

(No Model.)

D. H. CHURCH.
WATCH BALANCE.

No. 544,883.

Patented Aug. 20, 1895.

FIG. 1.

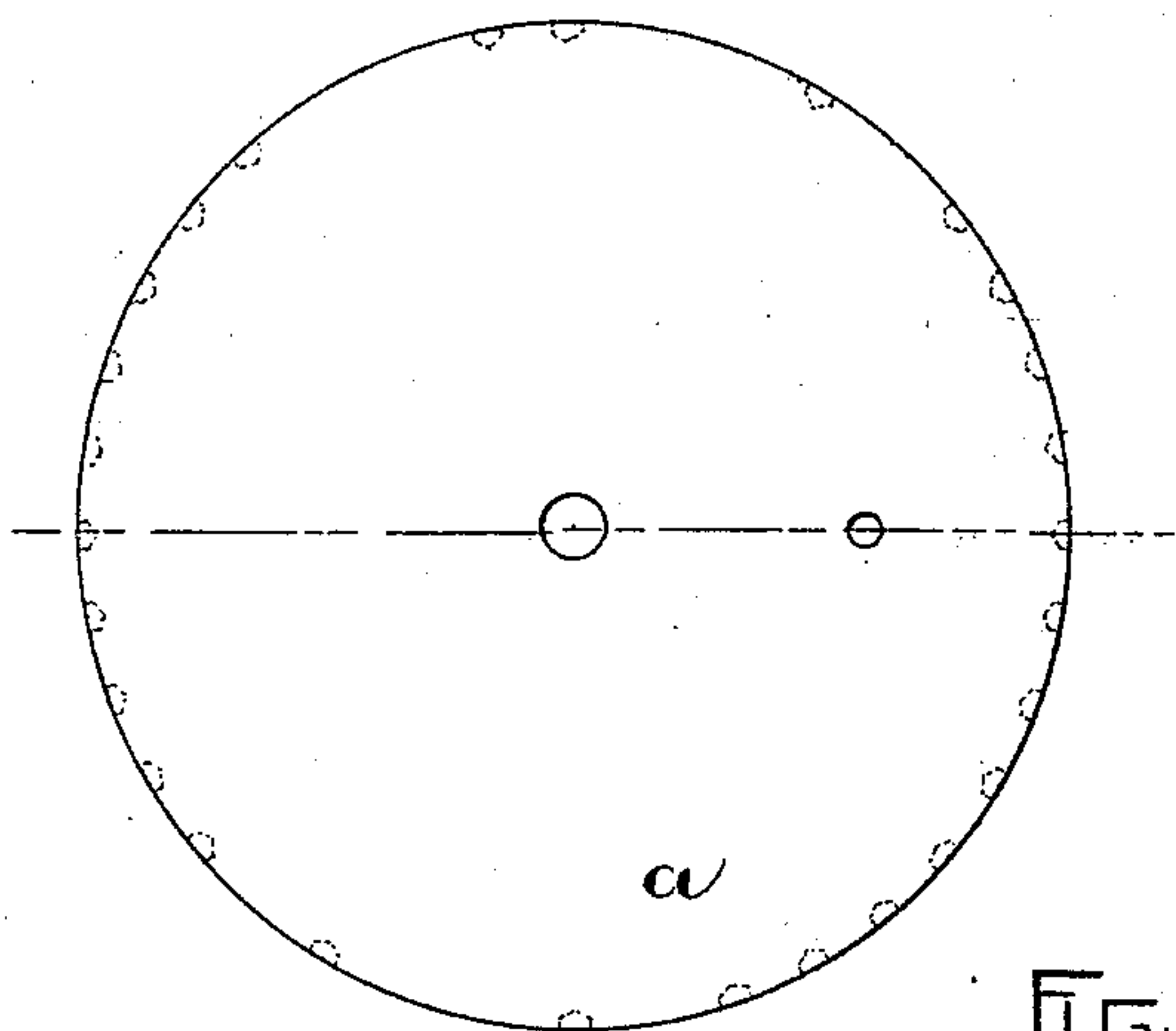


FIG. 2.

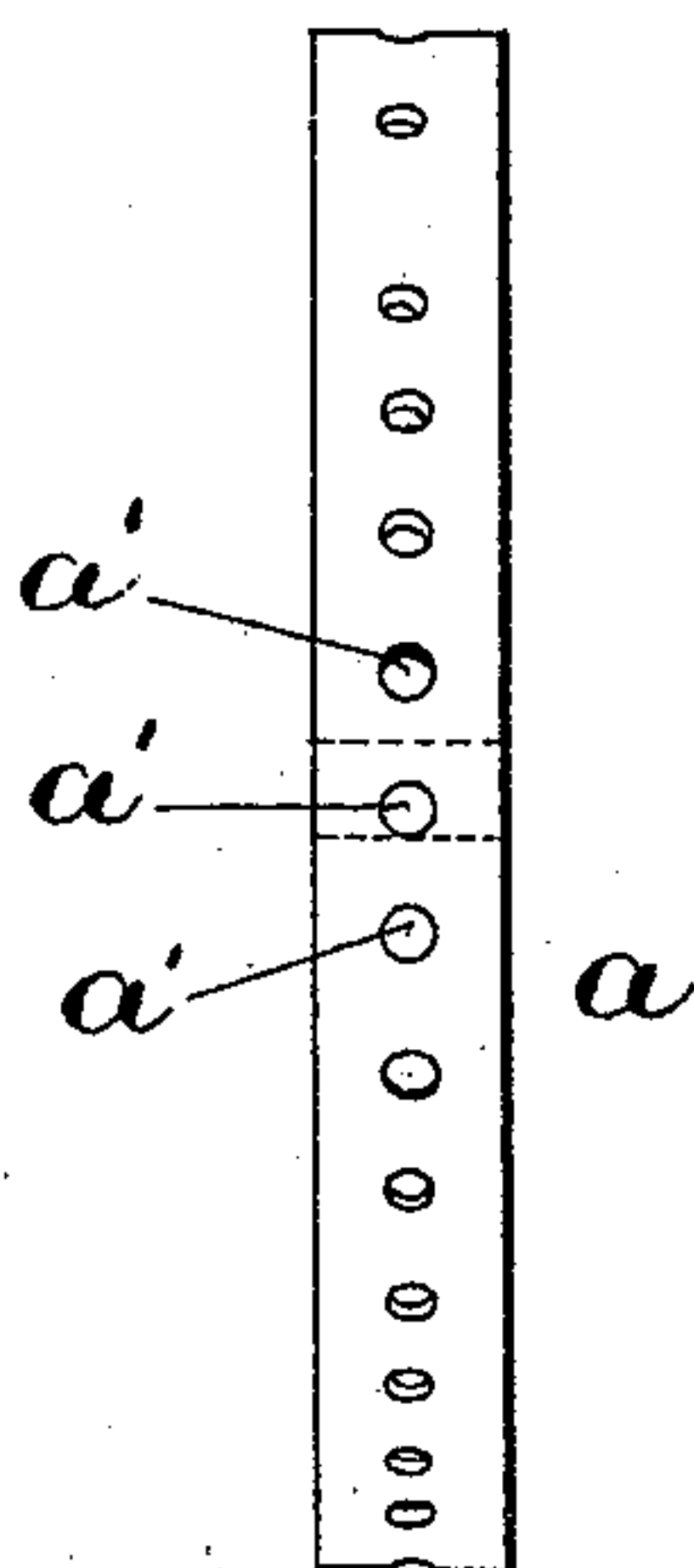


FIG. 3.

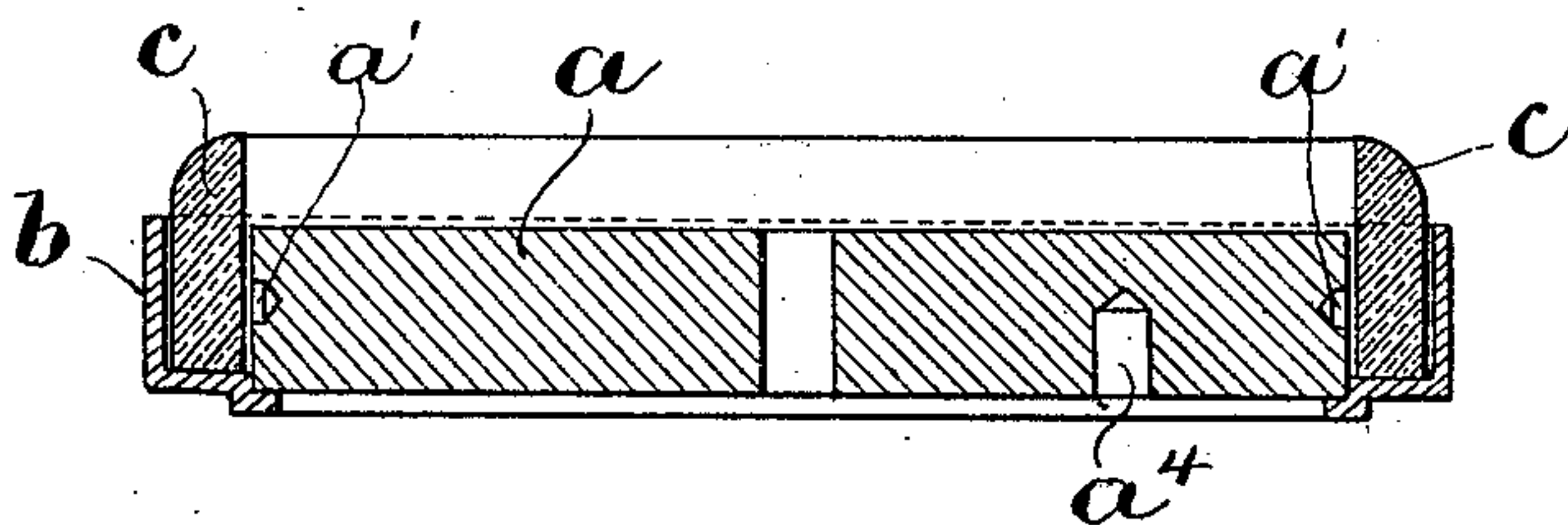


FIG. 4.

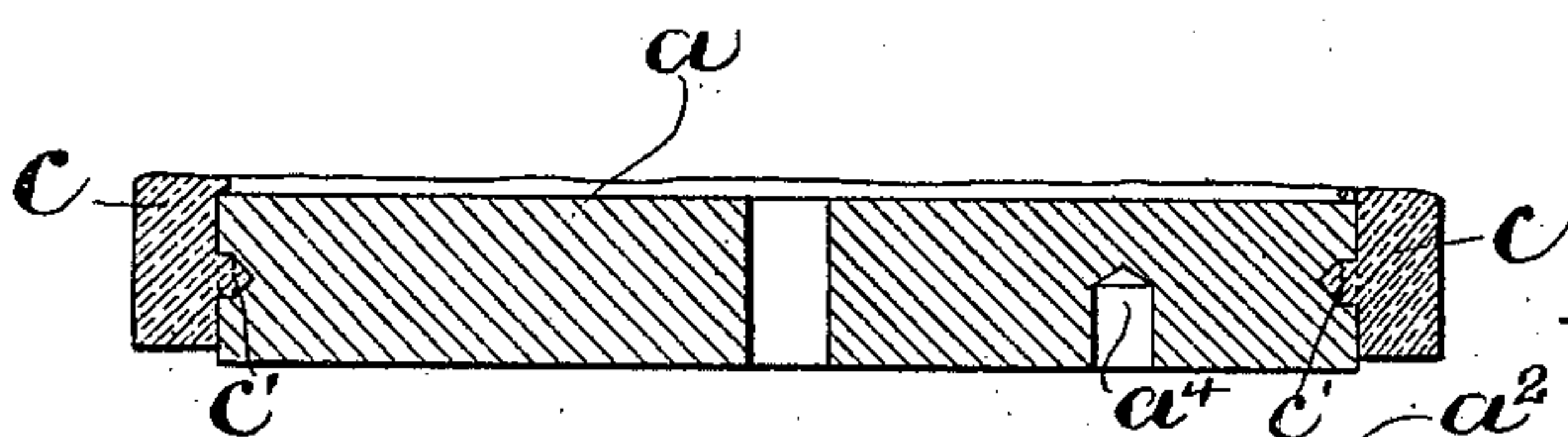


FIG. 5.

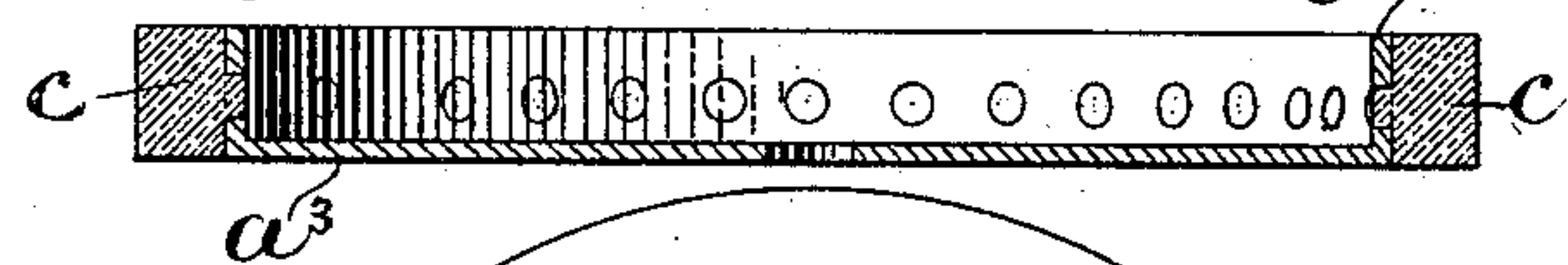


FIG. 7.

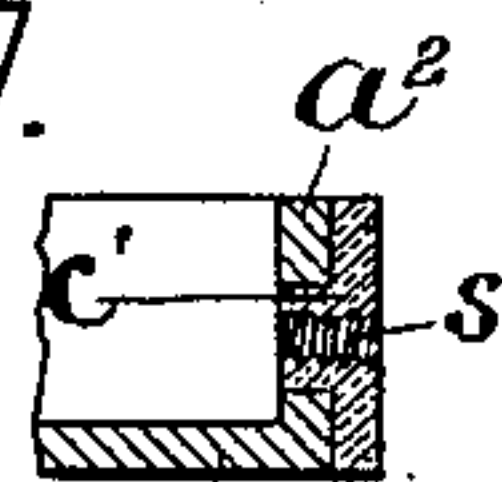


FIG. 8.

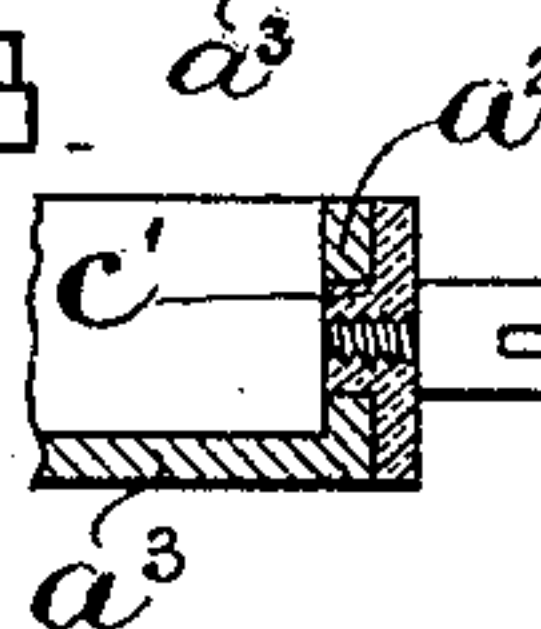
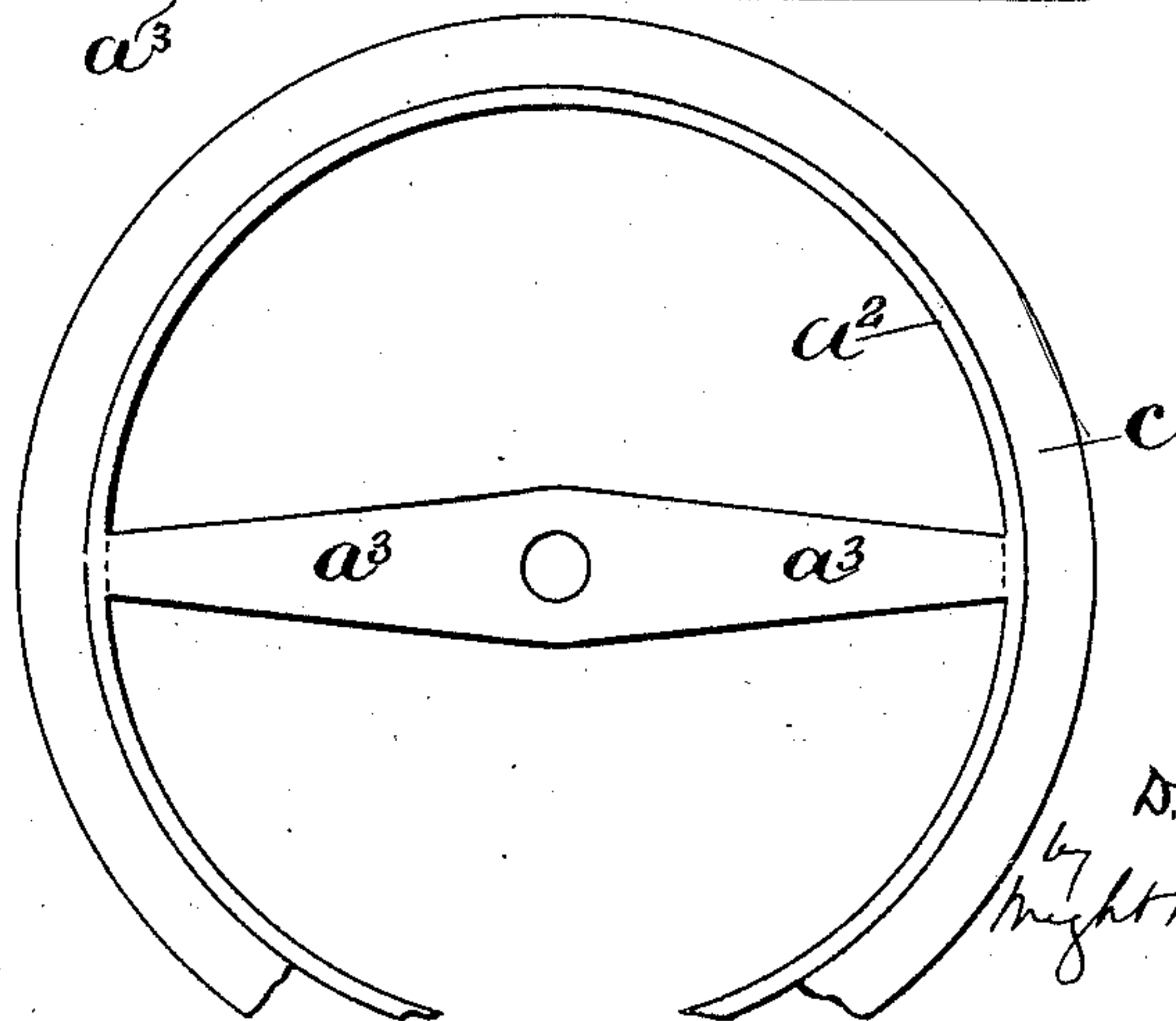


FIG. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

DUANE H. CHURCH, OF NEWTON, MASSACHUSETTS.

WATCH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 544,883, dated August 20, 1895.

Application filed June 20, 1895. Serial No. 553,427. (No model.)

To all whom it may concern:

Be it known that I, DUANE H. CHURCH, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Expansion-Balances for Watches and other Timepieces, of which the following is a specification.

This invention relates to expansion-balances for watches and other timepieces, and has for its object to enable the steel portion or lamina of the balance to be hardened and tempered. Although it is well known that a balance having its steel lamina hardened and tempered is much more desirable for various reasons than one in which said lamina is soft, a tempered steel lamina has not been considered practicable, because it is practically impossible to drill and tap it for the reception of the weighting screws. I overcome this objection by making orifices in the steel lamina corresponding to the points where the screws are to be inserted but of greater diameter than the screws, and forming projections on the brass lamina extending into said orifices, said projections being large enough to have the screw-holes formed in them, so that the drilling and screw-threading tools do not encounter the steel lamina; hence the latter can be tempered and hardened to any desired extent.

My invention therefore consists in an expansion-balance having enlarged orifices in its inner lamina, and projections formed on its outer lamina extending into said orifices, said projections being drilled and tapped for the reception of the balance-screws.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side view and Fig. 2 an edge view of the steel blank from which the inner lamina of the balance is made, said blank having the cavities formed in its periphery which afterward constitute the enlarged orifices in the completed steel lamina. Fig. 3 represents a sectional view of said blank and of the brass blank for the outer lamina, said blanks being assembled in a capsule preparatory to the fusion of the brass blank. Fig. 4 represents a sectional view of the two blanks after they

have been united by the fusion of the brass blank and removed from the capsule. Fig. 5 represents a sectional view showing the steel lamina after the usual operations on the blank to form the inner side of the lamina and the arms of the balance. Fig. 6 represents a plan view of the balance in the condition represented in Fig. 5. Figs. 7 and 8 represent sectional views through the rim of a completed balance.

The same letters of reference indicate the same parts in all the figures.

In carrying out my invention I first take a steel blank *a*, such as is usually employed in the manufacture of the steel lamina of an expansion-balance, and drill a series of cavities *a'* in its periphery, said cavities corresponding to the positions which the screws occupy in the completed balance, but being considerably larger than the drilled and tapped holes which receive said screws. I then assemble in a suitable capsule *b* the said blank *a* and a blank *c* of brass, which forms the outer lamina of the balance. The parts thus assembled are subjected to sufficient heat to fuse the brass and cause it to fill the space between the capsule and the periphery of the steel blank *a*, and also fill the cavities *a'*, a series of projections *c'* being thus formed upon the inner surface of the brass lamina projecting into the cavities *a'*, as shown in Fig. 4. The steel blank is then subjected to the usual operations, whereby it is recessed to form the inner surface of the steel lamina *a''*, and cut away at the bottom of said recess to leave only the connected arms *a'' a''* extending across the interior of the steel lamina. In recessing the steel lamina enough metal is removed to expose upon the inner surface of the steel lamina the projections *c'* formed upon the brass lamina, said projections being larger than the diameter of the holes subsequently formed for the reception of the screws. The steel lamina may now be hardened and tempered and the brass lamina rolled to suitably harden it and reduce its diameter to the proper size. After this the screw-holes *s* are drilled and tapped in the brass lamina and in the projections *c'* thereof, as shown in Fig. 7, the loca-

tion of the projections c' at points corresponding with the location of the screws enabling the screw-holes to be formed entirely in the softer material of which the outer lamina is
5 composed, so that the hardening and tempering of the steel lamina does not affect the operation of forming the screw-holes.

For the purpose of registering the blank preparatory to punching out sections of the
10 web that extends across the steel blank after the recess has been formed therein I make a hole a^4 in the steel blank, and use this hole to register or place the blank when the arms a^3
15 a^3 are being formed by the usual punch and die, the hole a^4 being in one of the sections removed by this operation. In the subsequent operation of drilling the screw-holes

the arms a^3 are used as the means for registering the balance.

I claim—

20 An expansion-balance having enlarged orifices in its inner lamina and projections formed on its outer lamina extending into said orifices, said projections being drilled and tapped for the reception of the balance
25 screws.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 15th day of June, A. D. 1895.

DUANE H. CHURCH.

Witnesses:

C. F. BROWN,
A. D. HARRISON.