

A. C. L. DELSARTE.
Pendulum Levels.

No. 142,005.

Patented August 19, 1873.

Fig. 1

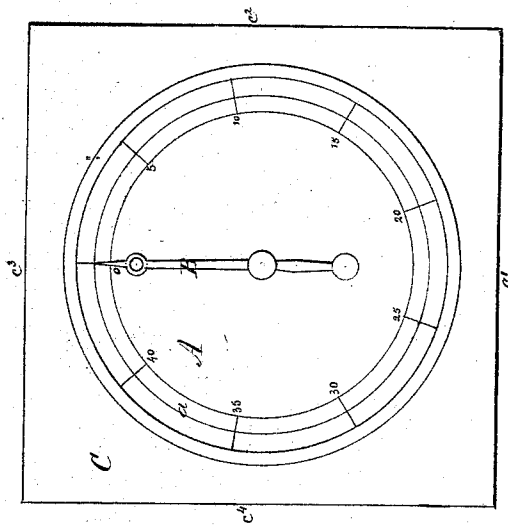


Fig. 2

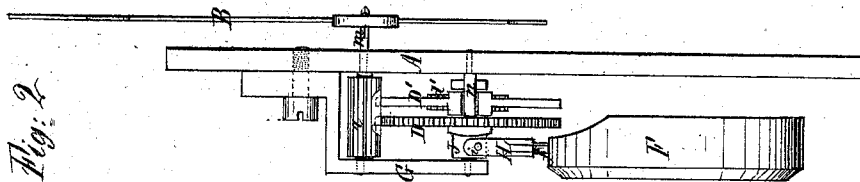
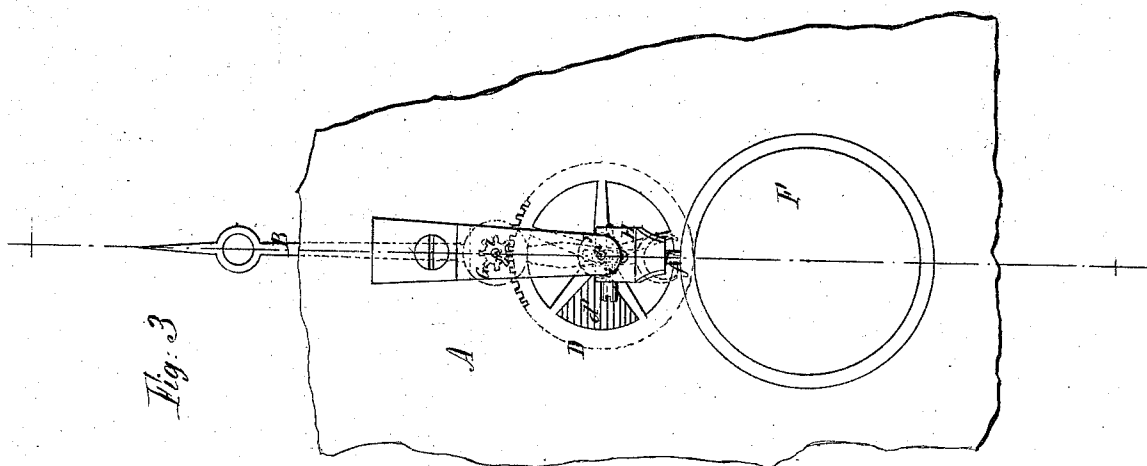


Fig. 3



Witnesses
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IMPROVEMENT IN PENDULUM-LEVELS.

Specification forming part of Letters Patent No. 142,005, dated August 19, 1873; application filed August 31, 1872.

To all whom it may concern:

Be it known that I, ADRIEN CHARLES LOUIS DELSARTE, of Paris, in the Republic of France, have invented certain Improvements in Pendulum-Levels, of which the following is a specification:

In the hitherto-known pendulum-levels the index or hand for indicating on a dial-plate or graduated limb the variations in level forms an immediate part of the pendulum-rod, in consequence of which, if a short rod be made use of, the indications on the limb do not possess sufficient accuracy; whereas, if the length of the rod be increased beyond a suitable measure, the level becomes unhandy and the observations rather slow, a long rod requiring a comparatively long time before arriving at full stop.

The object of my invention is to allow of obtaining very accurate and quick observations by means of pendulum-levels provided with a rod of comparatively very small length, which, consequently, permits of reducing the level to a very small compass. For this purpose I interpose between the pendulum-rod and the index a pinion and wheel; or, if wished, two or more sets of such gearing, by which means the sensibility of the level may, consequently, be increased to any required extent, though the pendulum-rod be of a comparatively very small length; and I further make use, in combination with the said gearing, of an arrangement for causing the indentations or teeth of the gearing to constantly fully engage into each other, and by thus exerting their full effect insure the accuracy of the indications of the index.

In the annexed drawing, Figure 1 shows a full size front elevation view of my improved pendulum-level; whereas the Figs. 2 and 3 represent, on a scale double that of Fig. 1, respectively, a side and a back elevation view of the mechanical parts of the level, the dial-plate and the pinion being in Fig. 2 represented as partly cut away and some other parts shown in vertical section, while in Fig. 3 only part of the teeth of the wheel which drives the pinion are represented.

In these three figures the same letters refer to corresponding parts.

The dial-plate A, and mechanical parts con-

nected thereto, are fixed in a frame, C, the four sides c^1 c^2 c^3 c^4 of which require to be situated exactly at right angle to each other, and those, c^1 and c^3 , at right angle with the zero of the dial-plate. The spindle or axis m of the hand or index B carries a pinion, r , of such length as to allow the two toothed spur-wheels D and D' of acting simultaneously on the indentations of the said pinion, these wheels D and D' being situated parallel to each other on the same spindle n , and of exactly the same size and indentations, the number of teeth of these wheels and of the pinion depending on the speed to be given to the index B. The pivoted ends of the spindles m and n turn in the dial-plate A and in a potence or bridge, G. The wheel D is fixed, and the other, D', fitted loose, on the spindle n , and this latter wheel, D', is provided with a counterweight, d' , by the effect of which the wheel D' will constantly exert a kind of leverage on the pinion r , and cause the tooth of this latter, which, at the time being, is in gear with one of the teeth of the wheel D, to be acted upon to the full extent of its power by the said tooth of the wheel D, by which means the accuracy of the indications of the index B will be insured. The pendulum-rod f is very short, and provided at its lower end with a comparatively very heavy bob or weight, F, whereas at its upper end the said rod is fixed to a forked piece, H, which may swing freely on a pin, i , inserted in the hub or socket J, by which the wheel D is fixed to the spindle n .

In small instruments in which gearing is made use of if the teeth are not mathematically true—i. e., if their curved ends are not perfectly epicycloidal—which in practice, and particularly in cheap instruments, is seldom the case, there always exists a twofold action in the gearing, which causes inaccuracy in the indications, and which, particularly if the indications be recorded by a comparatively long hand, renders the indications unreliable.

It is found in practice that a pinion driven by a wheel exercises a counter action or backward motion, tending to present a deviation, the extent of which is more or less dependent upon the inclined position of the instrument, and which increases according as the diameter of the pinion is diminished, and still more if

the index carried by the pinion is comparatively long. In this invention the counterweighted loose wheel D' forces the tooth of the pinion, which for the time being is engaged with the wheel, to come and remain in contact with the corresponding tooth of the driving-wheel, whatever may be the shape of the curved part of the teeth.

The counterweighted loose wheel is found preferable to a hair-spring, because a spring will make a series of extensions and contractions before actually coming to rest.

The manner of making use of my improved pendulum-level is exactly the same as for other instruments of the same class, any de-

viation in level being at once indicated on the graduated limb a by the index B .

I claim as my invention—

A wheel, D' , provided with a counterweight, d' , and fitted loose on the spindle n of the wheel D , and for the purpose of causing the indentations of the wheel D constantly to act to the full extent of their power on those of the pinion r in order to insure the exactness of the indications of the index B .

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Witnesses:

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