United States Patent

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[31] **2912/68**

[54] **PROCESS OF HOLDING AND PERFORMING AN OPERATION ON THE OUTER COIL OF A TIMEPIECE HAIR SPRING**
3 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **83/18,** 140/89, 269/49, 83/907
[51] **Int. Cl.** **B26d 7/14**
[50] **Field of Search** 269/38, 40, 49; 140/89; 83/176; 81/6, 7.5

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ABSTRACT: A process for facilitating operations to be made on the outer coil of a timepiece hair spring consists in positioning the hair spring on a support and holding it by its inner end, and pressing together against the center the coils located on the side opposite the center of the location on the outer coil where it is desired to effect this operation in order to increase the spacing between the coils on the other side. A device for carrying out this process has a frame in which is mounted a rotating broach for maintaining the inner end of the hair spring and a horizontal slider moving in the direction of the broach and having a vertical finger intended to compress the coils of the hair spring.

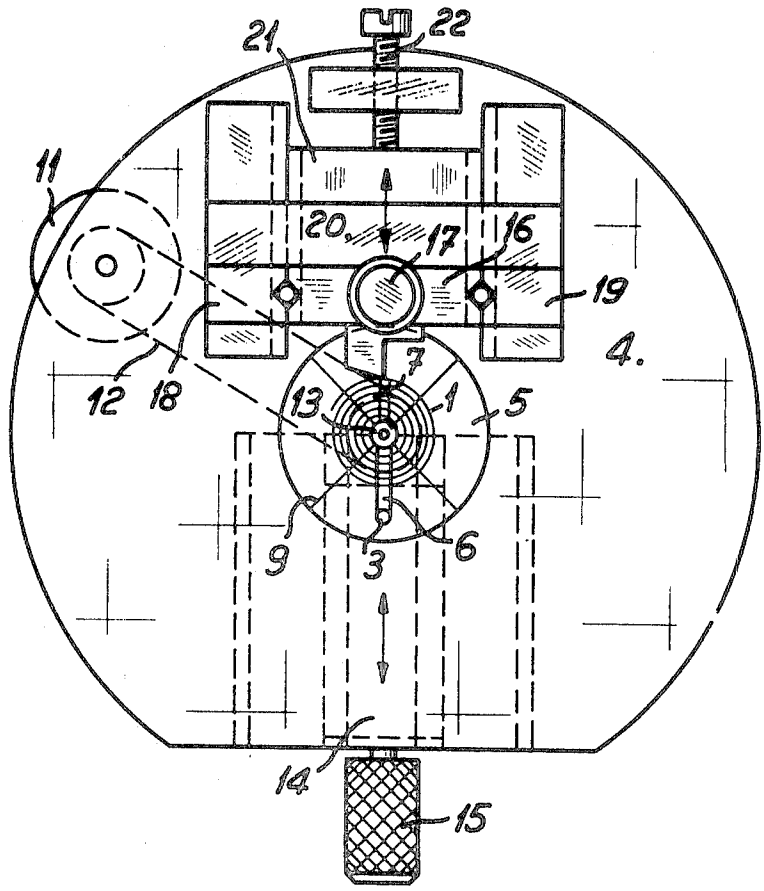

FIG.1

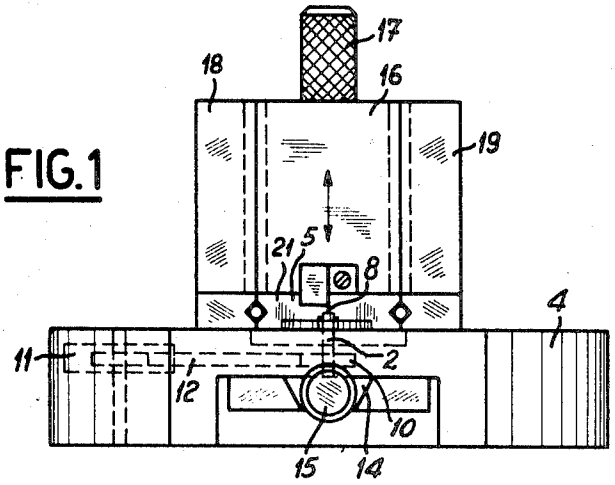

FIG.3

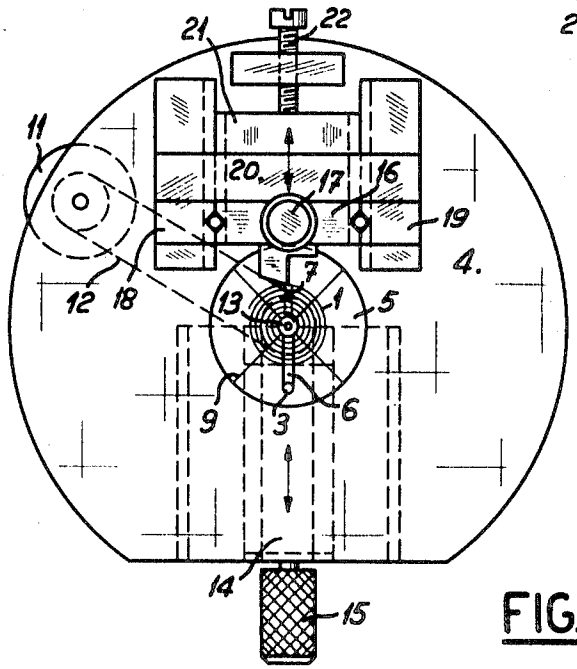

FIG.2

PROCESS OF HOLDING AND PERFORMING AN OPERATION ON THE OUTER COIL OF A TIMEPIECE HAIR SPRING

A timepiece hair spring generally must be made to size by cutting a part of the outside coil. Aside from conventional means such as shears or other cutting instruments, machines have already been suggested in which the hair spring is maintained on an anvil, a device allowing to pinch the hair spring by a horizontal movement before cutting it. The outer coil of the hair spring being located very near the neighboring coil, the cutting tool can be very fine and guided with great precision if it is desired to avoid touching the coil next to the coil to be cut.

The present invention is directed to a process allowing to increase temporarily the distance separating the outer coil from the neighboring coil in such a way as to facilitate not only the cutting but all operations to be carried out on the outer coil, such as securing to the canon, forming or bending.

It has for its object a process for facilitating all operation to be effected on the outer coil of a timepiece hair spring, characterized in that the hair spring being positioned on a support and retained by its inner end there are pressed together against the center the coils located on the side opposite relative to the center of the place on the outer coil where it is desired to effect the said operation, in such a way as to increase the spacing between the coils on the other side.

The invention also has for its object a device for carrying out the process, characterized by the fact that it comprises a frame in which is mounted a rotating broach for maintaining the inner end of the hair spring and a horizontal slider moving in the direction of the broach and carrying a vertical finger intended to compress the coils of the hair spring.

The accompanying drawing represents by way of example one embodiment of a device for cutting the outer end of a hair spring.

FIG. 1 shows an elevational view of the device.

FIG. 2 shows a plan view thereof.

FIG. 3 shows the deformed hair spring.

The cutting process is illustrated by FIG. 3 which shows a hair spring 1 secured by its inner end to a broach 2, the coils of the hair spring being pressed together by a finger 3 against broach 2, and against the collet if the hair spring is already

provided with a collet, at a point at least approximately opposed to the point on the outer coil that it is desired to cut. The space between the outer coil and the neighboring coil increases in such a way that it is easier to cut it without risk of touching the neighboring coil.

The device used for this purpose comprises a frame 4 carrying an anvil 5 of hard metal having a slot 6 for the passage of finger 3 and slot 7 for the passage of knife 8 as well as marks 9 for setting the hair spring. The center of the anvil is occupied by a broach 2 rotatably mounted and rotated by a knurled pulley 11 overlapping the frame and connected to a pulley 10 on the broach by a transmission belt 12. The broach terminates in its upper part in a conical part intended to carry collet 13. It is however possible to use a hollow conical broach having a slot in which can engage directly the inner end of the hair spring which has not been provided with a collet.

Finger 3 is mounted on a horizontal slider 14 operable by a knurled button 15. As for knife 8, it is mounted on a vertical slider 16 moved by a knurled button 17, the slides 18 and 19 of the slider 16 being themselves mounted through a piece 20 on a horizontal slider 21 whose path is limited by a stop 22. The knife has an oblique edge in which is made a vertical nick whose bottom constitutes the blade of the knife, the hair spring being maintained laterally during cutting by the sides of the nick.

Instead of moving the finger against the broach, it is naturally possible to move the broach against a fixed stop.

What I claim is:

1. Process for performing an operation on the outer coil of timepiece hair spring, comprising positioning said hair spring on a flat support, holding said hair spring by its inner end, pressing together against the center the coils of said hair spring located on the side opposite relative to the center of the place on the outer coil where it is desired to effect said operation, whereby to increase the spacing between the coils on the other side while maintaining the coils of said hair spring in the general plane of said spring, and performing said operation on the outer coil of said hair spring while the spacing between the coils thereof on said other side is thus increased.

2. A process according to claim 1, wherein said operation is a cutting operation to cut said spring to proper size.

3. A process according to claim 2, wherein said cutting operation is effected by a knife moved toward said support.