

E. B. HORN.
Watch Regulator.

No. 22,428.

Patented Dec. 28, 1858.

Fig. 1

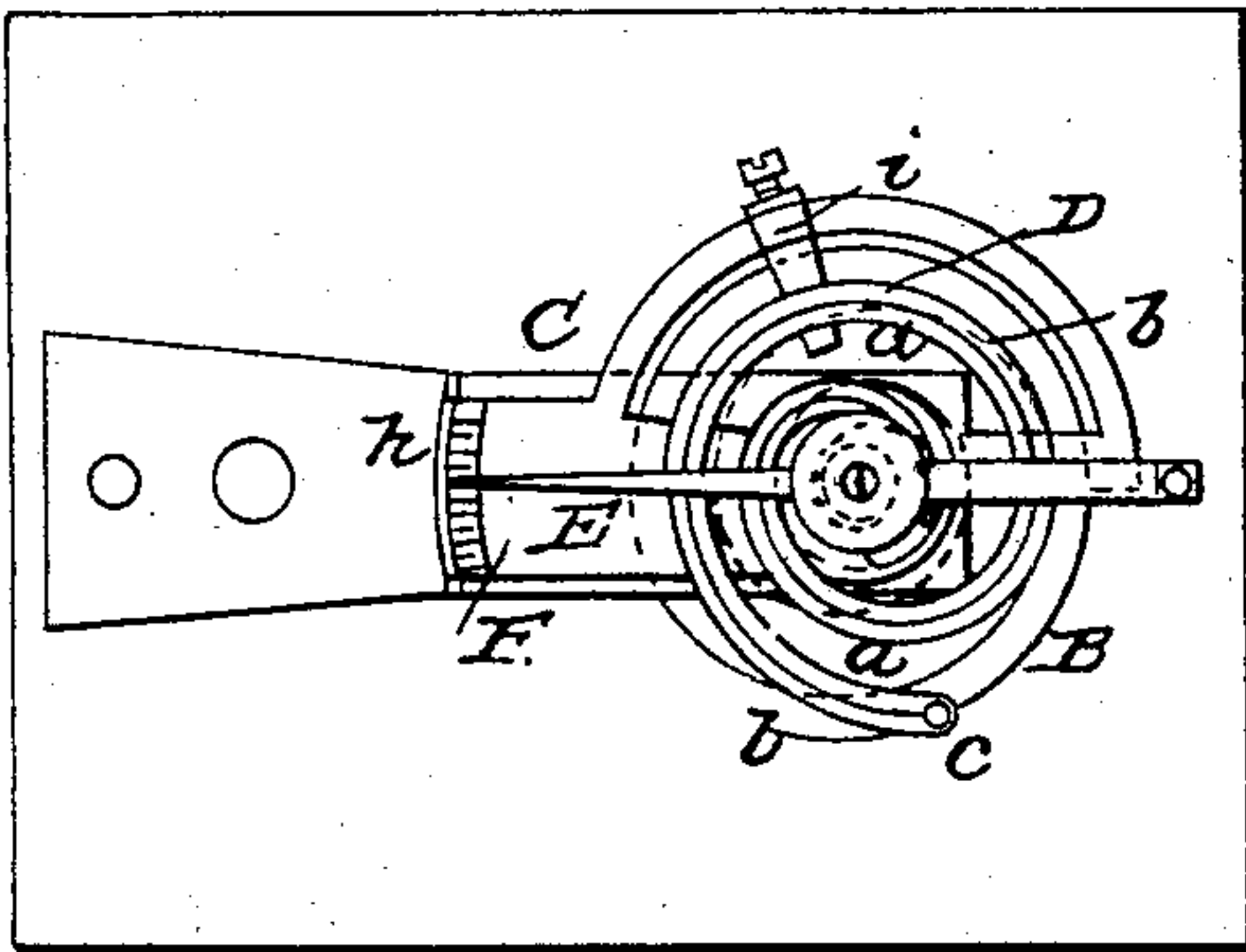


Fig. 2

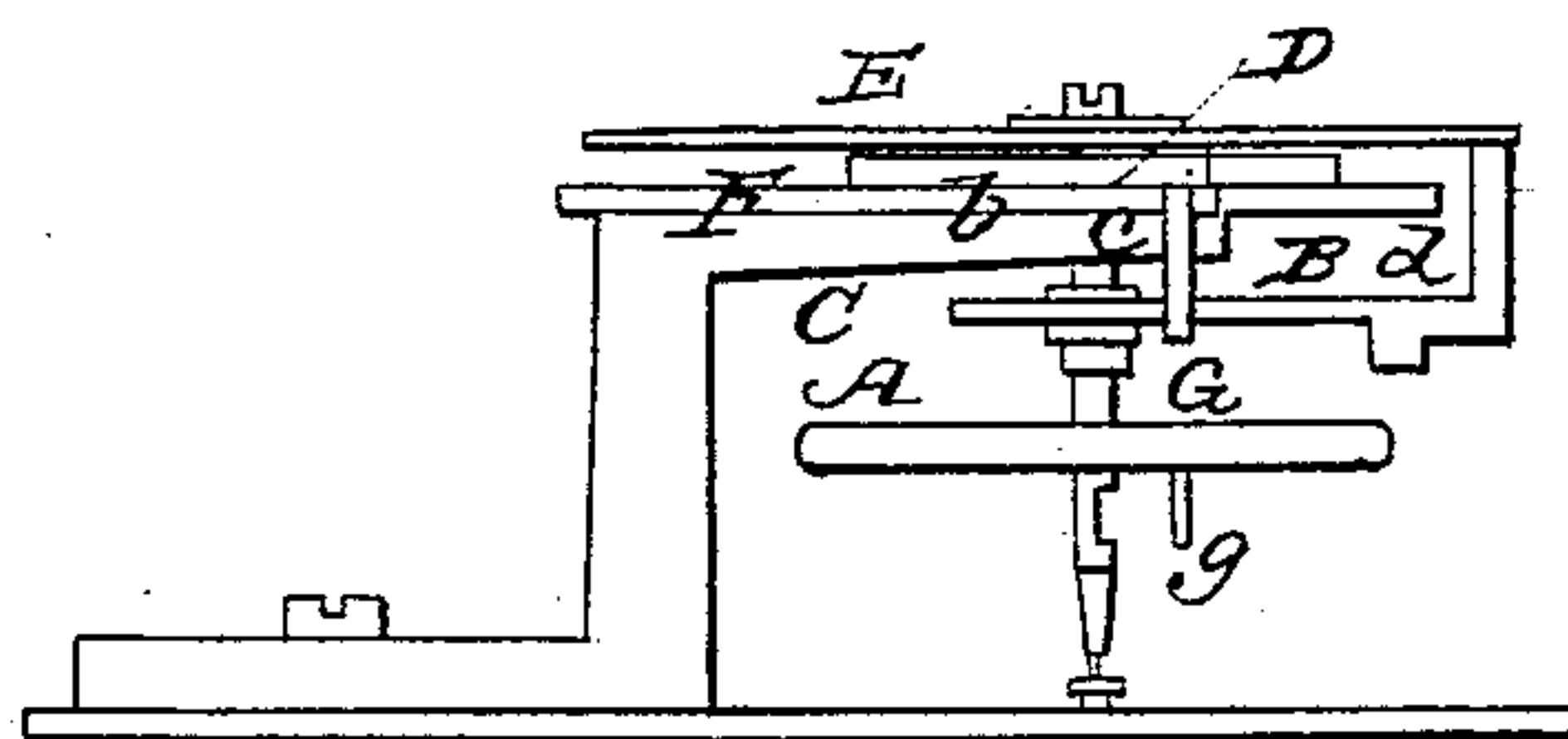


Fig. 3

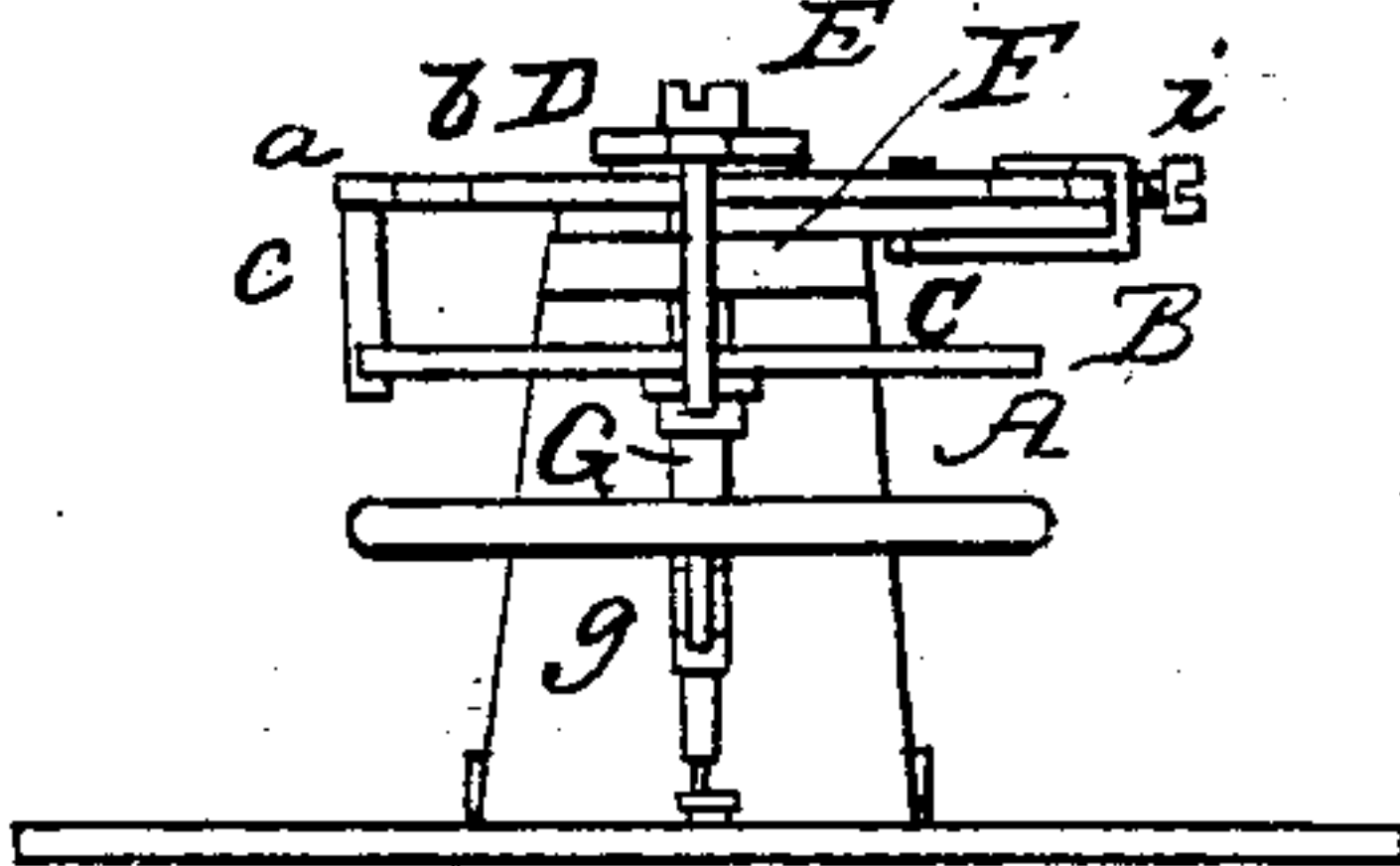
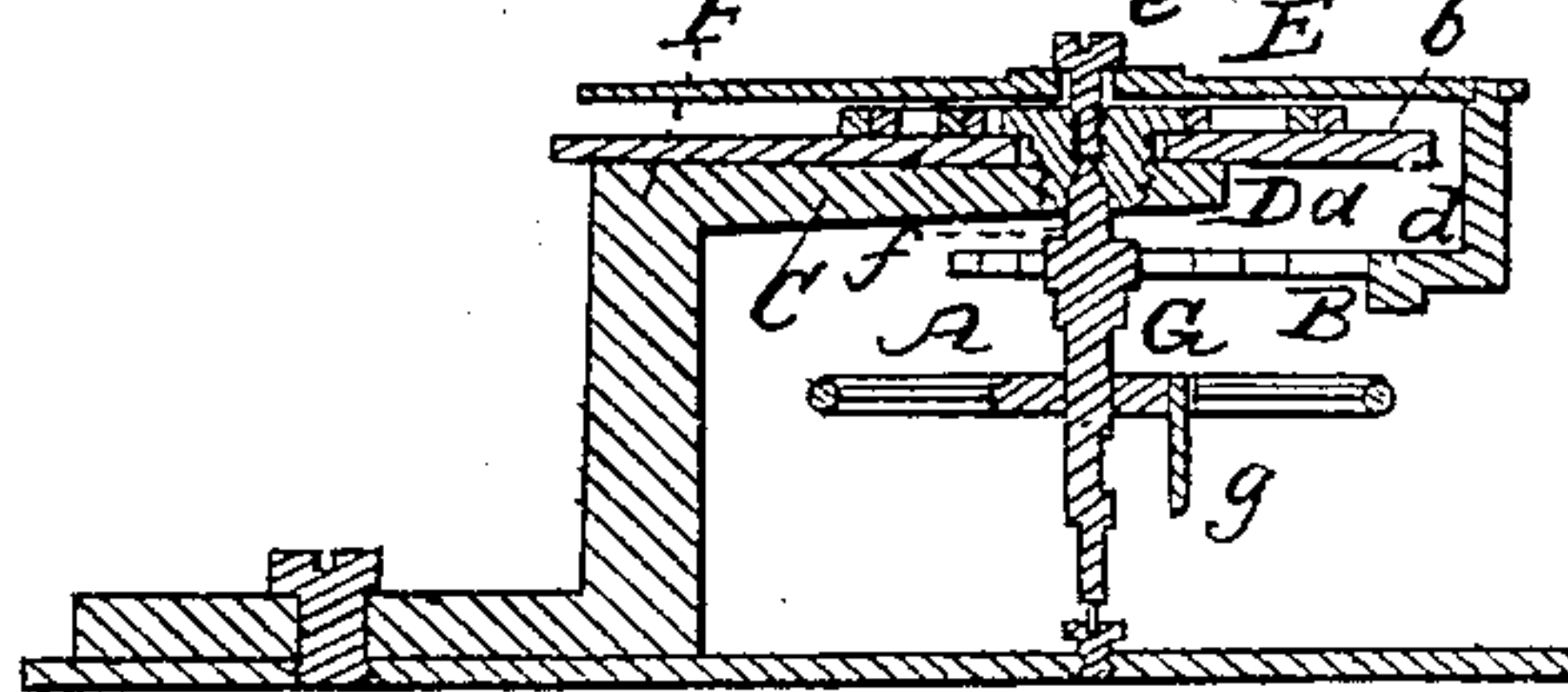


Fig. 4



UNITED STATES PATENT OFFICE.

EDWIN B. HORN, OF BOSTON, MASSACHUSETTS.

METHOD OF ADJUSTING TRIPPERS TO ESCAPEMENT-LEVERS OF TIMEKEEPERS.

Specification of Letters Patent No. 22,428, dated December 28, 1858.

To all whom it may concern:

Be it known that I, EDWIN B. HORN, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Compensation Apparatus for Hair-Spring Balances for Watches or Timepieces; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1, exhibits a top view; Fig. 2, a side elevation; Fig. 3, a front elevation; Fig. 4, a vertical and longitudinal section of a hair spring and balance furnished with my invention.

In the drawings, A, exhibits the balance and B, the hairspring of an ordinary watch, the same being supported beneath a standard, C.

It is well known that owing to the expansion of metals under any increase of temperature, it is very difficult to keep the hair-spring of a watch at a uniform degree of tension. The purpose of what is termed the "chronometer balance" is to compensate for the stretching of the hairspring caused by different degrees of temperature. Instead of the chronometer balance or any such contrivance making part of a balance wheel of a watch, I employ what may be termed an expansible or compensating spiral coil, D, separate from the balance wheel and formed of two strips of metal, *a*, *b*, laid side by side and united together where they touch one another, one of the strips, viz., *a*, being made of brass while the other or outer one, *b*, is constructed of steel. The effect of heat on one of these metals is to expand it much more than the other, that is to say, the expansion of the brass will be about double that of the steel. The consequence will be, that when the coil expands, the extreme outer end of it will be retracted instead of being advanced, and of course, the movement will be in the direction opposite to that of the adjacent or outer end of the hairspring, the spiral coil being held stationary at its inner end and having its outer end connected to the outer end or part of the hair-spring B, as shown at *c*.

The hair-spring, at its inner end is attached in the usual manner to the balance, and has its outer coil lying in a slit, formed as shown at *d*, in the rear bent arm of an index lever pointer or regulator, E, such as is

well known and in common use in most watches, its purpose being to so affect the action of the spring as to make the watch go either slower or faster as circumstances may require.

The inner end of the spiral compensating scroll is fixed to a cylindrical projection, *e*, extending upward from a plate, F, which turns on a pivot, *f*, extending upward from a standard G. Thus, when we turn the plate, F, laterally on its pivot, the compensating scroll, the hair-spring and the balance will be moved with it. Consequently, the pin or tripper, *g*, of the escapement lever will be moved with such movement of the balance. Thus, it will be seen that the object or purpose of the movable plate, F, is to enable the said pin or tripper to be properly adjusted to the escapement lever.

The movable plate, F, is furnished with a semi-circular arc, *h*, projecting from it, as shown in the drawings. This arc carries a slider, *i*, which is notched to receive the compensating scroll, which fits closely in the notch. This slider affords a means of regulating the action of the compensating scroll, for the nearer the slider is moved toward the outer end of the scroll, the less will be the amount of movement of such outer end under any change of temperature. The slider therefore is a regulator for the scroll with reference to its action on the hair spring.

The advantage of the above described scroll and its means of adjustment over the well known "chronometer balance," or that in which the rim of the balance wheel is made of two separate concentric rings, one of which is composed of steel and the other of brass, is as follows. First, the chronometer balance is very difficult of construction and adjustment, and requires great care and skill in its manufacture, and adjustment. But the scroll balance can be made and applied to a watch at very much less cost and can be adjusted with far greater ease and is not liable to get out of order or adjustment. Besides, it has the advantage of the means of adjustment of the beat or the pin or tripper, *g*, of which the chronometer balance is wanting.

I do not claim a compensating scroll or coil, D, composed of two metals of variable expansive properties and applied to a hair spring balance, but

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I claim—

The movable plate, F, or its equivalent supported so as to be capable of turning on a pivot or its equivalent carried by the stand, the same being for the adjustment of the beat or the pin or tripper of the escapement lever, as specified.

In testimony whereof I have hereunto set my signature.

EDWIN B. HORN.

Witnesses:

R. H. EDDY,

F. P. HALE, Jr.