

(No Model.)

E. LEACH.  
ART OF DECORATING WATCH CASES.

No. 454,946.

Patented June 30, 1891.

Fig. 1.

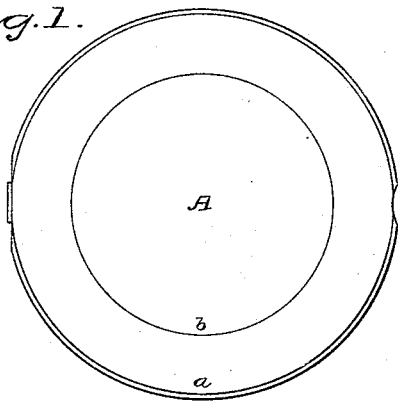


Fig. 3.

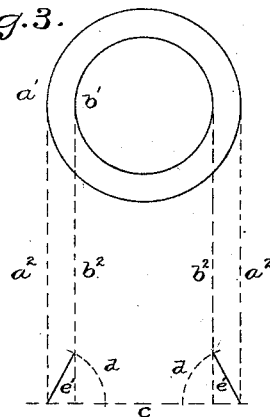


Fig. 2.

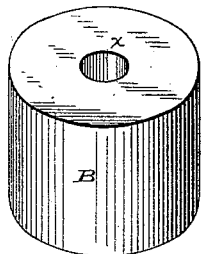


Fig. 4.

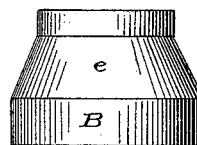


Fig. 5.

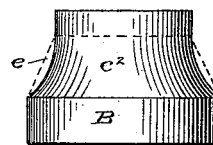


Fig. 8.

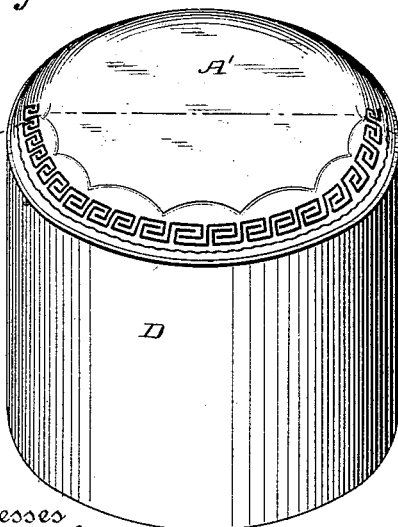


Fig. 6.

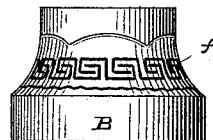
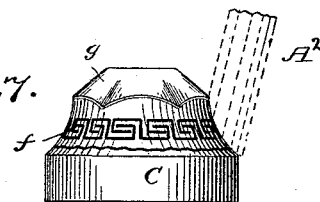


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## ART OF DECORATING WATCH-CASES.

SPECIFICATION forming part of Letters Patent No. 454,946, dated June 30, 1891.

Application filed July 10, 1888. Serial No. 279,505. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN LEACH, a citizen of the United States, and a resident of Brooklyn, in the State of New York, have invented a new and useful Improvement in the Art of Decorating Watch-Cases, of which the following is a specification.

This invention is additional to my improvement in the art of decorating watch-cases set forth in a previous specification, forming part of an application for Letters Patent filed June 30, 1888, Serial No. 278,637, as a division of an application filed January 6, 1888, Serial No. 259,989.

The present invention relates to the production of die-rolls for the transfer of hand-engraving to watch-case backs and caps by the process set forth in said previous specification.

It consists, first, in an original method of proportioning the die-rolls to their work, so as to insure uniformity of surface speed when they receive the double or compound or planetary motion set forth in said previous specification, and thus to prevent any cutting or grinding action; secondly, in a novel process whereby the die-rolls are completed, and, thirdly, in a peculiar method of transferring hand-engraving to the die-rolls, whereby the engraving operation is facilitated and die-rolls of a given design may be readily duplicated or multiplied, as hereinafter set forth and claimed.

A sheet of drawings accompanies this specification as part thereof.

Figure 1 of the drawings represents a diagrammatic face view of the front "back" of a watch-case. Fig. 2 is a perspective view of a die-roll blank of a suitable size. Fig. 3 is a diagram illustrating the method of proportioning the die-roll to the work. Figs. 4 to 7, inclusive, are a series of elevations illustrating the process of completing a die-roll, and Fig. 8 is a perspective view illustrating the method of transferring hand-engraving to the die-rolls.

Like letters of reference indicate corresponding parts in the several figures.

To carry this invention into effect, take a sample or pattern watch-case back or cap, as represented at A, Fig. 1, and lay out upon its outer face by concentric circles  $a$   $b$  an annu-

lar surface, or it may be a segment or segments of an annulus, of appropriate or pleasing proportions to be decorated. Then select or produce a cylindrical blank B, Fig. 2, of soft steel, of a convenient length, having an axial bore  $x$  and an outer diameter that is a given aliquot fraction of the outer circle  $a$ , say one-half, which is the proportion represented in the drawings. Then make a diagram, as illustrated by Fig. 3, with an outer circle  $a'$ , a corresponding fraction (one-half) of said outer circle  $a$ , and an inner circle  $b'$  a like fraction (one-half) of the inner circle  $b$ . Draw parallel lines  $a^2$   $b^2$  from the respective circles  $a'$   $b'$  and an intersecting line  $c$  at right angles to said lines  $a^2$   $b^2$ . Then with a radius equal to the full width between the lines  $a$   $b$  on the back or cap A and centers at the intersections of said lines  $a^2$   $b^2$  and  $c$ , draw arcs  $d$ , intersecting said lines  $b^2$ , and from the intersections last named to the centers of the arcs draw straight lines  $e'$ , which represent exactly the "bevel"  $e$  required on the die-roll, the diameter of said circle  $b'$  being the smaller diameter of the face portion  $f$  of the finished die-roll C, Fig. 7, as that of said circle  $a'$  is its larger diameter. If the surface to be decorated is flat or a flat bevel, said bevel  $e'$  is simply reproduced on the periphery of the die-roll blank B, as represented at  $e$ , Fig. 4, by a "turning" operation. The more common "oval" convexity of watch-case backs and caps requires a corresponding concavity in the die-roll face, as represented in full lines in Fig. 5, and the die-roll may be turned at once to the required "concave bevel"  $e^2$  with the aid of a templet first cut to the bevel  $e'$  and then concaved to fit the back or cap. The peripheral "face"  $f$ , so conformed to the surface to be decorated, must now be provided with a continuous or complete section of the desired design in reverse, as represented in Fig. 6. Then cut away the smaller end of the blank B, as represented at  $g$ , Fig. 7, up to the near margin of the design. This may be done by a milling or filing operation. Then harden the die-roll, which is now complete, as represented at C, Fig. 7, and ready to transfer the design to any number of watch-case backs or caps of the size and shape represented by the pattern A, Fig. 1, as illustrated by the dotted fragment

of a contiguous watch-case back at A<sup>2</sup>, Fig. 7.

The die-roll face *f* may be engraved by hand, or the design may preferably be transferred to it, as illustrated by Fig. 8 in connection with Figs. 6 and 7. According to this method an anvil-die D, Fig. 8, is made from a blank of soft steel, which is turned to a diameter equal to that of the pattern back or cap A, and its circular top A' is then shaped with the aid of a templet, so as to bear a positive counterpart of the surface to be decorated. A little more than the adopted fraction (one-half in the example) of the circumference of the die-top A' is now hand-engraved just as it is to appear on the watch-case, and the die D is then hardened, after which the design may be transferred to any number of die-roll blanks B, proportioned and conformed to the same pattern back or cap by rolling such die-roll blanks under pressure back and forth from end to end of said engraved portion of the die-top until the design is raised or sunk on the die-roll blank to the required extent. This may be done in my machine set forth in a previous specification forming part of said application filed January 6, 1888, Serial No. 259,989, or with the aid of any mechanical appliance whereby the face of the die-roll blank may be kept at the required distance from the axis of revolution, while the inclined die-roll axis is kept in a plane radial to said axis of revolution. The same is true as to the transfer of the design from the die-roll to the backs or caps.

I am aware that die-rolls have before been employed for transferring designs to metallic articles, and that engraved designs have been transferred to such die-rolls from an engraved positive; but, so far as I am aware, both processes have been confined in their successful application to flat plane surfaces—such as printing-plates and cylindrical or substantially cylindrical surfaces—upon which spiral designs have been produced by die-rolls. Previous to my discovery of the within-described methods it was not practicable to so transfer the required delicate and circular or continuous designs to the watch-case backs and caps, owing to their peculiar shapes. With the aid of these methods I am enabled to so decorate watch-cases at a greatly-reduced cost, and so that the work cannot readily be distinguished from original hand-engraving.

Instead of one-half, the proportion of the diameters of the die-rolls to those of the surface to be decorated may be one-third or one-fourth, the formula illustrated by Fig. 3 being

correspondingly modified, and the design may in some cases be transferred to the die-top A' from a die-roll previously engraved and hardened, as in providing for raised designs on the watch-case back or cap. By engraving the same design on a die-roll and an anvil-die and transferring from each, it can be reproduced on the backs or caps either raised or sunken, as may be preferred.

Other like modifications will suggest themselves to those skilled in the art.

Having thus described my said improvement in the art of decorating watch-cases, I claim as my invention and desire to patent under this specification—

1. The within-described method of proportioning die-rolls to circular or segmental surfaces to be decorated on watch-case backs or caps, the same consisting in making the larger diameter an aliquot fraction, as one-half, of the outer circle of the surface to be decorated, the smaller diameter a like fraction of the inner circle of said surface, and the connecting bevel of a width equal to that of the surface to be decorated, substantially as set forth.

2. The within-described process of making a die-roll for decorating watch-case backs or caps, the same consisting in cutting a peripheral face in the form of a bevel on a cylindrical blank of the required larger diameter and proportioning and conforming the same to the surface to be decorated, then providing said face with a proportionate section of the desired design in reverse, then cutting away the smaller end of the blank to the near margin of the design, and finally hardening the otherwise finished die-roll, substantially as set forth.

3. In the art of decorating watch-case backs or caps by means of die-rolls, the within-described method of providing the peripheral faces of the die-rolls with the desired design in reverse, which consists in cutting the top of an anvil-die to the shape of the outer face of a given pattern watch-case back or cap and engraving thereon a section of the desired design somewhat longer than the circumference of the corresponding die-roll face and rolling the previously-conformed die-roll blank back and forth upon the engraved surface until the design is raised or sunk on the die-roll face to the required extent, substantially as set forth.

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