No. 632,128. Patented Aug. 29, 1899.

E. KRAHENBUHL.

WATCH PLATE.

(Application filed June 16, 1896. Renewed Sept. 20, 1898.)

(No Model.)

Fig. 1.

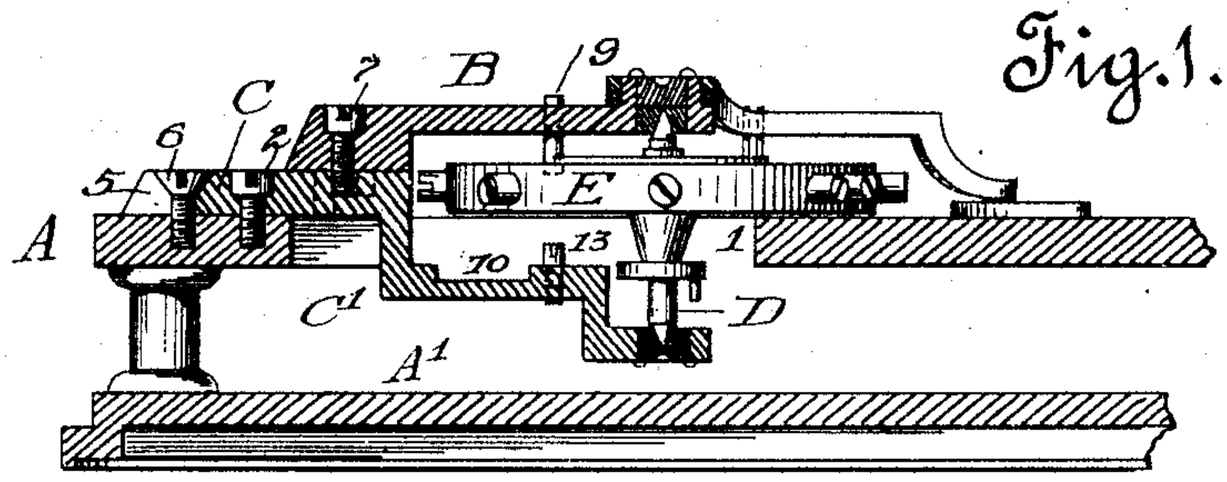


Fig. 7.

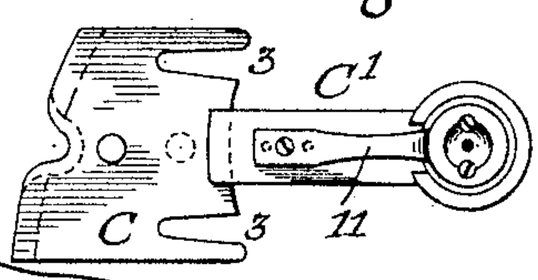


Fig. 2.

Fig. 4.

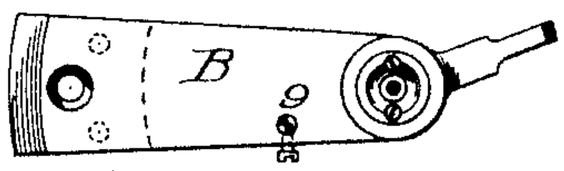


Fig. 5.

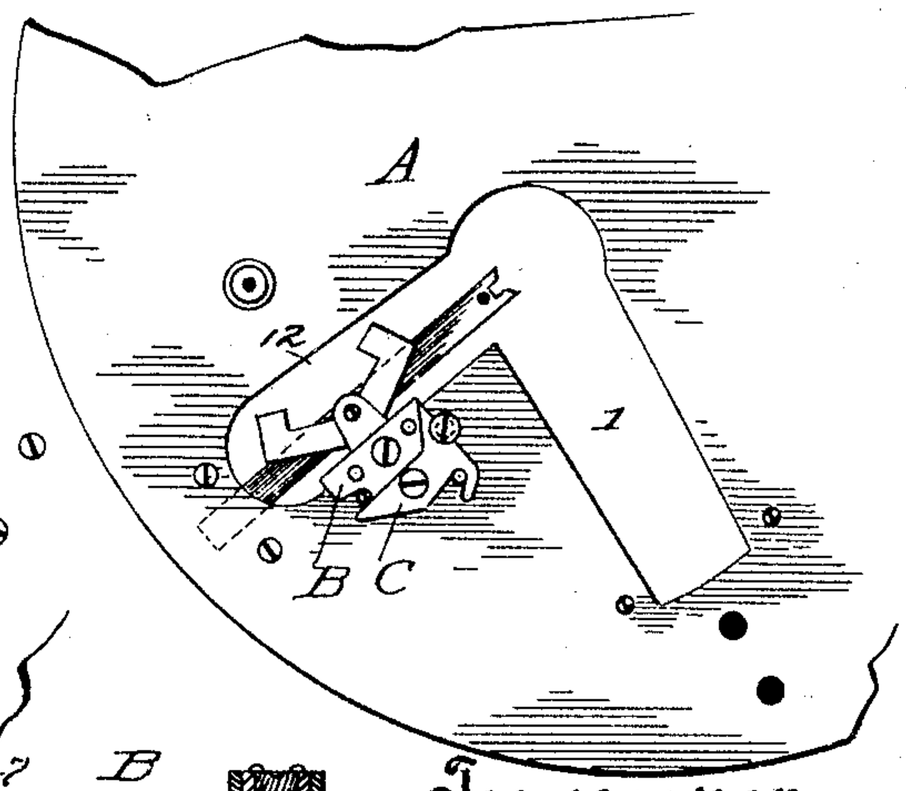


Fig. 3.

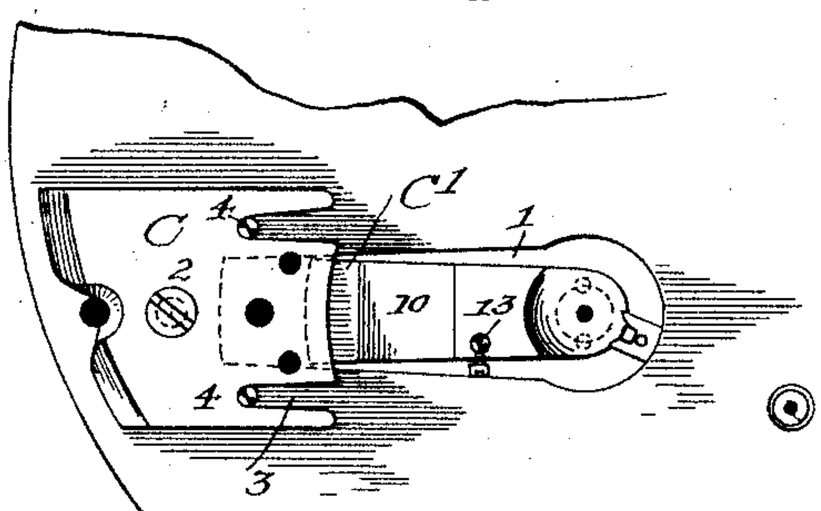
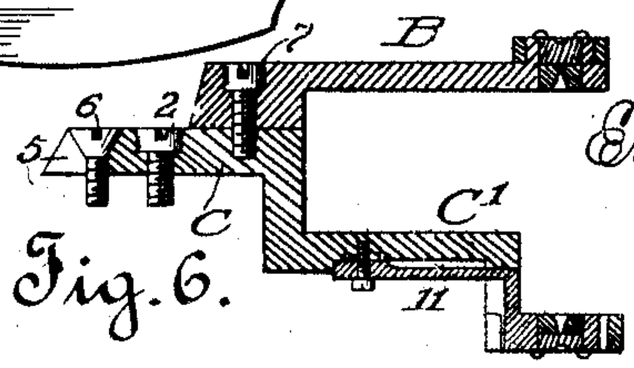


Fig. 6.



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UNITED STATES PATENT OFFICE.

ERNEST KRAHENBUHL, OF SAN RAFAEL, CALIFORNIA.

WATCH-PLATE.

SPECIFICATION forming part of Letters Patent No. 632,128, dated August 29, 1899.

Application filed June 16, 1896. Renewed September 20, 1898. Serial No. 691,444. (No model.)

To all whom it may concern:

Be it known that I, ERNEST KRAHENBUHL, a native of Switzerland, (but having declared my intention to become a citizen of the United States,) residing at San Rafael, in the county of Marin and State of California, have invented certain new and useful Improvements in Watches; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to watches and analogous mechanisms, and particularly to means for holding and supporting the bearings for pivoted parts of the movement, such as the balance, lever, and pallets.

The object of my invention is to provide means for holding at all times such assembled parts, with their attachments, independently of any direct connection with the movement-plate and without having to separate or disturb such parts at any time in order to attach or to remove them as a whole and complete device from the watch-movement, and I accomplish this object by means of two bridges secured to each other and one of them secured to the movement-plate, so that they may be removed either bodily along with the movable part in its bearings or separately. The result of the construction is to greatly facilitate the inspection and repairing of the watch and to avoid the necessity of removing such a moving part from and replacing it in its bearings in case it must be detached from the movement for any purpose.

Besides these general features my invention also includes special features of construction for the bridges, which features, as well as their operation and advantages, are fully hereinafter described.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section on the line $x x$ of Fig. 2 through the top and pillar-plates of a watch-movement, showing my improvements as applied to support the bearings of the balance-staff. Fig. 2 is a top plan of the same. Fig. 3 is a similar plan with the upper bridge removed. Fig. 4 is a top plan of the upper bridge. Fig. 5 is a plan showing my improvement as applied to the bearings for a lever and pallet. Fig. 6 represents a modified construction of the lower bridge. Fig. 7 is a bottom plan of the same.

In describing my construction I use the terms "top" and "bottom" relatively to the position of the watch shown in the drawings and for convenience, the plate A being the top plate of the movement when the watch is being held in position to inspect said movement, the dial then being underneath the pillar-plate A'. In the case of the ordinary full or double-plate watch-movement, as illustrated in this instance, a slot 1, having an enlarged circular end, is formed in this plate which extends from the position of the bal, ance toward the edge of the plate.

The bearings for the balance-staff are carried by two independent bridges. The lower bridge is a plate C, connected by a screw 2 to the plate A and provided with recesses 3, which engage with the banking-pins 4 and so hold the bridge immovably after it has been brought into position. Another recess 5, having an inclined face, is formed in the edge of the bridge-plate, so that a screw 6 acts as a wedge in the recess and automatically guides the plate into its proper position against the banking-pins. It is not, however, necessary to use the banking-pins and the slots or recesses 3; but I prefer to do so in the case of bridges for supporting the balance. The hole in the bridge C for the screw 2 may be large in proportion to the diameter of the screw, so as to allow some play to the bridge when the screw 6 is removed.

The lower bridge proper is in this instance an angular projection C' from the plate C, which when in position drops through and under the slot 1 and extends inwardly the proper distance to hold the lower jewel for the staff D. The upper bridge B is removably secured to the plate C of the lower bridge by a screw 7 and two holding-pins 8. This bridge projects inwardly above the slot 1 and in line with the bridge C' and has at its end the upper jewel for the balance-staff. The balance E vibrates between the plate A and the upper bridge B. The result of this connection is that both bridges and the balance and hair-spring can be removed together by simply taking out the holding-screw 2 and the guiding or locating screw 6, and the advantages of this

will be at once apparent to those skilled in the art. The balance, when the bridges are removed together, remains undisturbed in its bearings and occupies the same relation to them that it does in the watch. Hence, repairs to the parts of the watch in which the removal of the balance is necessary, and in which, ordinarily, it must be taken out of its bearings and sometimes the whole movement taken apart, can now be facilitated by taking out the combined bridges undisturbed and together with all the parts supported thereby, and the result of this is more than a saving of time and trouble to the watchmaker. Since the balance-pivots need not be taken out of their jewel-holes so often and never unnecessarily, the timing adjustments and regulation of the watch is better maintained, and the bearings are thus kept cleaner by this construction than when they are carried by the movement-plate, because when the pivots have to be removed and replaced in jewel-holes, as it is the case when said jewel-holes are formed in the movement-plate, any dirt in the oil around the holes frequently works into the holes and causes disturbances in the time-keeping features of the watch-movement. The device also greatly facilitates the manipulation, inspection, and adjustment of the balance and its attachments without any change in the position which they occupy in the watch, because the whole device can be completely and readily separated as a whole from and reconnected to the remainder of the mechanism without disturbing the latter or any of its attachments, such as the hands and dial, or without even taking the movement out of the watchcase. In addition, however, to the bodily removal of both bridges and everything carried by them the upper bridge can be separately disconnected by removing the screw 7, leaving the lower bridge attached to the plate A. If the balance is oversprung, the hair-spring will be attached to the stud 9 on the upper bridge B, and hence the balance and hair-spring will be removed when the upper bridge is taken off. In undersprung balances the hair-spring stud 13 is mounted in the lower bridge C'. Hence in either case the balance, with its attached hair-spring, can be removed with the bridge to which the hair-spring is connected. Access to the lower bearings and jewel-holes is greatly facilitated, as they can be reached, replaced, and manipulated independently without having to take the plates and works apart or to remove the dial. It must also be noticed that since the ordinary potence for the balance is done away with the common annoyance of the catching of the lever-fork and safety-pin in the nose of the potence and the bending of pivots and chipping of jewels caused thereby in the act of assembling the parts is entirely obviated.

I prefer to reduce the size of the lower bridge, as shown at 10, Fig. 1, in order to make it somewhat elastic, so as to yield to blows or shocks, and thus save my pivots and jewels. This of course is possible only when a thin narrow bridge can be used, and such a bridge is necessarily independent of the movement-plate as I construct it. I have carried this idea somewhat farther in the modification shown in Figs. 6 and 7, in which a separate thin narrow spring-arm 11 is secured below the bridge C'. The free end of this arm, which carries the lower jewel, is inclosed and has free play in a hole formed in the end of the bridge C', by which it is completely protected. The construction of the upper bridge, the relation of the two bridges to each other, and their attachment to the movement-plate are unchanged; but it should be noticed that the upper bridge can be made elastic or provided with such a tongue for the same reason as the lower bridge.

I have described my attachment thus far as applied to the balance of the watch, as that is perhaps its most important use; but it can be employed without any material change to support other movable parts of a watch, and to show its adaptability in this respect I have illustrated it in Fig. 5 in connection with the pallets and lever. Supposing that in this case I use the construction heretofore described to support the balance, I form a slot 12 in the plate A at an angle to the slot 1. My upper and lower bridges are applied to the side of the slot, and their shapes are somewhat changed to suit this particular situation; but in their manner of attachment to the plate A and to each other and in their capacity for removal, either separately or together with the parts supported by them, they are in no wise different from the construction heretofore described.

My construction as applied to the lever and pallet is of particular value on account of the facility it gives in certain watches for ascertaining whether the train runs freely and also to allow the watch to run down when necessary or desirable by simply taking out the lever and pallet, which illustrates the facility it offers for refastening loose pallet-stones or altering their position, &c., without even removing the movement from the watchcase.

Apart from its connection with the watch structure this construction may be considered a self-contained, independent, complete, bodily removable, and interchangeable device, forming one of the most important elements of a watch mechanism—viz., its regulating and timing device—and consisting mainly of the balance-wheel and its attached parts, the hair-spring, bearings, and bridges. As such, said separate and self-contained device made separately—as, for instance, in the case of the balance-wheel—may pass through the usual processes of hair-springing, adjusting, timing, counting, and comparing the vibrations of the balance, &c., offering great facilities for manipulation by the ready access to all its parts and capable of being applied in-

tact and bodily exactly as it finally leaves the handle of the adjuster to its intended or any suitable movement.

The means for fastening and locating the lower bridge in its proper position to and from the exposed side of the movement-plate permits said bridge to be so shaped as to conform to any style of movement, whether it be full or three-quarter plate or with separate bridges for each wheel, and in no case does it necessitate any cutting or slotting from the periphery into the movement-plate for the lateral introduction of the bridge's tailpiece, which weakens and causes the movement-plate to wabble when being fastened into the watchcase.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the movement-plate of a watch, a lower bridge, an upper bridge and a balance-wheel or other part, said upper bridge being carried by the lower bridge and all of said parts being removable from the movement-plate as one body without disturbing the balance-wheel from its bearings, the screw for securing the upper bridge to the lower bridge, the second screw independent of the first for securing the lower bridge to the exposed face of the movement-plate, both of said screws being exposed on the same side of the movement-plate, substantially as described.

2. In combination with the movement-plate of a watch a lower bridge for the balance-wheel or movable part and an upper bridge, said upper bridge being secured to the lower bridge by a screw on the exposed side of the movement-plate, the said lower bridge having its tailpiece extended in rear of the upper bridge and secured to the exposed face of the movement-plate by a screw independent of the screw which holds the upper bridge to the lower bridge.

3. In combination with the movement-plate of a watch, a bridge secured to the face of the plate, the screws 2 and 6, for connecting said bridge to the plate, the recesses 3 in said bridge, and the pins 4 in said plate engaging with said recesses, substantially as described.

4. In combination with the movement-plate of a watch having a slot, a lower bridge of angular shape secured to the face of the plate, but extending below said slot, screws 2 and 6 for connecting said bridge to the plate, recesses 3 in said bridge, and pins 4 in said plate engaging with said recesses, and an upper bridge extending above the slot and independently secured to the lower bridge above such slot, whereby both bridges can be removed together, and the upper bridge can be removed separately, substantially as described.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 8th day of June, 1896.

E. KRAHENBUHL.

Witnesses:
L. W. SEELY,
GEO. T. KNOX.

Correction in Letters Patent No. 632,128.

It is hereby certified that in Letters Patent No. 632,128, granted August 29, 1899, upon the application of Ernest Krahenbuhl, of San Rafael, California, for an improvement in "Watch-Plates," an error appears in the printed specification requiring correction, as follows: In line 2, page 3, the word "handle" should read *hands;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 28th day of November, A. D., 1899.

[SEAL.]

WEBSTER DAVIS,
Assistant Secretary of the Interior.

Countersigned:

C. H. DUELL,
Commissioner of Patents.