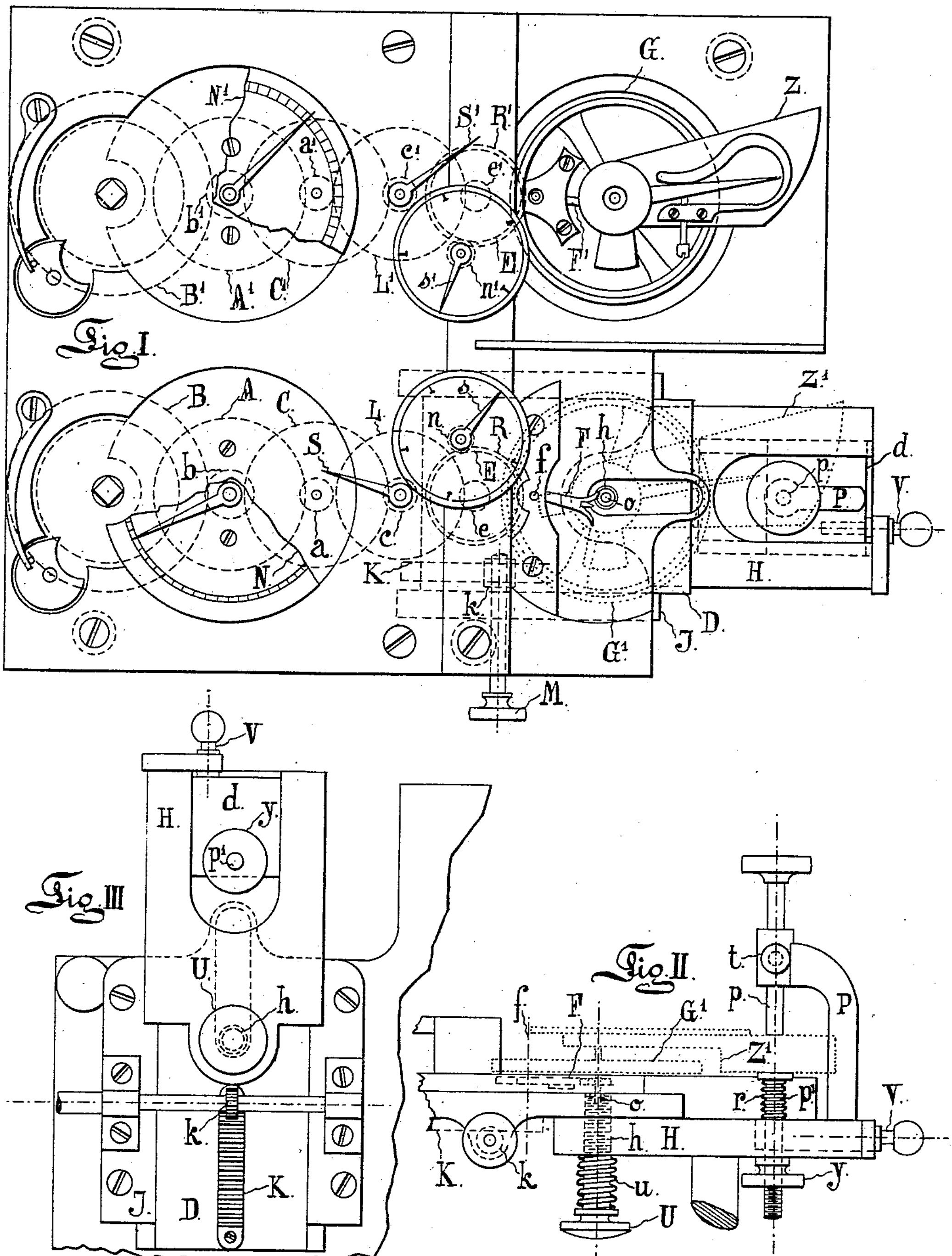
No. 653,996. Patented July 17, 1900.

L. GRISEL.

WATCH BALANCE TESTER.

(Application filed June 12, 1899.)

(No Model.)



Witnesses:

E. B. Bolton

[signature]

Inventor:

Lucien Grisel

By Richards & Co

his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LUCIEN GRISEL, OF LA CHAUX-DE-FONDS, SWITZERLAND.

WATCH-BALANCE TESTER.

SPECIFICATION forming part of Letters Patent No. 653,996, dated July 17, 1900.

Application filed June 12, 1899. Serial No. 720,256. (No model.)

To all whom it may concern:

Be it known that I, LUCIEN GRISEL, a citizen of the Republic of Switzerland, and a resident of La Chaux-de-Fonds, canton of Neufchâtel, Switzerland, have invented certain new and useful Improvements in Machines for Testing Watch-Balances, of which the following is a specification.

The testing-machines built and used until now have a balance-wheel worked by any suitable mechanism to the number of vibrations wanted, above which the balance-wheel of the watch to be tested was made to oscillate, said balance-wheel being hung by its hair-spring to a suitable potence. That system, besides other inconveniences, had this very serious one that the way of suspension and pivoting of the hair-spring and balance-wheel not being the same when those parts were placed on the regulating-machine or in the movement it resulted very often in noticeable mistakes. That system, besides, required very great skill and close attention from the worker. The machine I have invented permits the testing of the balance-wheel and its hair-spring placed definitively on the cock of the movement, the difference in the vibrations being, besides, rendered more visible by means of hands indicating the fifths of a second, the seconds, and the minutes.

Figure I is a plan view of the testing-machine, and Fig. II a side elevation of it, showing on the machine the place where the cock bearing the balance-wheel to be regulated is placed. Fig. III is a bottom view of the parts shown in Fig. II.

Two similar barrels B B′ communicate each their motion, by the medium of the wheels and pinions *b b′* A A′ *a a′* C C′ *c c′* L L′ *e e′*, to the escape-wheels E E′, against which the lever-forks F F′ are acting, a balance-wheel, G acting on the fork F′. The balance-wheel, as well as the escapement it is working, is so calculated as to give a determined number of vibrations, corresponding to the number of the balance-wheel's vibrations of the watch to be tested. The arbors of the pinions *b* and *b′* bear each a hand showing the number of minutes on the dials N N′, respectively. The arbors of the pinions *c c′* are provided each with a hand S S′, showing the seconds, and the hands *s s′*, attached to the pinions *n n′*, which are acted upon by the wheels R R′, show the fifths of a second. In order that the two lever-forks F F′ should act identically on each wheelwork and on each pair of hands, it is necessary that the balance-wheel and the hair-spring, which act upon lever F, be absolutely in identical working conditions as the balance-wheel G.

An arm P, set on a sliding block *d*, may be moved, by means of an adjusting-screw V, into a sliding piece H, pivoting upon a milled head-screw *h*, screwed into a second sliding block D, that may be moved into a slide J by a pinion *k*, acting upon a rack K, attached to the sliding block D, that pinion being worked by the knob M. The screw *h* is provided with a hole-jewel *o*, the hole of which corresponds to the pivot of the balance-wheel arbor to be tested. In the arm P a cylindric spindle *p* may be moved, opposite which is another spindle *p′*, the threaded end of which is provided with a nut-screw *y*, allowing to push down more or less that spindle, which is pushed up again by a spring *r*. A spring *u* acts also between the head U of the screw *h* and the piece H, so as to insure the contact of that piece with the sliding block D, while giving a certain elasticity to that coupling arrangement.

To test a balance, the cock, with the balance-wheel on its arbor and the hair-spring, is placed between the two spindles *p p′*, which are regulated so as to obtain the suitable height insuring the desired contact of the balance-wheel roller with the fork of the lever F, the distance from the centers being obtained in moving in one direction or the other the sliding block *d*, bearing the potence, by the screw V, and the sliding block D by the knob M, that sliding block bearing the screw *h*, of which the hole-jewel *o* constitutes the lowest point of the balance-wheel arbor pivoting, the upper pivot pivoting naturally in its place in the cock. The balance-wheel being then in place and taken by the escapement and the two barrels wound up, the two balance-wheels are placed so that the seconds, minutes, and fifths-of-seconds hands are occupying the same position, then they are let start together between the two balance-wheels, the differences of vibrations being read on the

dials what allows to correct the distances between the two balance-wheels until they vibrate in unison.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In a watch-balance-testing device having a frame or support carrying two trains of gearing and a testing-balance operated by one of said gearing, a block D having a sliding connection with said frame adjacent to the other train, a piece H pivotally connected with said block, an arm P having a clamp for holding the balance-bridge and balance to be tested, and a sliding connection between said arm and piece H, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

LUCIEN GRISEL.

Witnesses:
PAUL MÉROZ,
CHARLES KOHLER.