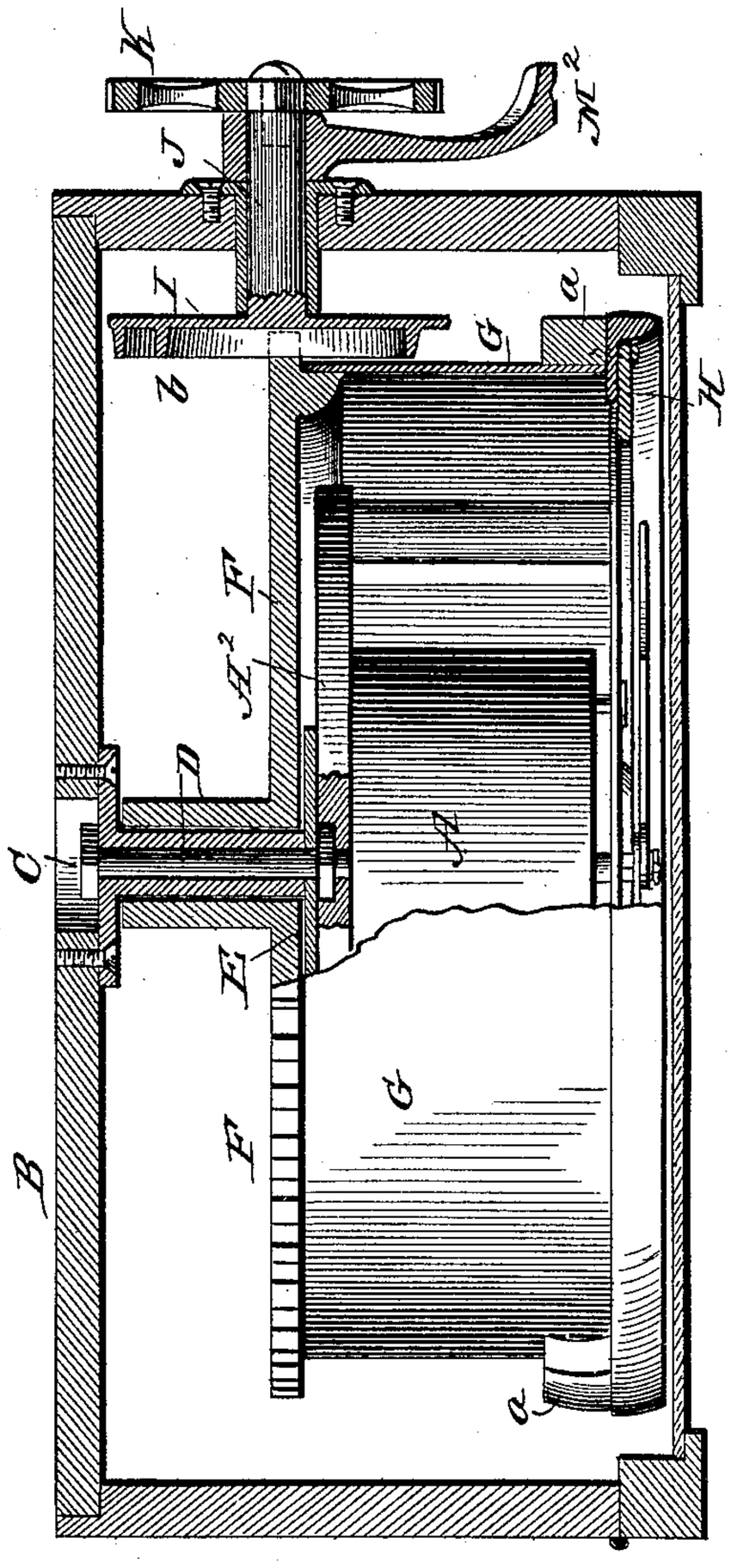
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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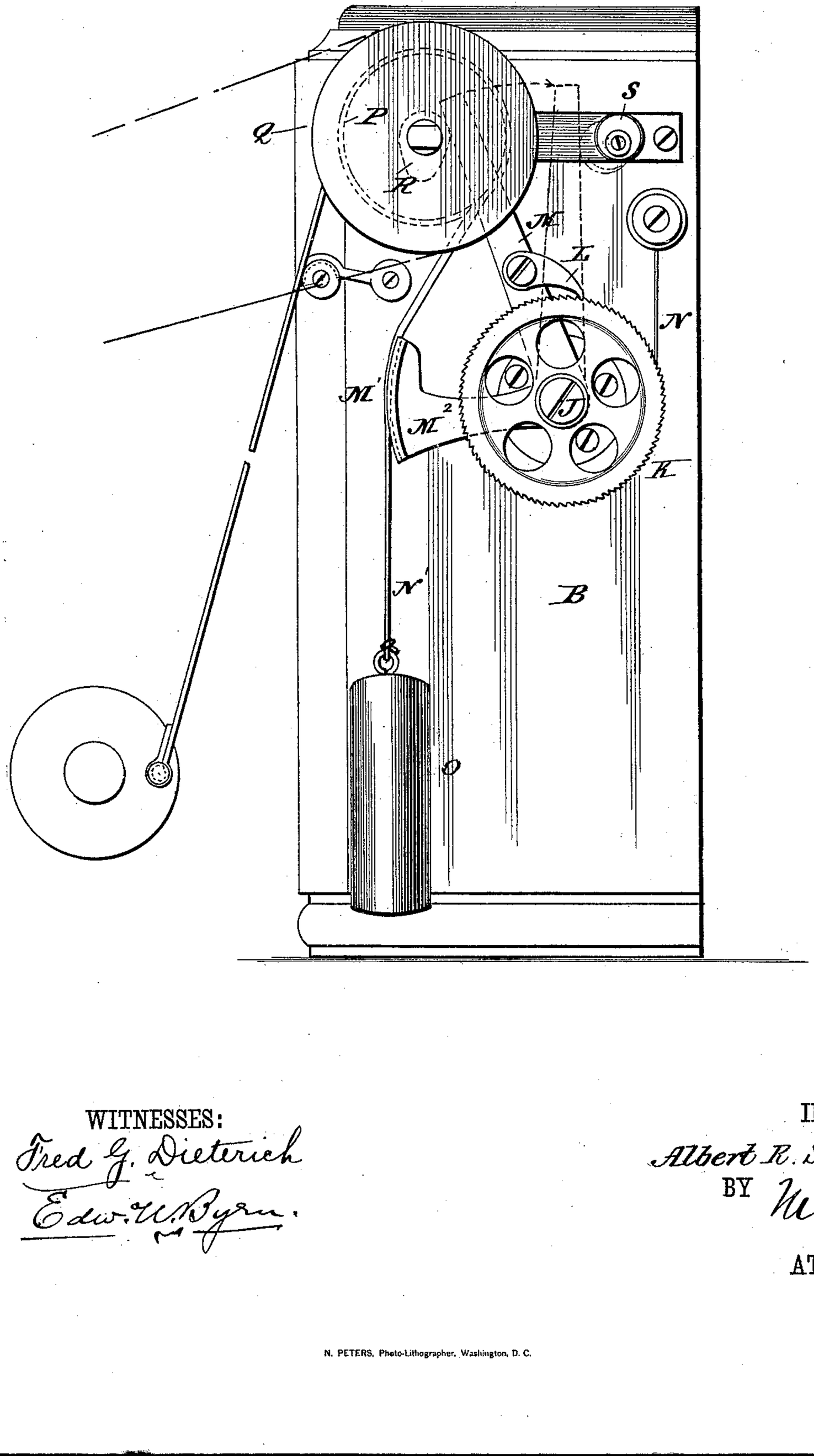
Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

A. R. SHERMAN.

SPEED INDICATOR.

No. 405,437. Patented June 18, 1889.

Fig. 4

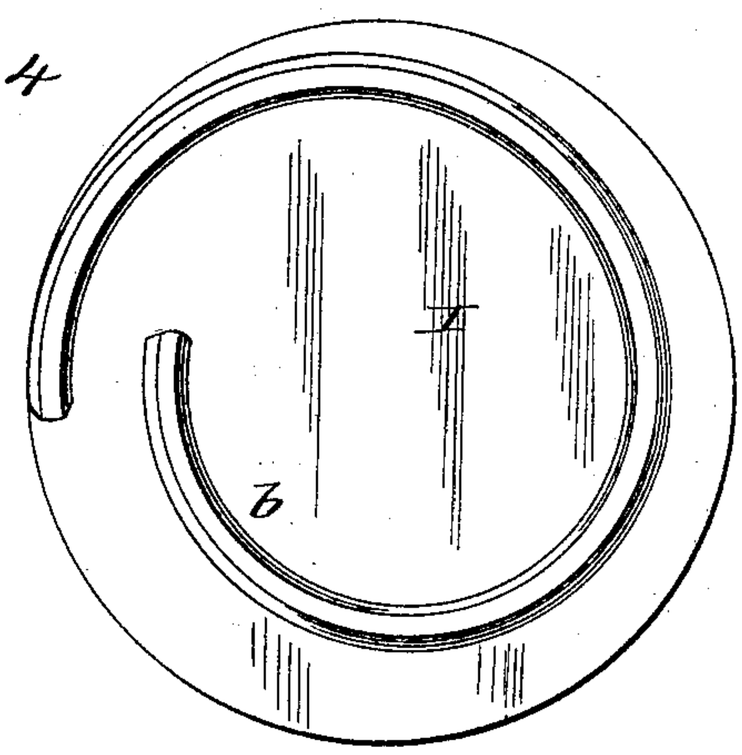
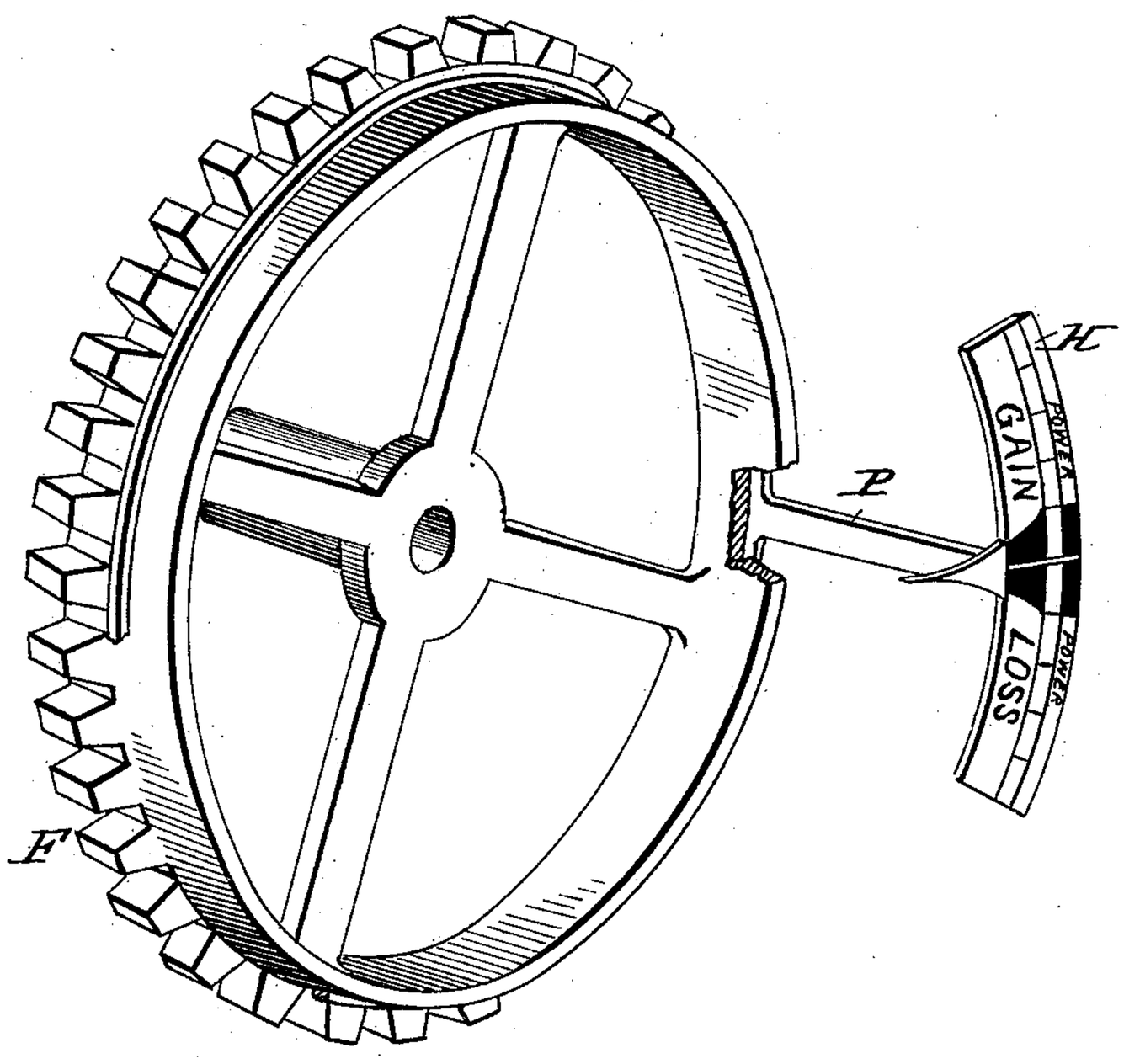


Fig. 5.



WITNESSES:
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UNITED STATES PATENT OFFICE.

ALBERT R. SHERMAN, OF PAWTUCKET, RHODE ISLAND.

SPEED-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 405,437, dated June 18, 1889.

Application filed December 26, 1888. Serial No. 294,701. (No model.)

To all whom it may concern:

Be it known that I, ALBERT R. SHERMAN, of Pawtucket, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Speed-Indicators, of which the following is a specification.

The object of my invention is to provide a speed-indicator for showing the degree of speed as compared with a clock that the engine may be running at as a basis for increasing its speed when it is running too slow or diminishing it when running too fast. Indicators for this purpose have heretofore been provided in which a time-clock was combined with gearing which was actuated by an impulse from each revolution of the engine-shaft, which gearing rotated an index-hand, which, when compared with the hands of the clock, would show the relative pace at which the engine was moving. My invention is founded upon this general principle; and it consists in the combination, with a clock, of a graduated traveling dial or scale of annular shape, which rotates around the clock-dial, and is actuated by the impulses of revolution from the engine, and also in the combination, with said clock and annular dial, of the particular means for transmitting the impulses of revolution from the engine to the annular dial, as hereinafter fully described.

Figure 1 is a front view of the speed-indicator. Fig. 2 is a horizontal section. Fig. 3 is a side elevation. Fig. 4 is a face view of the worm-plate; and Fig. 5 is a perspective view, in detail, of a modification of my invention.

In the drawings, A represents any good time-clock, which, as shown, belongs to the class of marine clocks, or clocks which are actuated by a spring instead of a weight. The clock may, however, be operated by a weight and pendulum, if desired. The clock is contained within a suitable inclosing-case B, having a hinged front door and a glass face. To the back of this case the clock-frame is securely fastened by a central bolt C, Fig. 2, whose threaded end passes into a screw-threaded hole in the clock-frame A^2, or into a nut attached thereto. Around this bolt is disposed a flanged sleeve D, and between the end of this sleeve and the back plate of the clock is disposed a washer E. On this sleeve and between its flange and the washer E there turns loosely a notched disk or wheel F, whose periphery is divided into sixty teeth. Projecting laterally from this disk and inclosing the clock-works there is a flange or cuff G, which extends forward as far as the clock-dial. Upon the edge of this flange or cuff is detachably fitted, by friction-lugs *a*, an annular dial H. This dial rests near the plane of the clock-dial and slightly overlapping the same, so that the minute-hand points to the subdivisions on the said annular dial. This annular or ring-shaped dial is graduated into equal subdivisions, which are numbered from the zero-point *z* in both directions. The numbers of the graduations on one side of the zero-point are marked "Power gain" and those on the opposite side are marked "Power loss." This annular dial has its zero-point set opposite the minute-hand of the clock, and when the engine is traveling at its normal speed this annular dial moves at the same rate as the minute-hand, although not actuated by the clock. This annular dial moves with the flange or cuff G, and is actuated by the toothed disk F, into whose teeth there meshes a worm *b*, Figs. 2 and 4, constructed on the face of a disk or plate I, fixed rigidly to a short shaft J, journaled in and extending through the side of the case. On the outer end of this shaft is keyed a ratchet-wheel K, Figs. 2 and 3, which is intermittently rotated by a pawl L, jointed to an arm M, hung upon the shaft J. N is a detent to prevent any back motion of the ratchet-wheel. The oscillation of the arm M serves to give an intermittent revolution to the ratchet-wheel, and this gradually turns the worm-plate, the toothed disk with cuff G, and the annular dial. For oscillating the arm M, its end M^2 is provided with a segment M′ of a grooved pulley. Over this grooved pulley-segment there passes a cord N′, which at its lower end is attached to a weight O, while its other end passes over a pulley P and extends to a crank, rock-shaft, or other oscillating or revolving part of the engine. At each revolution or rocking motion of this part of the engine this

cord and weight are alternately drawn up and let out, and as the cord moves its frictional contact against the segment M′ causes this segment and the lever M to oscillate, and thus actuates the pawl for giving an intermittent motion to the ratchet-wheel. Instead of using this weighted cord and the segment M′ for oscillating the lever M, I may provide a pulley Q, to be continuously rotated by a belt from the engine, and attach to the hub of the pulley a cam R, adapted to bear against the lever M to oscillate it.

The operation of my speed-indicator is as follows: The annular dial, which is made removable from and adjustable to any position on the rotating cuff or flange of the toothed disk, is fitted onto the edge of said cuff with the zero-point opposite the minute-hand. The gearing is now connected to the engine and adjusted by the length of the stroke of the pawl to rotate the toothed disk bearing the cuff once in an hour, each of the sixty teeth of this disk representing one minute. It will therefore be seen that when the engine is running at normal speed—say sixty revolutions a minute—it will turn the annular dial just as fast as the clock turns its minute-hand, and the zero-point of the dial will travel with the minute-hand. If, however, the engine runs too slow, the zero-point of the dial will drop behind the minute-hand and mark the indication "Loss." On the other hand, if the engine runs faster than the normal speed, the zero-point of the dial will advance faster and go beyond the minute-hand and mark the indication "Gain," and by this means the running of the engine may be corrected from time to time to preserve a uniform pace.

To limit the stroke of the pawl in rating the normal speed of the engine, a stop *s*, Fig. 3, is affixed to a plate on the side of the case, and is constructed in the form of an eccentric boss secured by a set-screw. By turning the projecting part of this boss to or from the lever M the lever strikes the stop sooner or later in its stroke, and the play of the latter is regulated and its pawl is made to take the required number of teeth of the ratchet-wheel according to the speed of the engine.

This speed-indicator is of very simple and inexpensive construction, since it does not involve any complication in the clock mechanism, but uses the ordinary clock, to which other gearing is applied without alteration of the clock mechanism, and while being simple and inexpensive it is at the same time an accurate and reliable indicator and is unaffected by vibration and jar.

In making use of my invention it is not necessary that the annular dial should be a complete circle; but it may be only a segment of a circle, and instead of being mounted upon the cuff or flange it might be carried by an additional hand P, as in Fig. 5.

Having thus described my invention, what I claim as new is—

1. A speed-indicator consisting of the combination, with a time-clock having the usual graduated face and moving index-hands, of an additional or supplemental dial or scale having circular graduations marked thereon and arranged to travel around the clock-dial, and gearing for rotating it by the engine, said gearing being arranged outside the clock mechanism, substantially as described.

2. A speed-indicator consisting of the combination, with a time-clock, of an annular dial surrounding the clock-dial and graduated, as described, and gearing for connecting the annular dial to the engine, substantially as described.

3. The combination, with a time-clock, of an annular dial surrounding the clock-dial, a toothed disk or wheel arranged behind the clock and having a cuff or flange extending around the clock and adjustably connected to the annular dial, and a gearing connecting the toothed disk to the engine, substantially as described.

4. The combination, with the gears of a speed-indicator, of a ratchet-wheel, oscillating arm hung upon the axis of said wheel and provided with segment M′ and a pawl, a detent for the ratchet-wheel, and a weight with cord passing over the said segment and over a pulley, substantially as and for the purpose described.

5. The combination, with the clock-frame and the case, of a bolt C, a flanged sleeve D, surrounding the bolt, the washer E, arranged between the clock-frame and the sleeve, and the disk or toothed wheel F, arranged to rotate between the flange of the sleeve and the washer, substantially as described.

ALBERT R. SHERMAN.

Witnesses:
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SOLON C. KEMON.