

(No Model.)

C. K. GILES.  
WATCH BALANCE.

No. 387,973.

Patented Aug. 14, 1888.

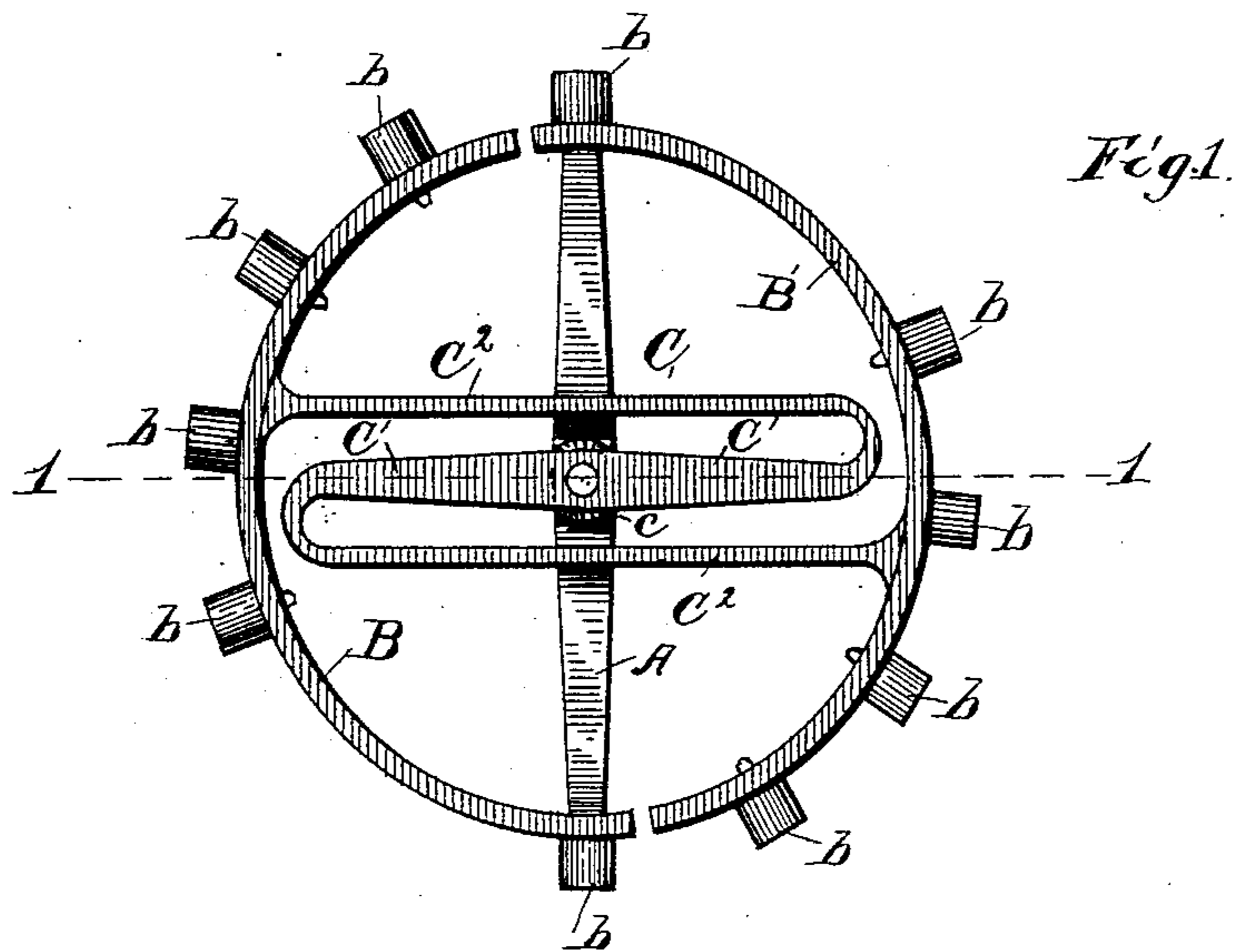


Fig. 2.

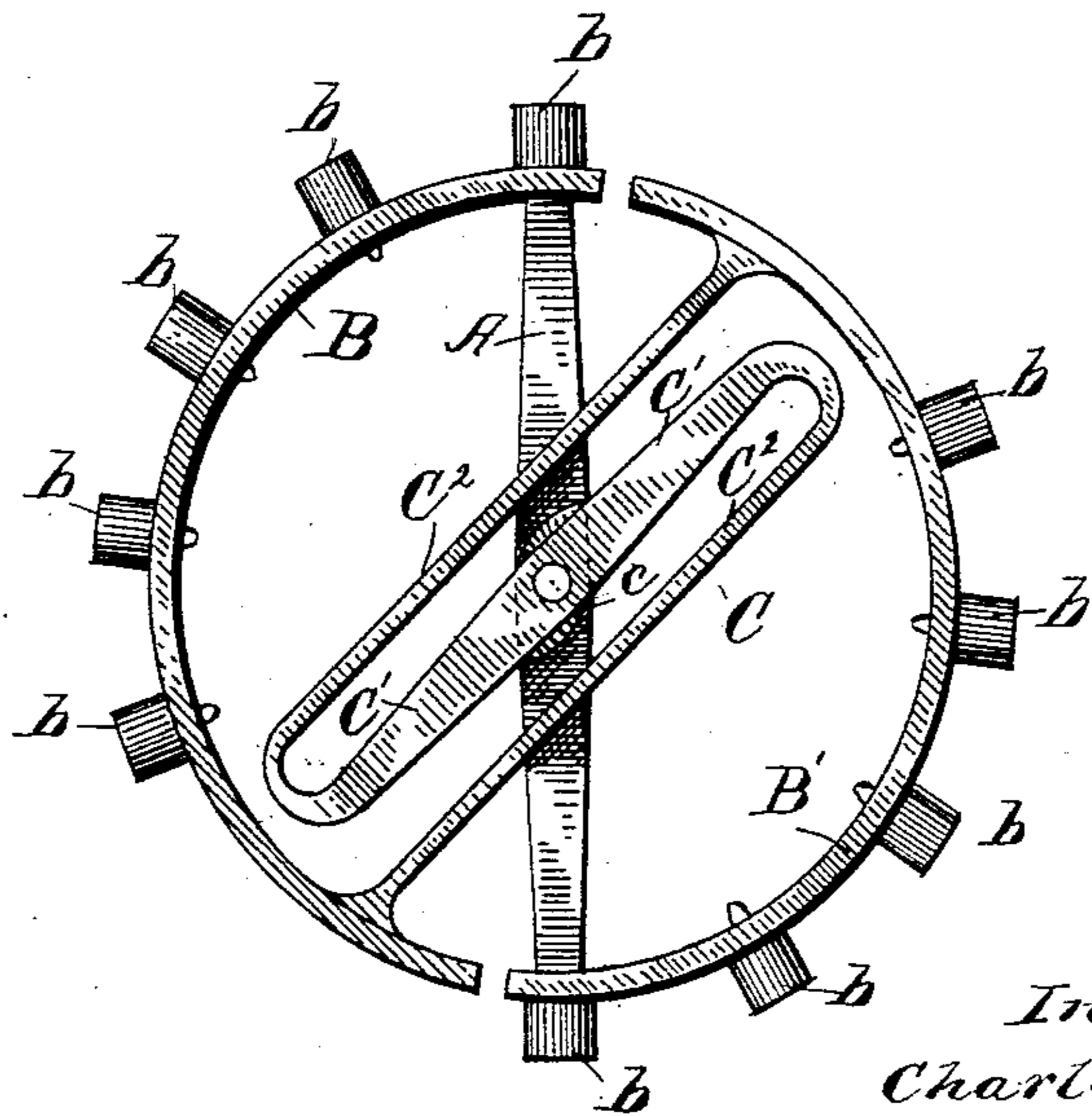
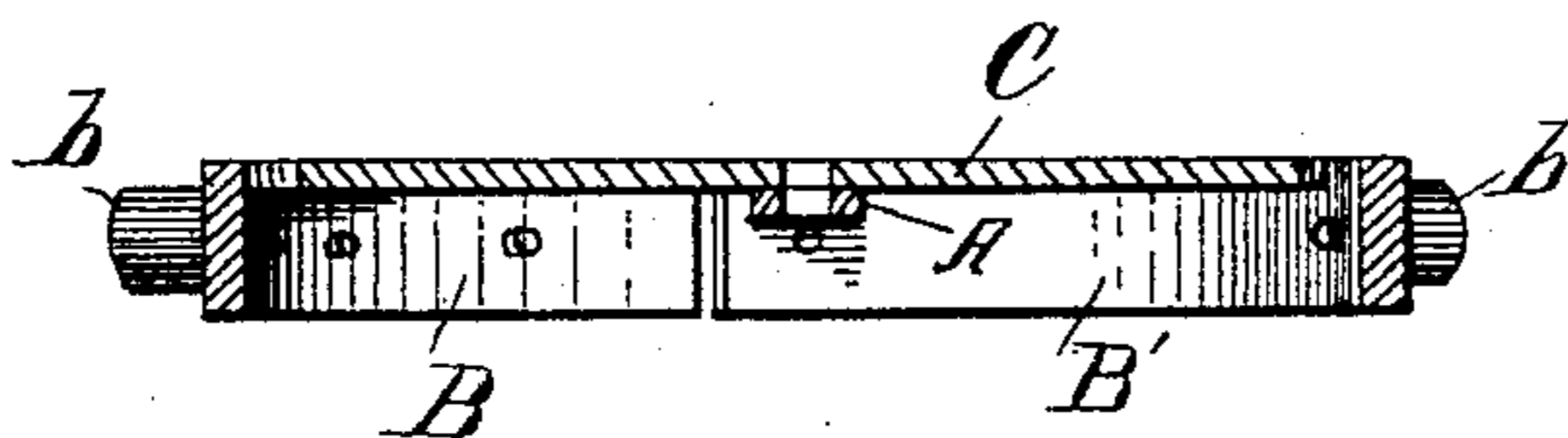


Fig. 3.

Witnesses  
W. C. Corlies  
B. M. Whitaker.

Inventor.  
Charles K. Giles.

By *Robert M. Thacher*  
Attys.

# UNITED STATES PATENT OFFICE.

CHARLES K. GILES, OF CHICAGO, ILLINOIS.

## WATCH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 387,973, dated August 14, 1888.

Application filed December 2, 1887. Serial No. 256,832. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES K. GILES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Watch - Balances, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

10 Figure 1 is a plan view of a balance-wheel embodying my invention; Fig. 2, a sectional view of the same, taken on the line 1 1 of Fig. 1; and Fig. 3, a plan view showing a modified form of balance-wheel.

15 Like letters refer to like parts in all the figures of the drawings.

My invention relates to balance-wheels for watches, clocks, chronometers, and other like instruments for measuring time, and has for its object to provide a device of this description which shall possess the advantages of superior simplicity, cheapness, and efficiency.

20 To these ends my invention consists in certain novel features, which I will now proceed to describe, and will then particularly point out in the claims.

In Figs. 1 and 2 of the drawings I have shown a balance-wheel in which my invention is practically embodied in one form. A represents the cross-bar of the balance-wheel, to the ends of which are attached the arms or sections B and B' of the rim. These arms, instead of being constructed of two metals of unequal expansion, are each constructed of a single piece of metal, and are provided with the usual poising and adjusting screws, *b*. C represents an S-shaped cross-bar attached at its center to the cross-bar A, as shown at *c*, and having one of its ends attached to the arm or section B of the rim, while the other end is attached to the arm or section B'. This cross-bar C may be considered as composed of two equal halves, which, starting from the central point of attachment, *c*, consist each of a member, C', extending away from that arm of the rim to which it is ultimately connected, and a member, C'', connected to the end of the member C' and extending in a reverse direction to the arm or section B or B', as the case may be.

50 The member C' is preferably constructed of some metal or material which expands and

contracts to a considerable extent under varying temperatures, while the member C'' is constructed of a metal which is comparatively unaffected by changes in temperature. The same result may of course be obtained by constructing the member C'' of two different metals, one half of which is affected to substantially the same extent as the member C', while the other half is not affected by changes in temperature. It will thus be seen that upon an increase in the temperature the expansion of the member C' will, owing to its connection with the arm B or B', counteract the lateral expansion of the balance-wheel, the converse being true upon any decrease in the temperature, so that compensation for the changes in temperature will be obtained in an obvious manner. Moreover, the two halves of the cross-bar C being symmetrical, the two halves of the balance-wheel will be equally affected. It will be observed, moreover, that whereas in the ordinary construction of balance-wheel, in which the rim is composed of two metals which are affected by heat to an unequal degree, the said rim is moved inward or outward by alterations in its shape produced by this inequality, and in thus moving curls inward or outward at its ends in an irregular curve, which produces inequalities in the movement of the balance-wheel, in the construction which I have devised each half of the rim is moved bodily in an even manner, and is not distorted in the manner just set forth, whereby one of the principal sources of error is avoided.

85 In Fig. 3 of the drawings I have shown a modified form of balance-wheel, in which the cross-bar C, instead of being arranged at right angles to the cross-bar A and connected to the arms B and B' about midway between their fixed and free ends, is arranged diagonally with relation to the said cross-bar A, so that its ends are connected to the arms B and B' near the free ends of said arms. By reason of this construction I am enabled to move the said rims inward or outward by means of their free ends, and thus cause them to assume more desirable shapes and positions.

It is obvious that various modifications in the details of construction may be made without departing from the principle of my invention, and I therefore do not wish to be under-

stood as limiting myself to the precise details hereinbefore described, and shown in the drawings.

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

1. In a balance-wheel, the combination, with the main cross-bar and the divided rim attached thereto, of the S-shaped cross-bar secured centrally to the main cross-bar and having its ends attached to the arms of the rim, substantially as and for the purposes specified.

2. In a balance-wheel, the combination, with

the main cross-bar A, and the arms B B', attached thereto and each composed of a single piece, of the S-shaped cross-bar C, attached centrally to the cross-bar A and consisting of two symmetrical halves, each composed of a member, C', and a member, C<sup>2</sup>, the latter being of a material expansive to a degree equal to or less than the material of the former, substantially as and for the purposes specified.

CHARLES K. GILES.

Witnesses:

CARRIE FEIGEL,  
A. M. BEST.