(No Model.) 2 Sheets—Sheet 1.

F. ECAUBERT.

TOOL FOR ORNAMENTING WATCHCASES.

No. 517,686. Patented Apr. 3, 1894.

Fig. 1.

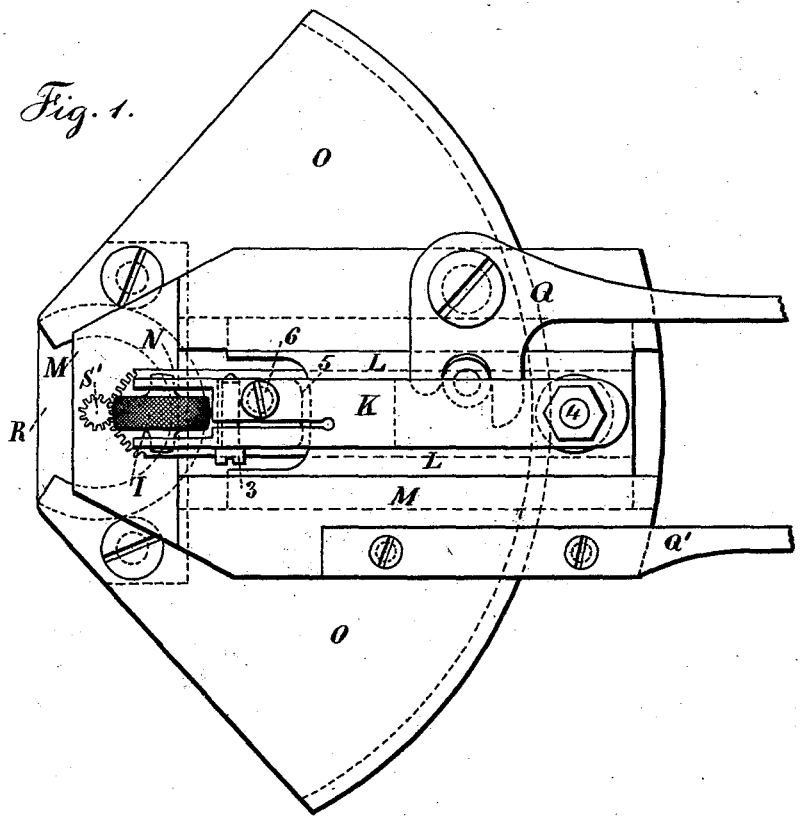
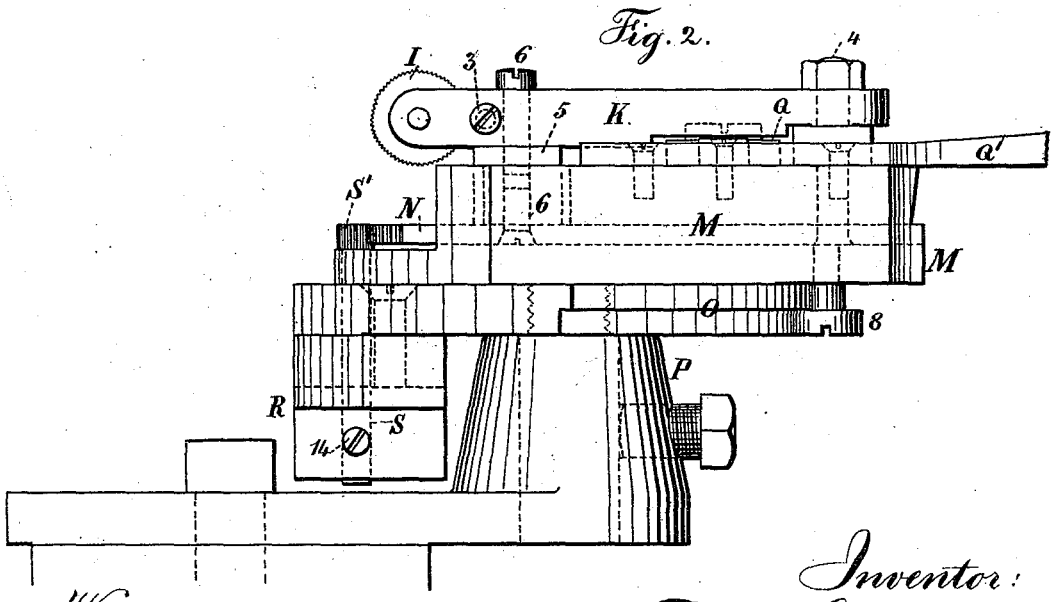


Fig. 2.



Witnesses:
J. Stair
Chas. H. Smith

Inventor:
Frederic Ecaubert
per Lemuel W. Serrell
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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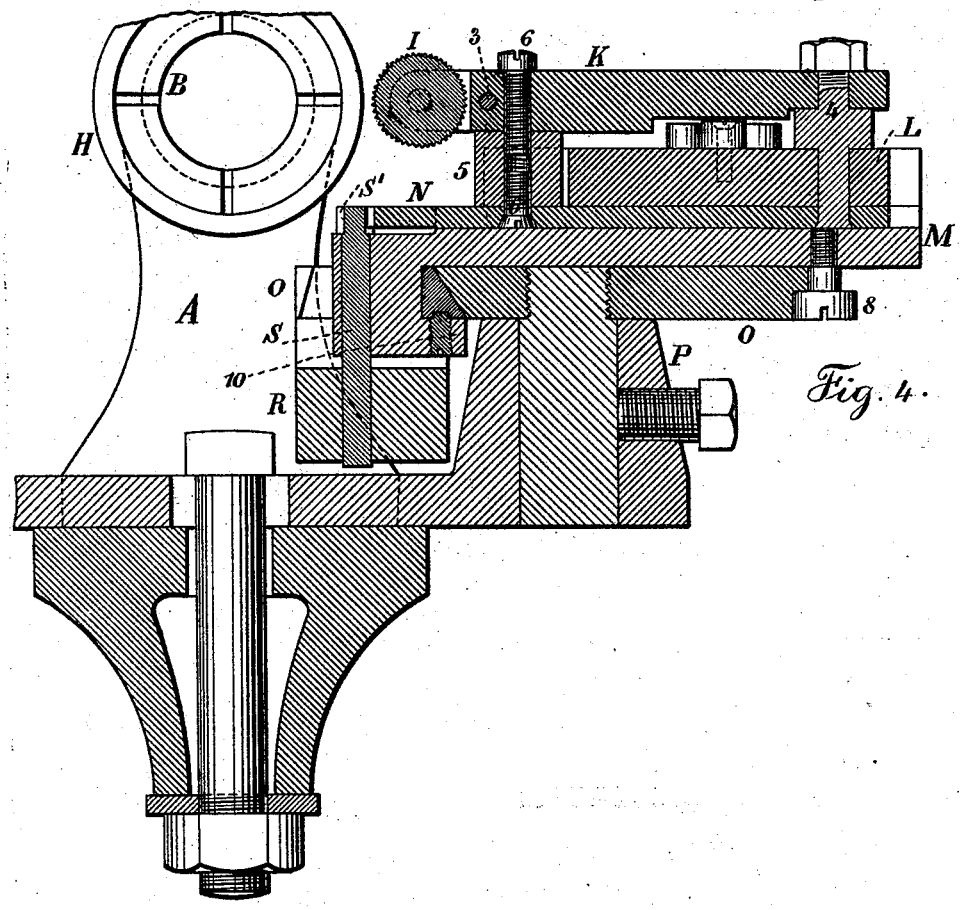
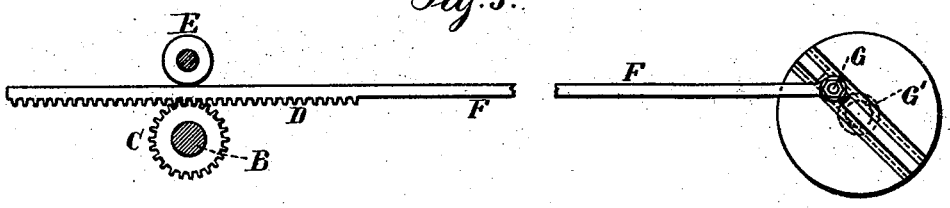


Fig. 4.

Fig. 3.



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J. Stail
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Inventor:
Frederic Ecaubert
per Samuel W. Serrell Atty

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UNITED STATES PATENT OFFICE.

FREDERIC ECAUBERT, OF BROOKLYN, NEW YORK.

TOOL FOR ORNAMENTING WATCHCASES.

SPECIFICATION forming part of Letters Patent No. 517,686, dated April 3, 1894.

Application filed February 13, 1888. Serial No. 263,867. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC ECAUBERT, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Tools for Ornamenting Watchcases, &c., of which the following is a specification.

Watch cases and other articles have been mounted upon the spindle of a lathe and revolved continuously while the knurl or ornamented wheel has been pressed against the metal for indenting or embossing into the surface of the metal corrugations or figures or ornaments of the desired character; difficulty, however, has arisen in doing this work reliably especially when the pattern on the knurl is large, for unless the relative sizes are accurate, the figure produced at the second rotation will not correspond accurately to the figure produced by the first rotation. Another source of difficulty arises from the fact that the watch case centers are almost always rounding or convex upon the edge that is knurled or ornamented, hence the periphery of the center is greater at one place than at another and the knurling operation is marred by the one part of the figure lapping over another part of the figure, and the knurl slipping upon the surface of the metal at one point or another of its contact therewith.

By my improvements I provide for giving to the article a reverse rotary movement to any desired extent, so that the watch case center or other article can be completely revolved, first one way and then the other way, or partially revolved to any desired extent; usually the revolution is almost a complete rotation, the stopping place being where the shank is afterward attached to the watch case center, and I provide a holder for the knurling tool, so that such tool can be swung around into any desired position to follow the curved or convex surface of the watch case center or other article, and bring the pressure perpendicular to the surface acted upon, and I hold the stock of the knurling tool in such a manner that the knurling tool itself will be properly presented to the surface acted upon, and there will not be any sliding or slipping of one part against the other, hence the knurls, beads or other ornaments, indented or embossed upon the metal, will be perfect and correspond accurately to the surface of the knurling or embossing tool.

In the drawings Figure 1 is a plan view of the knurling tool and its holder. Fig. 2 is an elevation of the same. Fig. 3 is a detached view in smaller size of the device for giving to the mandrel a rotation in first one direction and then the other direction. Fig. 4 is a section through the axis of the support for the knurling tool showing the head stock of the lathe that holds the article to be operated upon in elevation.

The head stock A of the lathe and the mandrel B are of any desired character, except that upon the mandrel B there is a pinion or gear wheel C and there is a rack D with teeth for gearing into such pinion C and a roller E for keeping the rack in contact with the pinion and this rack D is upon the connecting rod F and the adjustable crank pin G is upon the counter shaft G′ so that by adjusting the distance of the crank pin G from the center of the counter shaft G′ the connecting rod F and rack D will receive a longer or shorter end movement and this allows for giving to the mandrel B either a complete or a partial rotation, first in one direction and then in the other, and this rotation is regular and automatic.

Upon the mandrel B is a suitable chuck or holder for the watch case center H or other article that is to be operated upon and I is the knurling tool, the periphery of which is engraved with the desired figures, lines, ornaments, or designs, in reverse to those to be produced upon the periphery of the watch case center or other article acted upon. This knurling tool I is in a holder K which is preferably slotted and provided with a screw 3 so that any wear upon the axis of the knurling tool may be compensated by tightening said screw 3 and this holder K is pivoted upon the stud 4 that rigidly holds the same to the slide L but allows such holder K a slight lateral or swinging movement, and there is a block 5 between the under side of the holder K and the rack bar N and the screws 6 hold the parts firmly together at this block 5 and the stud 4 passes through the slide into the rack bar N so that such rack bar N and the holder K are rigidly connected together, but they can both

swing laterally to a slight distance upon the stud 4 the end of the slide L being recessed adjacent to the block 5.

The slide rest M is upon the base O and this base O is in the form of a sector the back edge of such sector being under cut so that the screw 8 or lip depending from the slide rest M passes against this under cut portion and holds down the slide rest to the base and at the front end of the sector there is a recess that is rather more than semi-circular and the slide rest M has a downward projection that passes into this circular recess and a beveled segmental key that hooks beneath the base O as seen at 10 so that by this construction the slide rest M can be moved across the top of the base O and in so doing will describe an arc of a circle in order that the knurling tool I may be swung around into any desired position relatively to the article operated upon thereby accommodating the knurling tool to the convex surface of the edge of the watch case center, or other article operated upon.

The base O is supported by a suitable stand P upon the slide rest of the lathe or other suitable support that will allow for the necessary adjustment of the knurling device to suit watch case centers of different sizes, or to adapt the tool to the article that is to be operated upon.

The slide L is moved endwise within the slide rest M by any suitable device, preferably by the bent lever Q which is acted upon by hand and I provide a grasping bar Q′ so that the power of the hand is applied to the best advantage in moving the knurling tool I up to its work.

Below the base O is a central block R which is fastened by screws permanently to such base O and it has a vertical hole at the center from which the sector shaped base is described, and into this hole the circular stock S of the pinion S′ is inserted and the same is clamped at the proper position by a screw 14 and this pinion S′ gears into the teeth at the end of the rack bar N.

When the knurling tool I is cylindrical the end of the rack bar N is straight, and if the edge of the knurling tool I is convex or in the form of an arc of a circle, the end of the rack bar N is shaped to correspond, and the teeth upon the end of the rack bar gear into the teeth of the pinion S′ and this pinion S′ is to be of a size corresponding to the convexity of the edge of the watch case center or other article to be operated upon, and the edge of the knurling tool is at the same distance from the vertical axial line passing through the pinion S′ as are the teeth upon the end of the rack bar N. In all instances this measurement is to be taken at the pitch line of the gear teeth and at the pitch line of the knurling tool.

It will now be understood that the knurling tool can be brought against the periphery of the watch case center or other article operated upon, and that as said article rotates, first in one direction and then in the other direction the figure upon the edge of the knurling tool will be rolled into the metal, and then the slide rest M and the slide L can be swung around one way or the other way upon the sector base O and the knurling tool will be properly kept against the convex edge of the watch case center one way and then the other way and the ornamenting will be extended in first one direction and then the other direction, until it is completed, and in this operation the teeth of the stationary pinion S′ holding the teeth at the end of the rack bar N prevent the knurling tool slipping laterally upon the metal as the figure is rolled into the same, and there will be no opportunity for the figure to be imperfect, because the convexity of the watch case center corresponds to the convexity of the pinion S′; and in order to insure the same proportion of peripheral distance around the knurling tool as there is distance around the watch case center with which it is in contact, the edge of such knurling tool should be convex, and the end of the rack bar N also convex, so that there will be a perfect contact of the knurling tool with the article operated upon throughout the entire operation, and no possibility of the tool slipping laterally out of its true position during all the various movements resulting from the rotation of the article first in one direction and then in the other, and the progressive indenting operation resulting from the pressure of the knurling tool upon the metal.

If the knurling or ornamenting roll and the holder for the same swung on the axis of the pinion S′ the surface of the knurling roll would slide laterally upon the curved edge of the watch case center in describing the arc of the circle; this is prevented by the use of the pinion and rack, which allows the stock of the knurling tool to swing on its pivot as the teeth of the pinion swing the stock in holding it and the knurling tool so that the latter does not slide laterally upon the surface acted upon while the holder is moved around to bring the tool vertically to the convex surface operated upon. And it will be evident that when the pinion and rack are used with a knurling tool held by a handle in the hand of a workman, the tool will be guided as it is swung around horizontally, the teeth of the pinion keeping it from becoming misplaced laterally.

In the present improvements the workman in grasping the handles Q Q′ is enabled to regulate, with accuracy, the pressure of the knurling tool against the article that is being knurled, by the grip of the hand, without the pressure being given by a screw as heretofore employed, and for this reason the accuracy and delicacy of the operation are very much promoted, because the workman is better able to appreciate the pressure and to allow the hand to yield to undue strain. Where the screw is made use of between the hand

and the knurling tool, the work is often injured by undue pressure, or by the knurl being moved accidentally out of contact and thus preventing a continuity of action by the same parts of the knurl on the watch case center.

In cases where a reciprocating or reversing rotary motion is given to a mandrel by a rack acting upon a pinion it is very important to prevent looseness of the teeth and of joints that connect the rack with the crank pin. Where a slide has been made use of, in guiding the rack, and at a distance from the pinion, the parts are apt to wear loose with rapidity, and not only make a very objectionable noise but produce concussion upon the teeth of the pinion that is injurious to the perfect working of the knurl.

By my present improvement the rack which operates upon the pinion of the mandrel, is held to its place by a roller directly in contact with the back of the rack and adjacent to the pinion and the rack and its connecting rod are rigid and extend directly to the crank pin, so that there is no risk of looseness in any of the parts and concussion between the teeth is reduced to a minimum and the rack moves with very little friction and can be kept properly in contact with the pinion by the roller.

I claim as my invention—

1. The combination with the knurl or ornamenting wheel and the mandrel and chuck or tool for holding the watch case center or other article to be ornamented, of a rotating shaft and adjustable crank pin and a rigid connecting rod extending from the crank pin and provided with rack teeth, a pinion upon the mandrel engaging the rack teeth, and a roller adjacent to the pinion for holding the rack to the pinion, substantially as set forth.

2. The combination with the knurling or ornamenting tool and the device for holding the same, of a rack connected with the holder, a stationary pinion with which the rack bar is in gear for steadying the knurling tool and a support for the parts and a lever handle for moving the knurling tool toward its work substantially as specified.

3. The combination with the knurling or ornamenting tool and the device for holding the same, of a rack bar connected with the holder a stationary pinion with which the rack bar is in gear, a quadrant, and slide rest for supporting the parts and a handle for pressing the knurl to its work, substantially as specified.

4. The combination with the knurling or ornamenting tool and its holder and the slide for supporting the same, of a rack bar connected with the holder and a stationary pinion with which the rack bar is in gear for steadying the knurling tool and means for pressing the knurl to its work and moving the same laterally substantially as set forth.

5. The combination with the knurling tool and its holder, of a rack connected with the holder and a stationary pinion for preventing the tool becoming misplaced laterally substantially as set forth.

6. The combination with a knurling tool, of a jaw and slide and slide rest for supporting such knurling tool, two handles upon the slide rest to be grasped by the workman, one of which handles acts upon the slide to press the knurling tool against the work, substantially as set forth.

7. The combination with a knurl or circular ornamenting tool, of a jaw and slide for holding such knurl a quadrant plate or base O and a slide rest M upon such quadrant plate or base and in which slide rest the tool slide is movable, a lever handle attached to the slide rest for moving the same and a lever handle pivoted on the slide rest for pressing the knurling tool toward the work, substantially as set forth.

8. The combination with a quadrant or base O of a slide rest supported by and movable upon the quadrant or base, a knurling tool and tool holding slide, a lever for moving the slide rest, a lever for pressing the knurling tool to its work, a mandrel and chuck or holder for the watch case center or other article to be ornamented and mechanism for communicating to the mandrel a rotary motion first in one direction and then in the other, substantially as set forth.

9. The combination with a knurling or ornamenting tool, of a jaw for holding such tool, a pivot upon which such jaw or holder can swing laterally, a slide rest carrying the pivot, means for pressing the tool to its work, a quadrant or base for supporting the slide rest, a mandrel and chuck or holder for the article to be ornamented and mechanism for communicating to such mandrel a reverse or rotary motion first in one direction and then in the other, substantially as set forth.

Signed by me this 4th day of February, 1888.

F. ECAUBERT.

Witnesses:

GEO. T. PINCKNEY,

WILLIAM G. MOTT.