(No Model.)

D. H. CHURCH.

WATCH MOVEMENT FRAME.

No. 527,771. Patented Oct. 23, 1894.

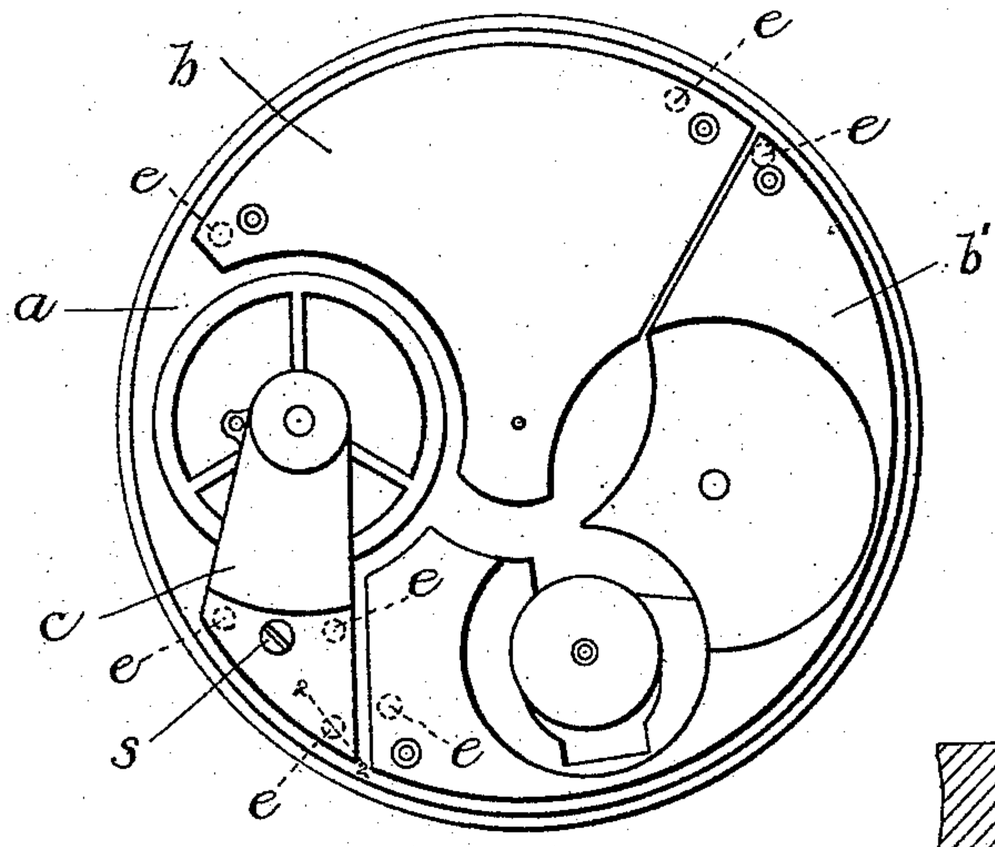


Fig. 1.

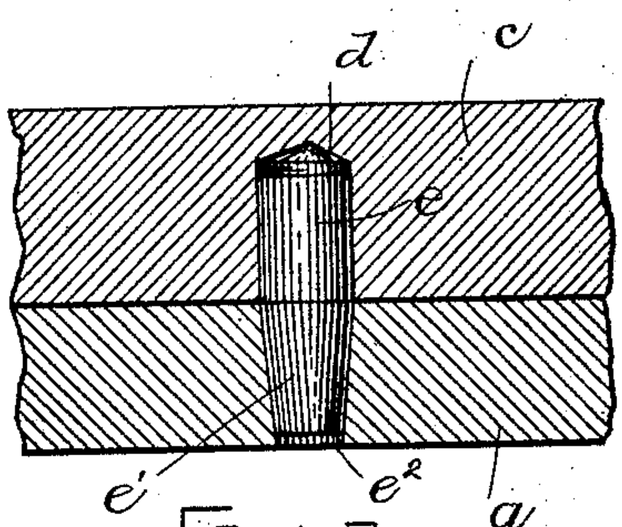


Fig. 2.

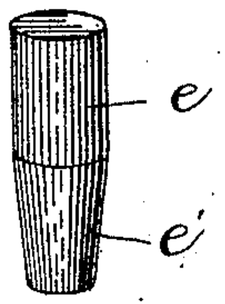
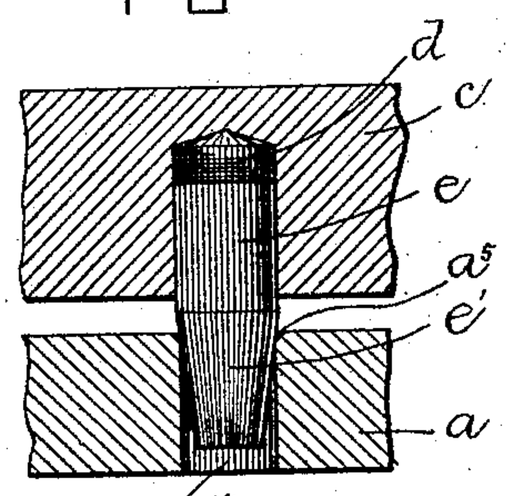


Fig. 4.

Fig. 5.



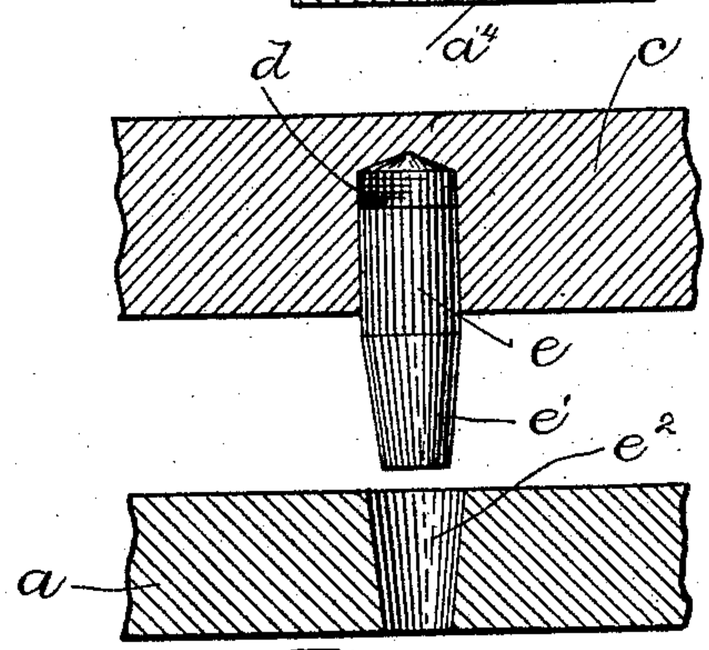


Fig. 3.

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UNITED STATES PATENT OFFICE.

DUANE H. CHURCH, OF WALTHAM, MASSACHUSETTS.

WATCH-MOVEMENT FRAME.

SPECIFICATION forming part of Letters Patent No. 527,771, dated October 23, 1894.

Application filed May 26, 1892. Serial No. 434,444. (No model.)

To all whom it may concern:

Be it known that I, DUANE H. CHURCH, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Watch-Movement Frames, of which the following is a specification.

This invention relates to those portions of the frame of a watch movement which support the arbors of the time mechanism, said portions including the upper and lower plates and the balance cock. The upper plate and the balance cock are constructed to bear upon a seat or surface on the lower plate, and are detachably secured to the latter by means of screws. In assembling said parts, the proper relative positions are insured by means of steady pins, engaged with and projecting from one of the plates or parts, and entering sockets in the other or opposite part, the steady pins being attached firmly to the part from which they project, and detachable from the sockets in the other part, in order that the component parts of the watch movement may be readily taken apart. Heretofore, the projecting parts of the steady pins have been cliyndrical, or of practically uniform diameter throughout, the sockets which receive said projecting parts being correspondingly shaped. Owing to the fact that the steady pins must fit closely in the sockets, in order to prevent any loose or independent motion of either part, it is a matter of some difficulty to separate the two plates or parts united by the steady pins, because, unless said plates are kept absolutely parallel with each other when they are being separated, one or more of the steady pins will bind on the socket, so that it not infrequently happens that the steady pins offer so much resistance to the separation of the parts that, in the effort to separate the parts, the delicate arbors are bent and sometimes broken.

My invention has for its object to enable the steady-pin-connected parts of a watch movement frame to be separated without resistance, so that the operator, after removing the connecting screws, can remove one plate from the other without the slightest resistance, and without liability of breaking or injuring the arbors.

To this end, the invention consists, first, in the combination with the arbor-supporting plates or parts, of steady pins, each of which is permanently connected with one of the plates, and has its projecting portion made of tapering form, its diameter decreasing from its inner to its outer end, and is inserted in a correspondingly tapered socket in the other plate, the tapering form of the steady pins and sockets enabling the plates to be separated without resistance.

The invention also consists in the combination of two arbor-supporting plates, one having cylindrical sockets, and the other tapering sockets, and steady pins, each having a cylindrical section adapted to be secured by friction in one of the cylindrical sockets, its length being less than the depth of said socket, and a tapering section formed to enter and fit one of the tapering sockets, the arrangement being such that the cylindrical section of the steady pin may be driven into its socket friction-tight by pressure exerted upon the tapering section by the tapering walls of the socket in the other plate; so that, when the two plates come to a bearing upon each other, the projection of the tapering sections of the steady pins will be regulated by the position of the tapering sockets, and thus an accurate and yet easy fit of the tapering sections of the steady pins in their sockets will be insured, all of which I will now proceed to describe.

Of the accompanying drawings, forming part of this specification: Figure 1 represents a plan view of the principal parts of the frame of a watch movement, including the lower plate, the upper plate and the balance cock, and showing also the balance wheel in place, without showing any of the other parts of the time mechanism. Fig. 2 represents an enlarged section on line 2—2, Fig. 1. Fig. 3 represents a similar section, showing the two parts separated and the steady pin in the position it occupies before the parts are assembled. Fig. 4 represents a perspective view of one of the steady pins. Fig. 5 represents a sectional view of a modification.

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

In the drawings: *a* represents the lower plate of a watch movement.

b b' represent the sections of the upper plate; and *c* represents the balance cock.

As my invention relates only to the connection of two parts of a watch movement frame, such as the lower plate and balance cock or the lower and the upper plates, by means of steady pins, I will refer in the following description only to the lower plate and the balance cock; as these parts sufficiently illustrate my invention, although it will be understood that the improvements hereinafter pointed out are intended for use in connection with any two parts of a watch movement frame, which are provided with steady pins and sockets whereby their proper relative position is insured when the parts of the watch are being assembled.

In carrying out my invention, I form in one of the parts,—such, for example, as the balance cock,—a cylindrical socket *d*, and insert in said socket a steady pin, having a cylindrical section *e* and a tapering section *e'*. The cylindrical section is preferably shorter than the depth of the cylindrical socket *d*, and said section is formed so as to closely fit the socket, so that, when forced into the latter, the steady pin will be engaged with the plate or part *c* containing the socket *d* by friction, the engagement being sufficiently firm to constitute a practically rigid connection between the steady pin and the part *c*. The tapering section *e* decreases in diameter from the cylindrical section to the outer end of the tapered section. In the other part or plate *a*, I form a corresponding number of tapered sockets e^2, having the same degree of taper as the sections *e'* of the steady pins, and formed to closely fit said sections.

Prior to assembling the parts, I insert the cylindrical section *e* of each steady pin partly into its socket, leaving said cylindrical section partly projecting, as shown in Fig. 3. I then insert the tapering sections of the steady pins into the sockets e^2 in the other plate or part *a*, and, by pressure suitably applied, force said plates together until each comes to a bearing on the other. This operation causes the tapering walls of the sockets e^2 to exert a sufficient endwise pressure on the steady pins to force the cylindrical sections farther into their sockets, so that, when the parts or plates, *a c* come to a bearing on each other, the position of the tapering sections of the steady pins will be determined by the position of the plate or part containing the tapering sockets. Hence there will be a uniform bearing of all the tapered sections of the steady pins upon the tapering sockets in which they are inserted, and therefore a uniformly close fit of the projecting portions of the steady pins in the sockets in which they are detachably inserted.

The tapering form of the steady pins and sockets that receive them enables the parts or plates to be readily separated without resistance from the steady pins and their sockets. Hence, when the attaching screws *s*, which positively connect the two parts, are removed, the operator can readily separate the parts, without liability of injuring the arbors journaled therein.

The described provision for determining the depth of insertion of the cylindrical portions of the steady pins in the plate to which they are permanently connected by the bearing of the other plate on the projecting portions of the steady pins, prevents any inequality in the fit or bearing of the tapering portions of the steady pins, such as would be liable to exist if the steady pins were driven home by any other means than by pressure exerted on them through the plates with which the steady pins are engaged.

I do not limit myself to the employment of tapered sockets in the plate *a*. In Fig. 5, I show an equivalent arrangement, in which the plate *a* is provided with a practically straight or cylindrical socket or orifice a^4, the diameter of which is slightly less than that of the cylindrical portion *e* of the steady pin. In this case the steady pin will be driven home by the bearing of one end of the socket a^4 on the tapered portion of the pin, the result being the same as if the socket a^4 were tapered. The mouth of the socket a^4 should be slightly reamed out or beveled, as at a^5, to prevent the formation of a sharp angle bearing on the tapered portion of the steady pin.

I claim—

1. In a watch movement frame, the combination with superimposed arbor-supporting plates such as the upper and lower plates or the lower plate and the balance cock, of steady pins, removably secured to one of said plates and projecting from the inner side thereof, the projecting portion of each pin being tapering and entering a socket or orifice in the other plate, whereby the plates may be readily separated without liability of injury to the arbors, and attaching screws for holding the plates firmly assembled as set forth.

2. In a watch movement frame, the combination of two superimposed arbor-supporting plates, such as the upper and lower plates or the lower plate and the balance cock, and steady pins, each having a cylindrical section adapted to be secured by friction in a socket in one plate, its length being less than the depth of said socket, and a tapering section formed to enter a socket or orifice in the other plate, the described difference between the length of the cylindrical section of the steady pin and the depth of the socket receiving it enabling the pin to be driven into said socket by the bearing of the opposite plate on the tapering section of the pin, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of May, A. D. 1892.

DUANE H. CHURCH.

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