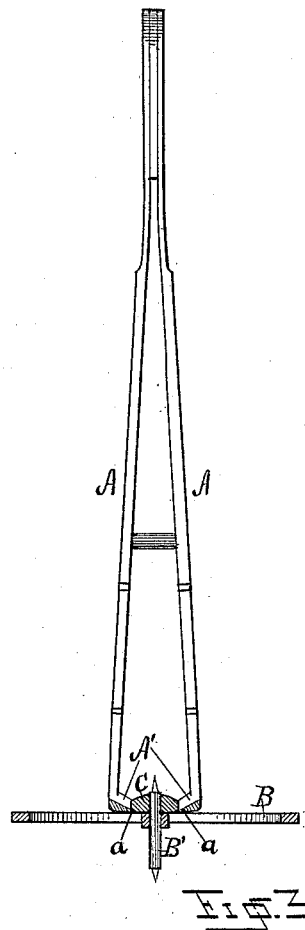
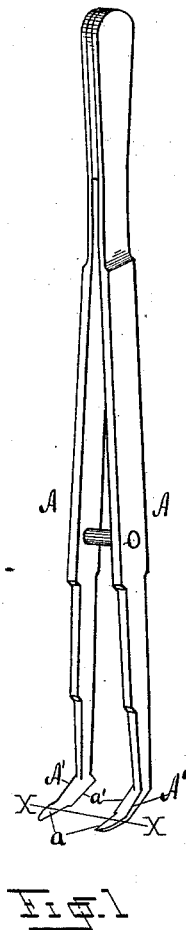
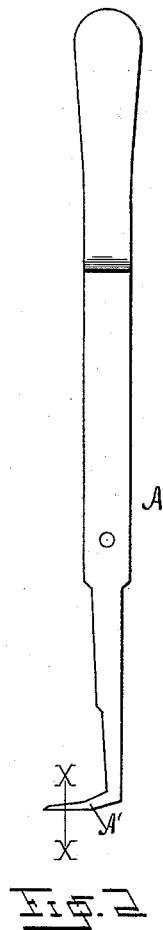


(No Model.)

J. R. GRAVES.
HAIR SPRING TWEEZERS.

No. 421,925.

Patented Feb. 25, 1890.



Witnesses

S. D. Robbins

Geo Bernier

Inventor

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By His Attys. *Hallock & Hallock*

UNITED STATES PATENT OFFICE.

JEROME R. GRAVES, OF CORRY, PENNSYLVANIA.

HAIR-SPRING TWEEZERS.

SPECIFICATION forming part of Letters Patent No. 421,925, dated February 25, 1890.

Application filed September 13, 1889. Serial No. 323,800. (No specimens.)

To all whom it may concern:

Be it known that I, JEROME R. GRAVES, a citizen of the United States, residing at Corry, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Watch-Makers' Tools; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to watch-makers' tools; and it consists in an improved pair of tweezers for removing hair-springs from the balance-wheel arbor, as will be hereinafter fully set forth, and pointed out in the claims.

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

Figure 1 is a perspective view of my improved tweezers for removing the hair-spring from the balance-wheel arbor. Fig. 2 is a side elevation view of the same. Fig. 3 is a front elevation view, with the jaws in section, on the line $x x$ in Figs. 1 and 2, and the balance-wheel and the collet of the hair-spring, also shown in section, the position of the tool being that which it occupies when ready to act upon the hair-spring collet.

The figures all show the parts magnified.

Like letters indicate like parts in all the figures.

The construction and operation of my device are as follows:

A A are the prongs or legs of the tweezers, and they are made to spring apart as is common in tweezers and nippers.

A' A' are jaws at the ends of the prongs, which turn out at right angles to the prongs or legs like feet. These jaws are beveled inwardly on top, as seen in section in Fig. 3, while the lower face is straight or horizontal. The inner edges of the jaws are parallel for some distance at their base, as at a' , and then divergent toward their points, as at a , so that when the two jaws are brought together they will impinge upon each other at the heel or base, but not meet at the toes or points. Those parts of the points which have the diverging edges a are the working-faces.

In Fig. 3 the tool is shown in use.

B is the balance-wheel of a watch.

B' is the arbor of the balance-wheel, and C is the collet of the spring. The spring itself is not shown.

In using the tool the operator slips the jaws A' A' under the spring with the points of the jaws under the collet, and by pressing the legs of the tool together the beveled edges of the jaws are forced in between the collet and the balance-wheel and act like wedges and force the collet up. The object in having the edges a divergent or offset, so as not to meet when the edges a' meet, is to prevent the jaws from injuring the pivot of the staff when the collet is forced off.

I am aware of the prior use of such tools for the purposes mentioned, as is shown in patent to Willis, No. 262,875, dated August 15, 1882, and I do not claim such a construction as a part of my invention.

What I claim as new is—

1. As a new article of manufacture, a tool for removing a hair-spring of a watch from the balance-wheel arbor, consisting of tweezers having jaws A' extending from the legs at right angles to the plane of their movement, and having working-faces a at the outer ends of said jaws A', so as to reach under the spring and engage the under surface of the collet.

2. As a new article of manufacture, a tool for removing the hair-spring of a watch from the balance-wheel arbor, consisting of tweezers or nippers having jaws A' extending at right angles from the legs thereof, and having their upper surfaces beveled inwardly and their inner edges near the points divergent or offset, as at a , and at the heels parallel, as at a' , substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JEROME R. GRAVES.

Witnesses:

A. F. BOLE,
L. B. MALONE.