

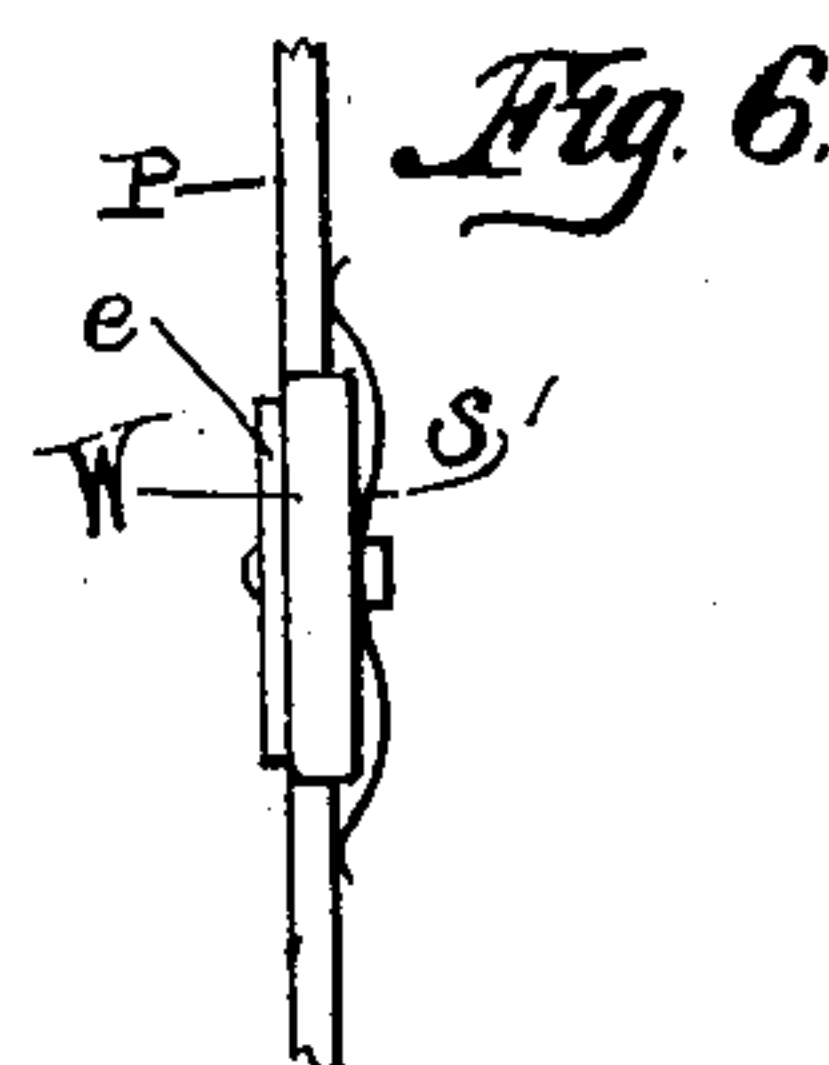
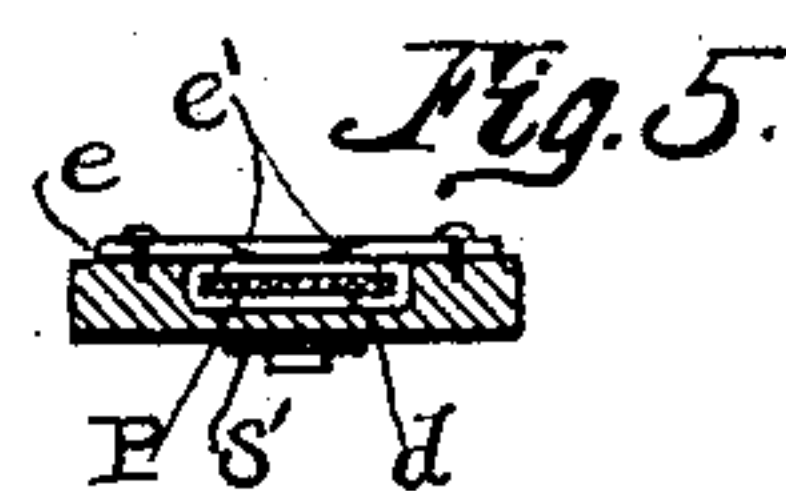
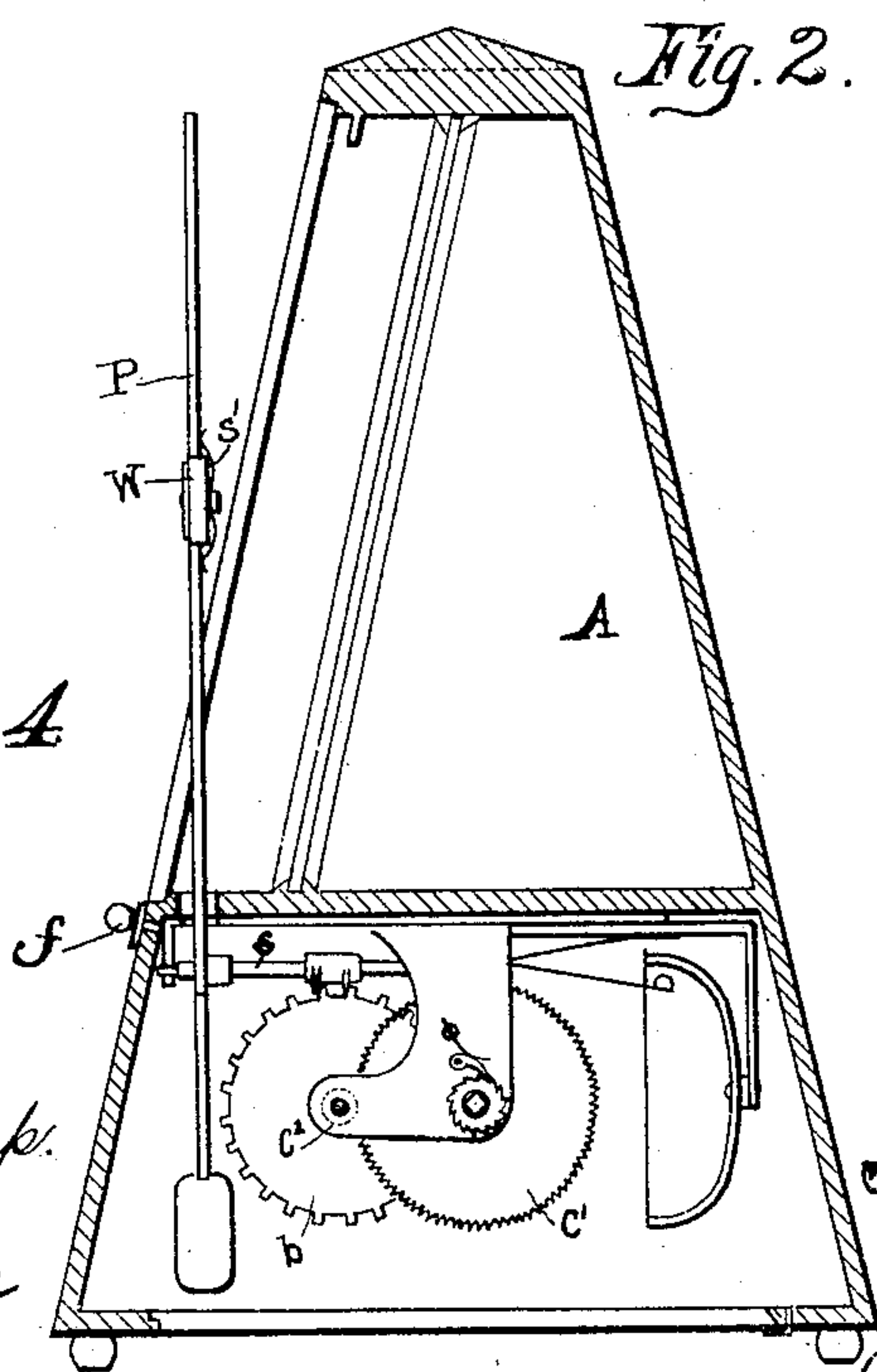
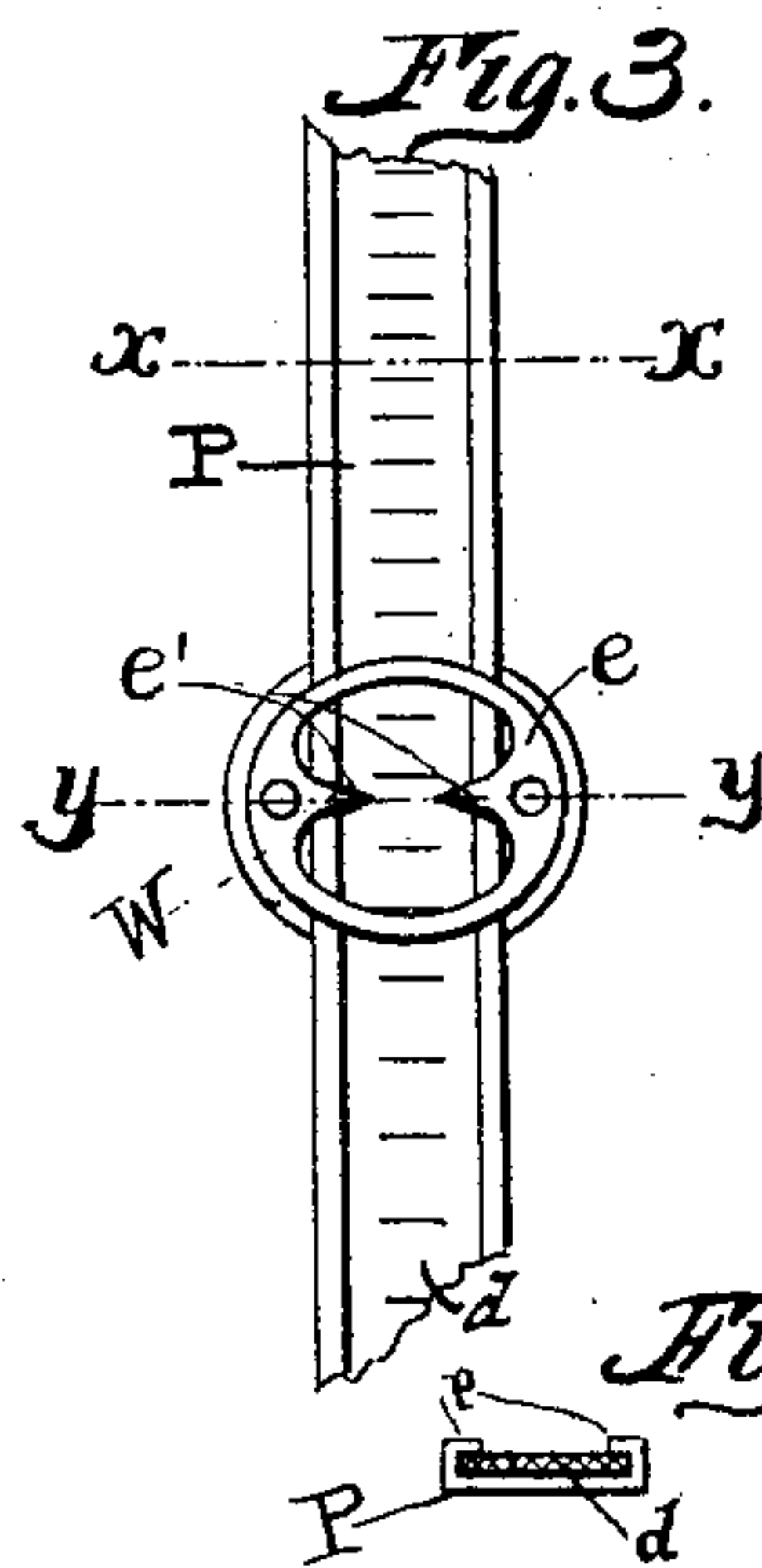
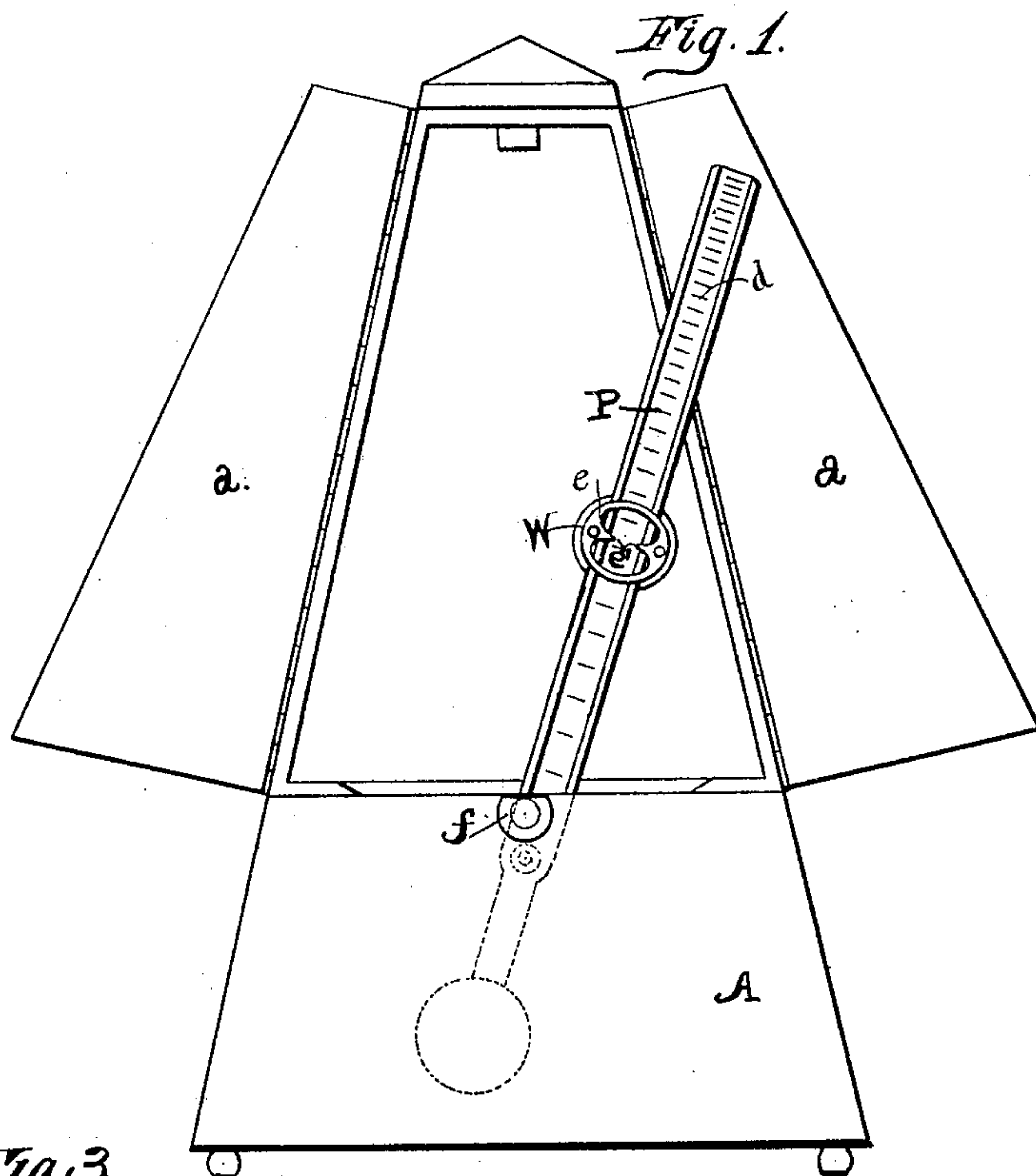
No. 637,624.

Patented Nov. 21, 1899.

F. A. LEE.
METRONOME.

(Application filed Oct. 11, 1897.)

(No Model.)



Witnesses.
Herbert J. Allsup.
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Inventor
Frank A. Lee
by
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UNITED STATES PATENT OFFICE.

FRANK A. LEE, OF CINCINNATI, OHIO, ASSIGNOR TO THE IMPERIAL COMPANY, OF SAME PLACE.

METRONOME.

SPECIFICATION forming part of Letters Patent No. 637,624, dated November 21, 1899.

Application filed October 11, 1897. Serial No. 654,802. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. LEE, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Metronomes, of which the following is a specification.

My invention relates to metronomes or apparatus for indicating to the eye and ear the time or rhythm of music; and it consists in the improved construction herein set forth whereby a more accurate indication of time is afforded and the apparatus more easily adjusted as required.

My invention is embodied in the accompanying drawings, in which Figure 1 is a general front elevation of my improved device; Fig. 2, a side elevation with part of the side removed to show the connection of the oscillating pendulum with the train of gears; Fig. 3, an enlarged detail front view of part of the pendulum and adjustable indicator or time-regulator; Figs. 4 and 5, cross-sectional views on the lines $x x$ and $y y$ of Fig. 3, and Fig. 6 a side view showing the friction-spring bearing upon the back of the pendulum.

Referring now to the drawings, the general apparatus, as shown in Fig. 1, consists of a box or case A, usually in pyramidal form, with its upper front provided with hinged doors $a a$, and a pendulum P, journaled in the lower part of the box and extending upward, secured when out of use within and behind the doors of the casing. Within the lower part of the casing is mounted the ordinary train of mechanism operated by a coiled spring for keeping the pendulum in motion when started. As this mechanism is of a construction commonly used and understood, a detailed description will be unnecessary. Sufficient to say it consists of a toothed wheel b , engaged alternately by rotary escapement-flanges upon the pivotal shaft s of the pendulum P and driven by gears $c' c^2$, impelled by a coiled spring attached to the gear c' , wound up by a key in the usual manner. (See Fig. 2.)

The pendulum, which embodies the principal part of my invention, is permanently weighted at its lower end and is provided with a sliding adjustable weight W above its pivotal shaft. Heretofore in these constructions

no sufficient or accurate means existed for properly adjusting the sliding weight. A series of marks were placed on the face of the casing behind the pendulum and the weight adjusted thereby; but owing to variations of dimension and liability to error by the mode of adjustment scarcely any two instruments would produce the same results.

The special object of my improvement is to enable the user to adjust the sliding weight with absolute certainty, with such a structure that all apparatus may be accurately gaged in the making, whereby all instruments, as manufactured and sold, may furnish a certain, reliable, and uniform time-marker adapted to modern demands. To this end I construct the pendulum P of a bar formed with a longitudinal undercut-face groove, as shown in cross-section, Fig. 4. This may be done by turning over the edges of a strip of sheet metal, so that the terminal edges $p p$ form the side walls of the groove and confine therein a strip d , preferably of light-colored material, such as celluloid, on which are stamped, cut, or printed the gage-marks, as indicated in Fig. 3. These parts being exactly duplicated in manufacture by suitable templets, &c., when placed together the gage-marks are always exactly distanced from the pivotal center and no variations in the case construction can effect the result.

The adjustable weight or marker W, I prefer to construct as a relatively flat piece of metal—say in the form of a disk—with a groove across one face to fit slide upon the back of the pendulum and held thereto by a ring e , secured across the face of the disk. The ring e is formed with two opposite inward projections e' as a guide in setting to the proper gage-marks. To secure sufficient friction to retain the weight W in adjusted positions, I may attach a flat spring s' with curved ends at the back of the weight, having its terminals curved to bear against the back of the pendulum, as shown in Fig. 6. The pendulum thus affords to the eye a series of black marks upon a white or light-colored ground, giving a perfectly plain and distinct visual indication by which the weight or marker W can be accurately set. The construction of the case as herein shown also facilitates the

convenience of use and proper care of the instrument as a whole. Usually the front is completely detachable, and in use it is necessary to remove the front and lay it aside, 5 whereby more or less inconvenience results, and when, as is frequently the case, the front is lost the working parts are exposed to dust and injury. I construct the front part of the casing or cover as shown, the lower part 10 permanently closed and the upper part provided with folding doors *a*, hinged at the sides and meeting at the center, where they are secured by a rotary flanged "knob" *f*, cut away at one side to permit the doors to 15 open. A "looking-glass" is preferably secured in the space immediately behind the doors, which adds to the attractiveness of appearance.

I claim as my invention and desire to secure by Letters Patent of the United States—

In a metronome, the combination with a pendulum having longitudinal undercut groove and a strip in said groove having graduated face, of a grooved weight receiving said pendulum and slidable thereon, a perforated 25 plate secured to the face of the weight across the face of the pendulum and having projections riding on the turned-over edge of the pendulum end extending toward each other into the perforation of the weight, and springs 30 on the back of the weight bearing on the pendulum, as and for the purpose set forth.

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

FRANK A. LEE.

Witnesses:

L. M. HOSEA,
HERBERT J. ALLSUP.