

M. MUCHIN.

Regulators for Spring-Clocks and Watches.

No. 156,647.

Patented Nov. 10, 1874.

Fig. 2.

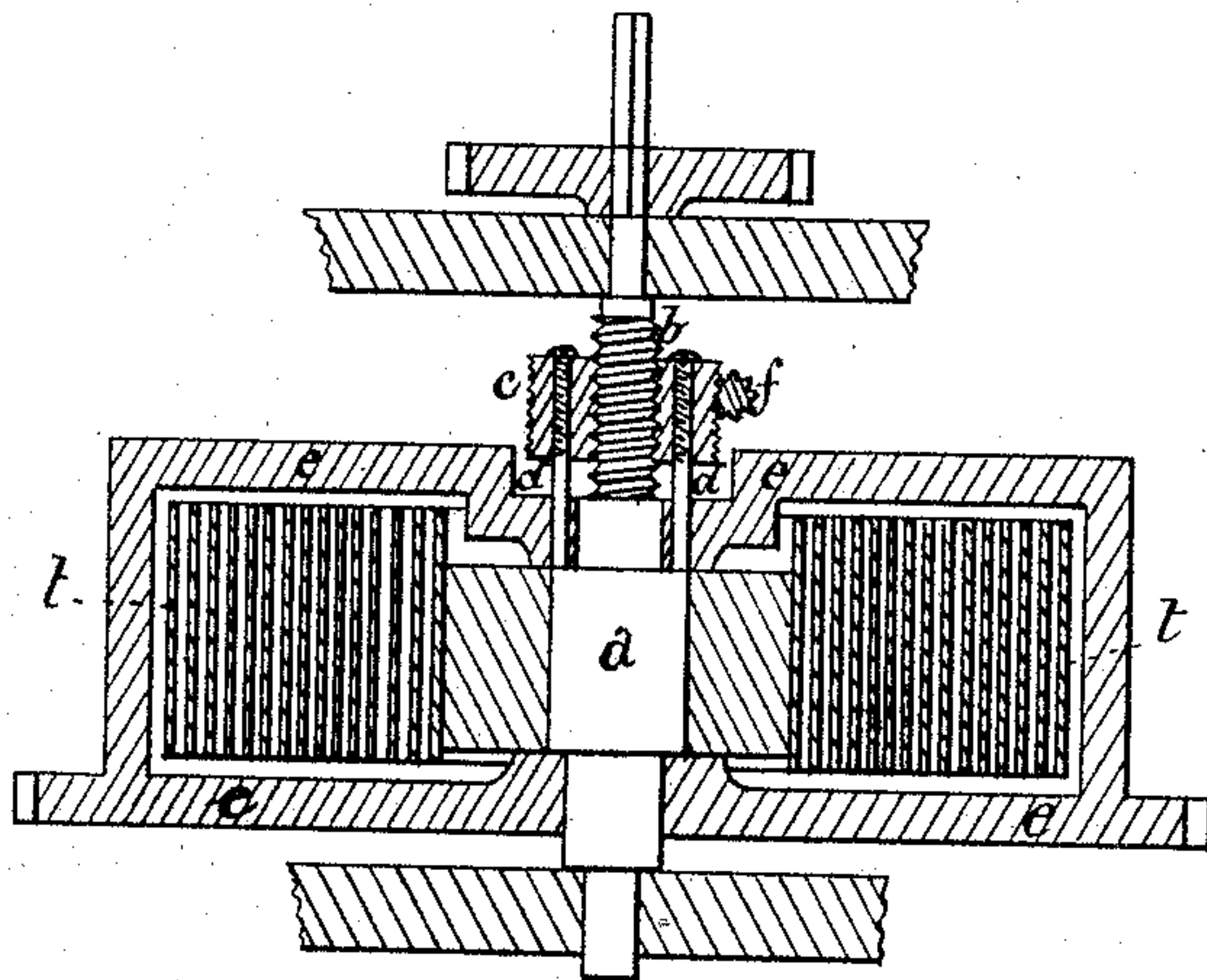


Fig. 1.

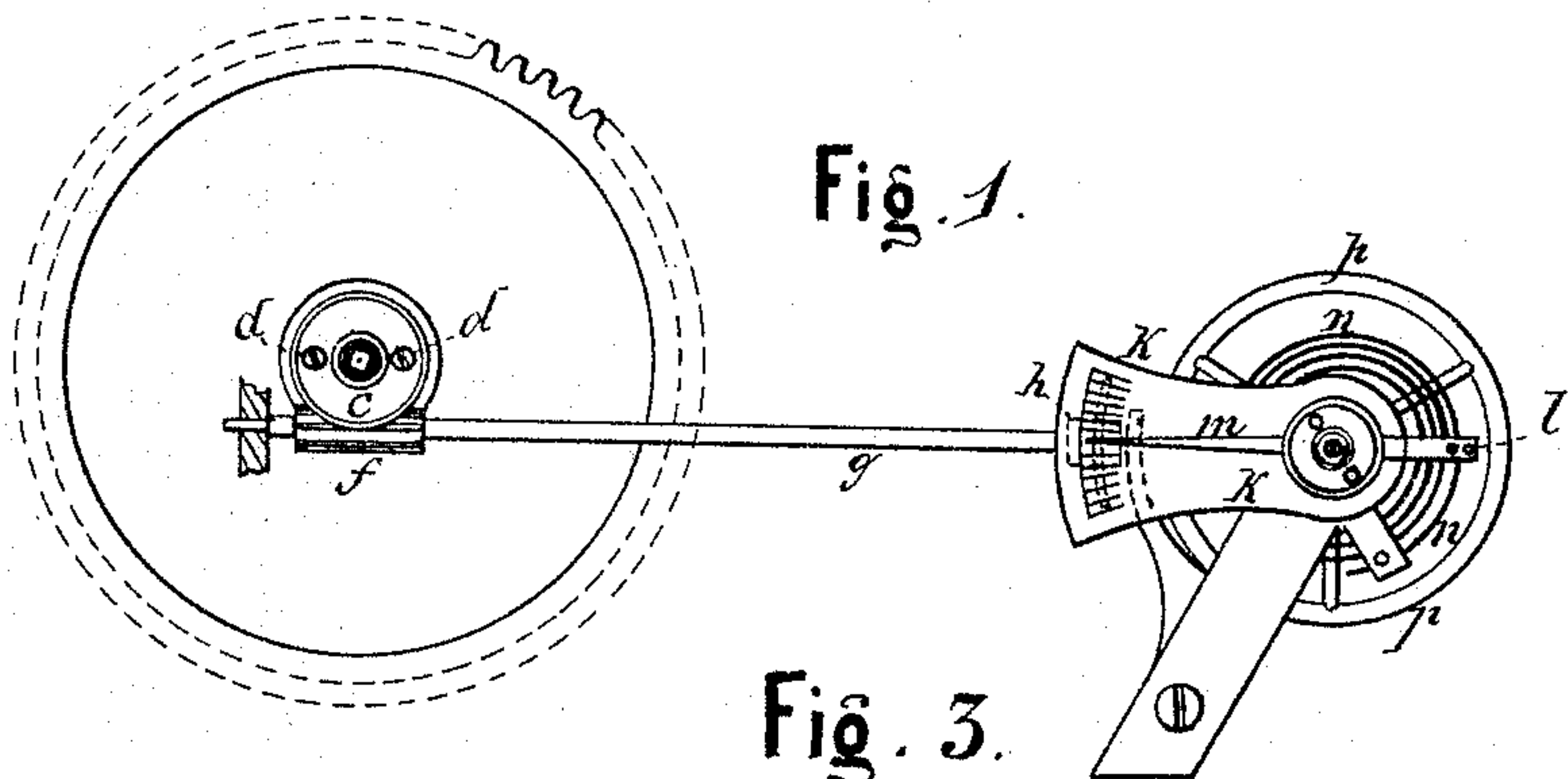
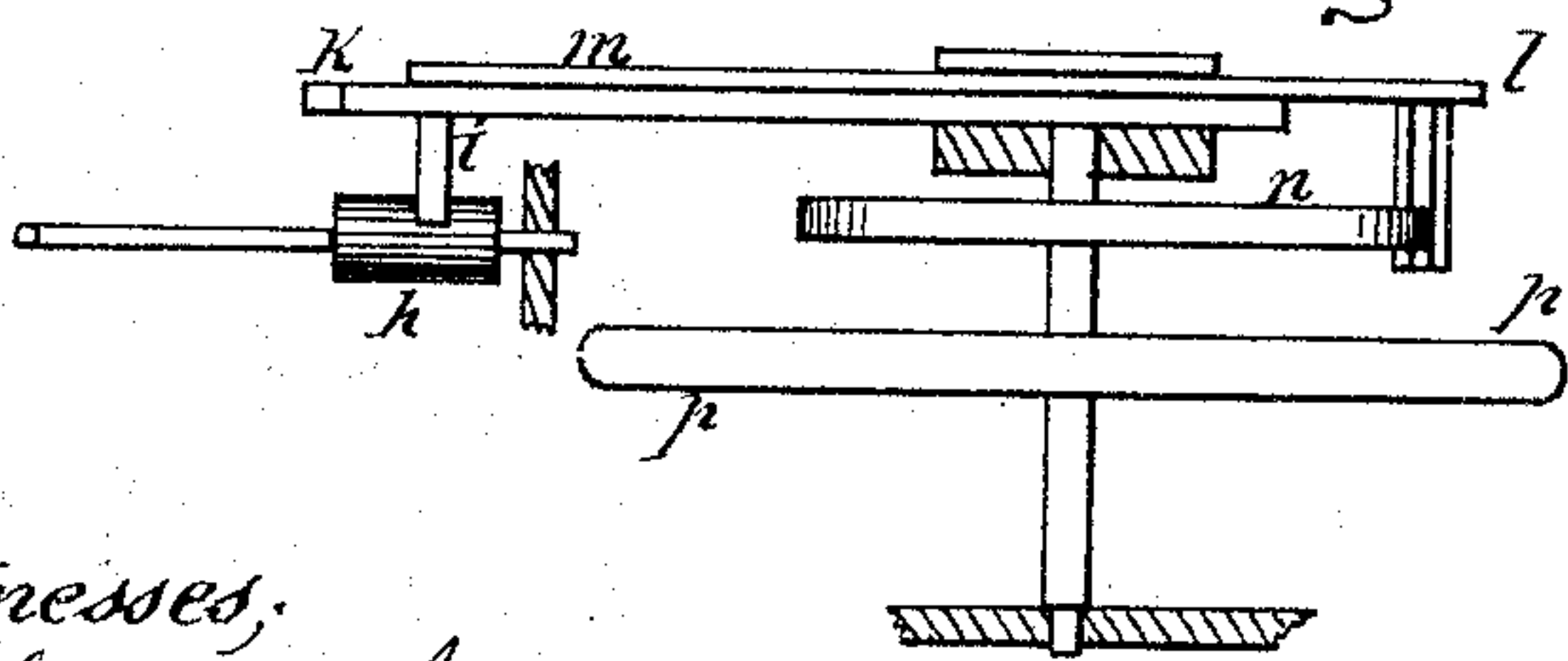


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

MATTHEW MUCHIN, OF RIGA, RUSSIA.

IMPROVEMENT IN REGULATORS FOR SPRING-CLOCKS AND WATCHES.

Specification forming part of Letters Patent No. **156,647**, dated November 10, 1874; application filed August 7, 1874.

To all whom it may concern:

Be it known that I, MATTHEW MUCHIN, of Riga, Empire of Russia, have invented a new Regulator for Spring-Clocks and Watches, of which the following is a specification:

My invention relates to a regulator for spring-clocks and watches, by which a continual and automatical regulation is attained.

In all spring-clocks and watches, the motive power slackens as the spring unwinds; consequently the clock goes slower and slower if it be not provided with some appliance to counterbalance this loss of tension of the spring. The variation of the length of the balance-spring affords a means which is generally employed for this purpose, the variation being effected by displacing a special finger, in order that the average speed may be a normal one.

Evidently, if the displacement of the balance-finger—*i. e.*, the regulation of the length of the spring—were continuous and proportional to the loss of tension of the motive-spring, the clock or watch would go regularly, if, however, it be not modified by irregularities of a different nature, and which do not coincide with the present case.

The appliance which I have invented for continually regulating clocks and watches consists of a mechanism, shown in the annexed drawings, of which Figure 1 is a front view; Fig. 2, a transverse section of the motive-spring barrel through the axle, and of the other parts of the mechanism. Fig. 3 shows the disposition of the mechanism of the balance.

a is the axle, to which is fixed, as usual, the spring *t*, which is wound up by turning this axle. The part *b* of the axle *a* is threaded, and has a screw-nut, *c*, on it. This screw-nut is united to the barrel *e* by two pins, *d d*, so that the barrel *e* turns the screw-nut *c* on the axle *a*, and consequently forces it along the threading *b* of the axle *a*. As usual, the other extremity of the spring *t* is fastened to the barrel *e*, thus giving it a rotatory motion, determined by the oscillation of the balance, while the axle *a* remains stationary. It follows that the screw-nut *c* moves itself farther and farther from the barrel *e* as the spring *t* unwinds. The screw-nut *c* is provided outside with circular

grooves, which work into the teeth of the pinion *f* of the axle *g*, so that the movement of the screw-nut *c* along the axle *a* turns the axle *g*. This axle *g* has another pinion, *h*, Figs. 1 and 3, which works into a toothed segment, *i*, fastened to the scale-plate *k*, which automatically diminishes the length of the spring *n* of the balance *p* by means of a short arm, *l*, fastened to the finger *m*, as is usually done. Instead of two pinions, *f* and *h*, wedged to the smooth axle *g*, one may use an axle provided with longitudinal grooves, or made of fluted wire.

The summary regulation of the working of the clock is produced, as usual, by the finger *m*, which may be turned either way independently of the plate *k*, but which is frictionally united to this plate. If the various parts of this mechanism be proportionally made it is evident that the watch or clock cannot go too slowly.

When the spring *t* of the watch or clock is wound up, the screw-nut *c* moves back along the axle *a*, and at the same time the arm *l* lengthens the spring *n* of the balance *p*, as it effectually should be.

By a slight modification in the arrangement of the devices, the same results are obtained—as, for instance, I can employ a smooth axle, *a*, instead of a threaded one, and place in the center of the side plate of the spring-barrel *e* a boss having a screw-threaded surface, upon which the nut *c* is screwed by the rotation of the spring-barrel *e*.

To prevent the nut from revolving with the barrel *e*, the nut *c* is provided with two grooves of the same diameter, and formed on the opposite ends. With these grooves engages a pin firmly held in the axle *a*.

By this arrangement the nut *c* will move to or from the barrel *e* as the axle *a* or the barrel *e* is turned, producing the result already described.

Having thus described my said invention, and the way in which it is to be performed, I have to state that I do not restrict myself to the precise details herein described; but

I claim as new and essential in my invention—

1. The combination of the balance-spring and regulator, operated by the main or motor

spring, with any suitable intermediate mechanism, whereby the variation of the length or tension of the balance-spring is automatically and continuously regulated according to the diminution of the tension of the mainspring, substantially as specified.

2. The combination of the mechanism consisting of the screw *b*, the screw-nut *c*, the axle *g*, with the pinions *f* and *h*, and the toothed segment *i*, fixed to the movable plate *k*, sub-

stantially as described, and shown in the annexed drawings, and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this twenty-fourth day of May, 1874.

MATTHEW MUCHIN.

Witnesses:

CHARLES TORIS,
JOHANNER HAUSMANN.