

HAWKES & REED.

Watch Balance.

No. 12,129.

Patented Jan. 2, 1855.

Fig. 1.

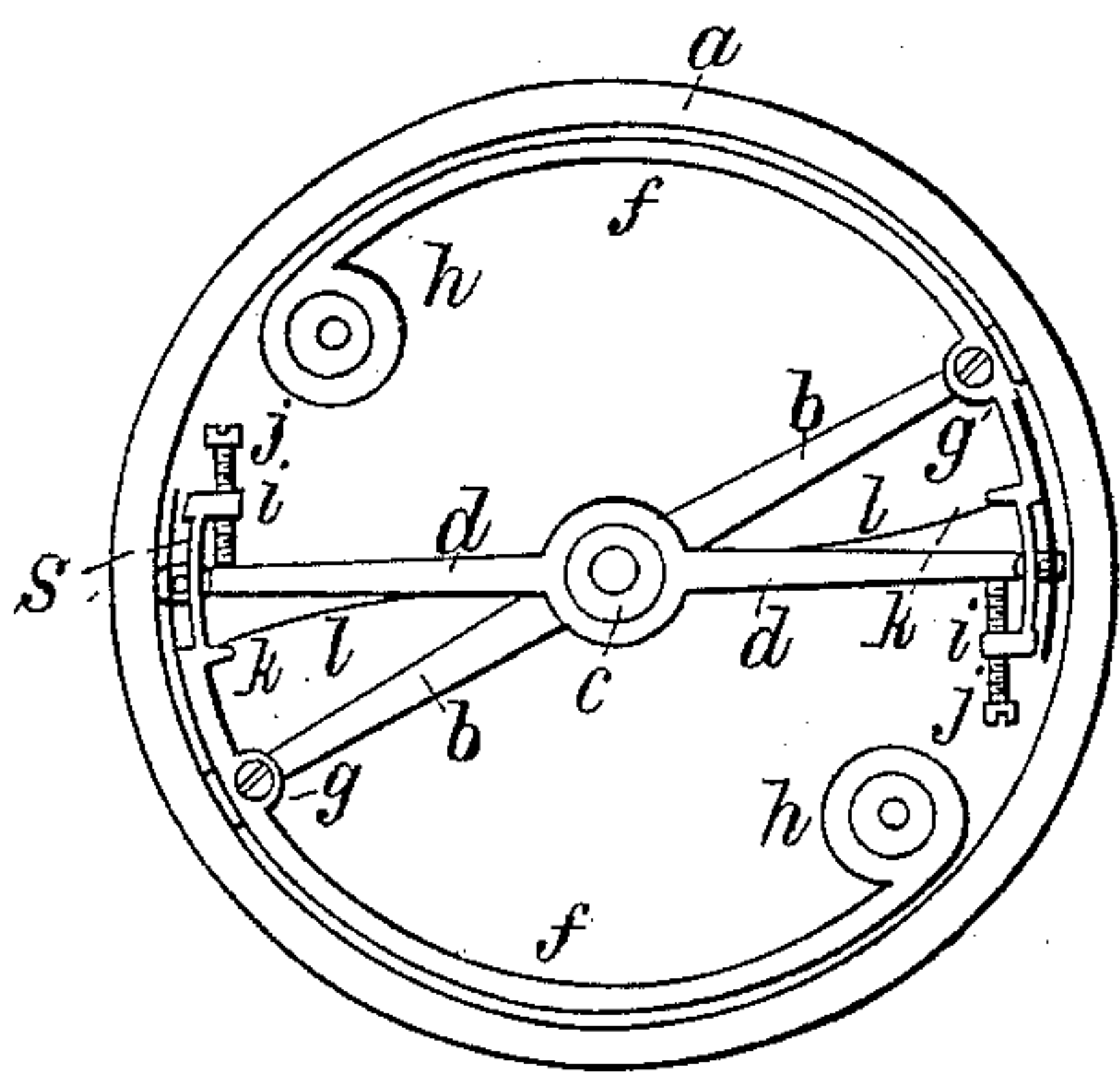


Fig. 3.

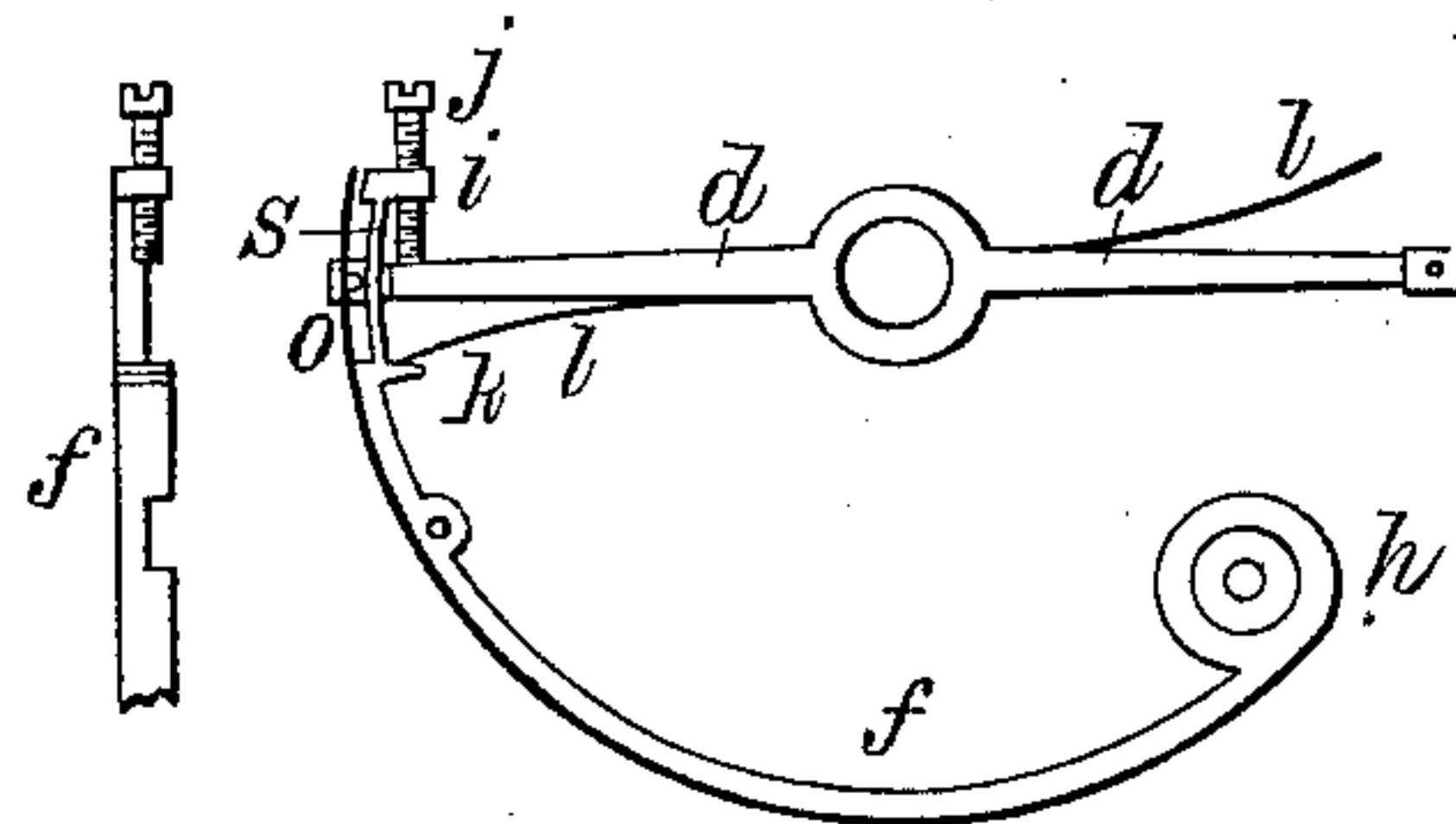


Fig. 2.

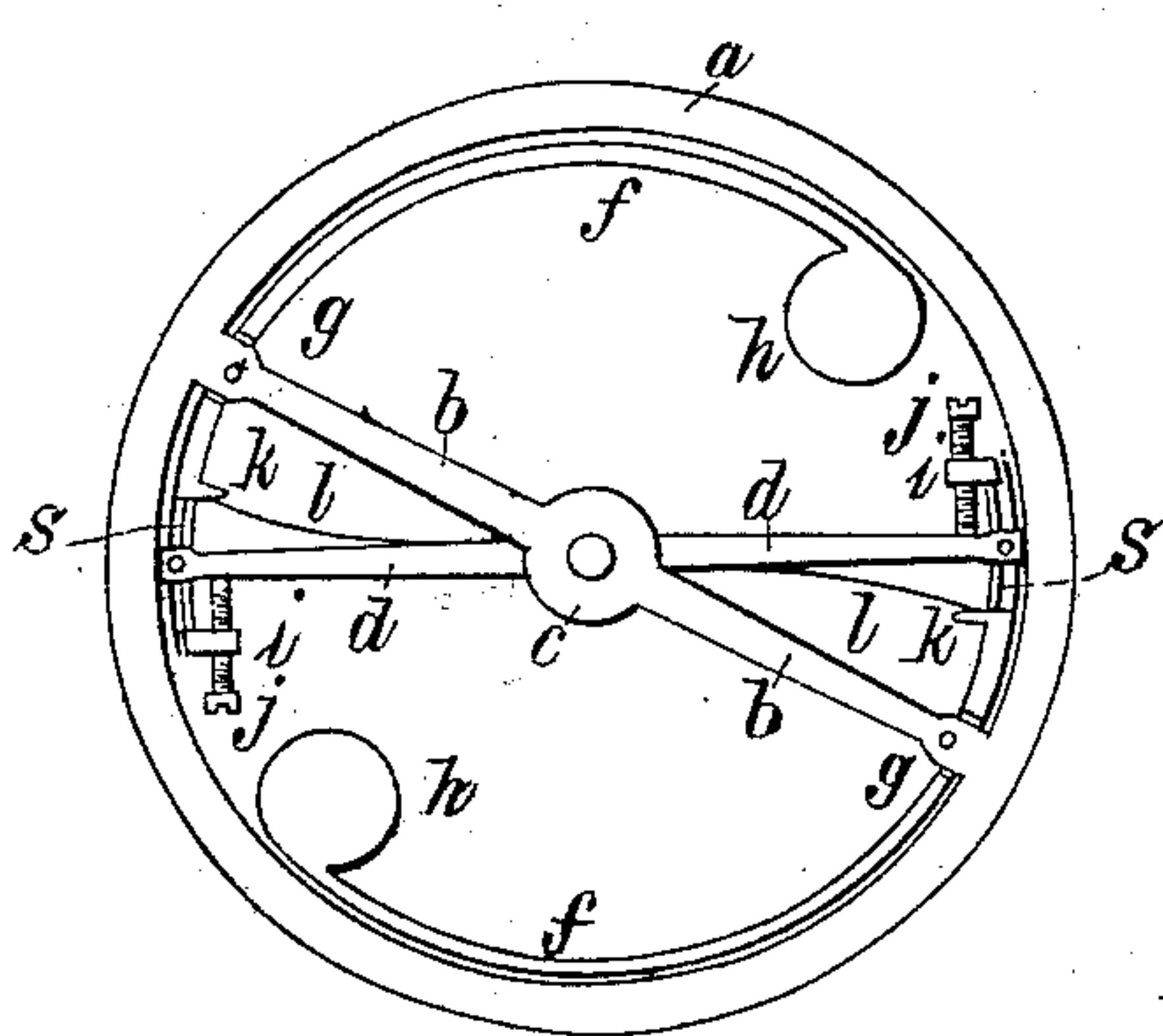


Fig. 4.

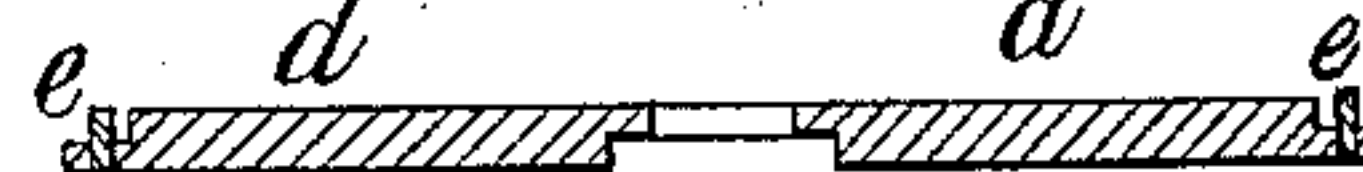
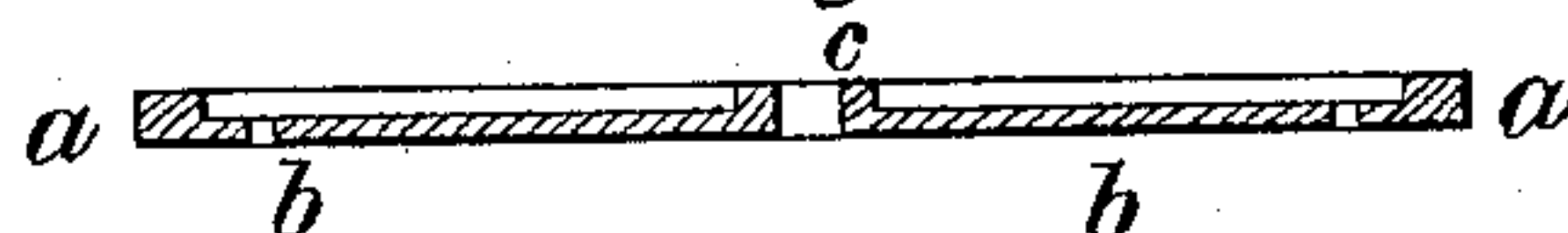


Fig. 5.



UNITED STATES PATENT OFFICE.

CHARLES W. HAWKES, OF BOSTON, AND GEORGE P. REED, OF WALTHAM, MASSACHUSETTS.

COMPENSATION-BALANCE FOR TIMEKEEPERS.

Specification of Letters Patent No. 12,129, dated January 2, 1855.

To all whom it may concern:

Be it known that we, CHARLES W. HAWKES, of Boston, in the county of Suffolk and State of Massachusetts, and GEORGE P. REED, of Waltham, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement on Compensating Balances for Watches and Chronometers; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 is a plan or a view of the upper side of the balance. Fig. 2 is a view of the under side. Fig. 3 represents the compensating lever and brass arm. Fig. 4 is a section of the brass arm, and Fig. 5 is a section of the steel rim through the steel arm.

The same letters refer to like parts in all the figures.

The nature of our invention consists in the accuracy and facility of adjustment, strength, compactness and neatness of form, and its peculiar method of compensating.

To enable others skilled in the art to make and use our invention we will proceed to describe its construction and operation.

We take a piece of steel or any suitable metal and construct a balance wheel with a solid rim, *a*, and two arms, *b*, *b*, Figs. 1, 2 and 5. The under side of the steel arms, *b*, *b*, are even with the under side of the rim and made about half the thickness of the rim with a hub, *c*, at the center projecting to the plane of the upper side of the rim as represented in Fig. 5, that part of the hub which projects above the arm is made a little smaller in diameter than the main part. We then take brass or some metal that when exposed to heat will expand more than the arms, *b*, *b*, and construct the arms, *d*, *d*, in one piece, with a hub in the center, the eye of which is sufficiently large to receive the projecting part of the steel hub, *c*, and is fitted to swing thereon. The brass arms are about the thickness of the rim, and the hub at the center is halved down to receive the larger part of the steel hub; the outer end of the brass arms are also halved down on the opposite side with a pin, *e*, set in the thin part, as clearly shown in Fig. 4. When the brass arms are attached to the steel arms the angle between the brass and steel arms is about thirty degrees more or less and can

be varied to change the leverage as occasion may require, as represented in Figs. 1 and 2. We then construct the compensating levers, *f*, *f*, in the form of a segment of a circle, and attach one to each of the steel arms near the rim by a screw, *g*, for its fulcrum, the fulcrum being very near one end of the lever; at the longer end of this lever, which is the farthest from the fulcrum, there is a fixed weight, *h*, and at the opposite end there is an ear, *i*, to receive a set screw, *j*, and a short distance from the end, between the ear, *i*, and the fulcrum, there is an ear, *k*, for the end of the spring, *l*, which is attached to one side of the brass arm, to bear against. The ears, *i*, and, *k*, both project toward the center of the balance, and opposite to these ears there is a thin spring, *o*, one end of which is firmly attached to the outside of the lever between its fulcrum and the ear, *k*, the other end of the spring extends out to the ear, *i*; a part of the lever under the spring, *o*, and between the ears, *i*, and, *k*, is cut out, forming a slot, *s*, to receive the pin, *e*, which is set in the outer end of the brass arm; this slot is in a circular form radiating from the center of the balance. The pin, *e*, is made sufficiently large to fill the slot transversely, and the spring, *o*, always bearing hard against the pin prevents any play in that direction. The set screw, *j*, sets up against one side of the brass arm, and the spring, *l*, being attached to the other side of the arm with the outer end of it bearing against the ear, *k*, will hold the brass arm firmly against the set screw. This balance is adjusted simply by turning the set screws, *j*, *j*, which increases or diminishes the leverage thereby giving a greater or less throw to the weighted end of the lever. When this balance is exposed to heat it will expand, the arms, *b*, *b*, increasing in length and the rim in diameter, carrying the whole weight of the rim farther from the center, but the arms, *d*, *d*, being made of brass will expand more than the arms, *b*, *b*, carrying the short end of the lever to which it is attached, by the pin, *e*, out farther from the center and in proportion to the length of leverage will throw the weighted end of the lever in toward the center thereby counteracting the natural tendency of the whole weight of the balance to recede from the center by which a uniform motion is maintained through all the different changes of temperature.

In the ordinary or uncompensating balance the natural tendency is to run faster in cold weather and slower in warm weather in consequence of the contraction and expansion of the metal, but in our improved compensating balance that difficulty is more effectually obviated and with greater facility by its peculiar construction and mode of adjustment than in any other compensating balance now in use.

Having thus fully described the construction and operation of our improved compensating balance we will now proceed to

point out the parts which we claim as our invention and desire to secure by Letters Patent.

We claim the compensating lever or its equivalent in combination with the radial arms, *b*, and, *c*, substantially in the manner and for the purpose herein described.

CHARLES W. HAWKES.
GEO. P. REED.

Witnesses:

WM. H. EASTMAN,
WM. BATES.