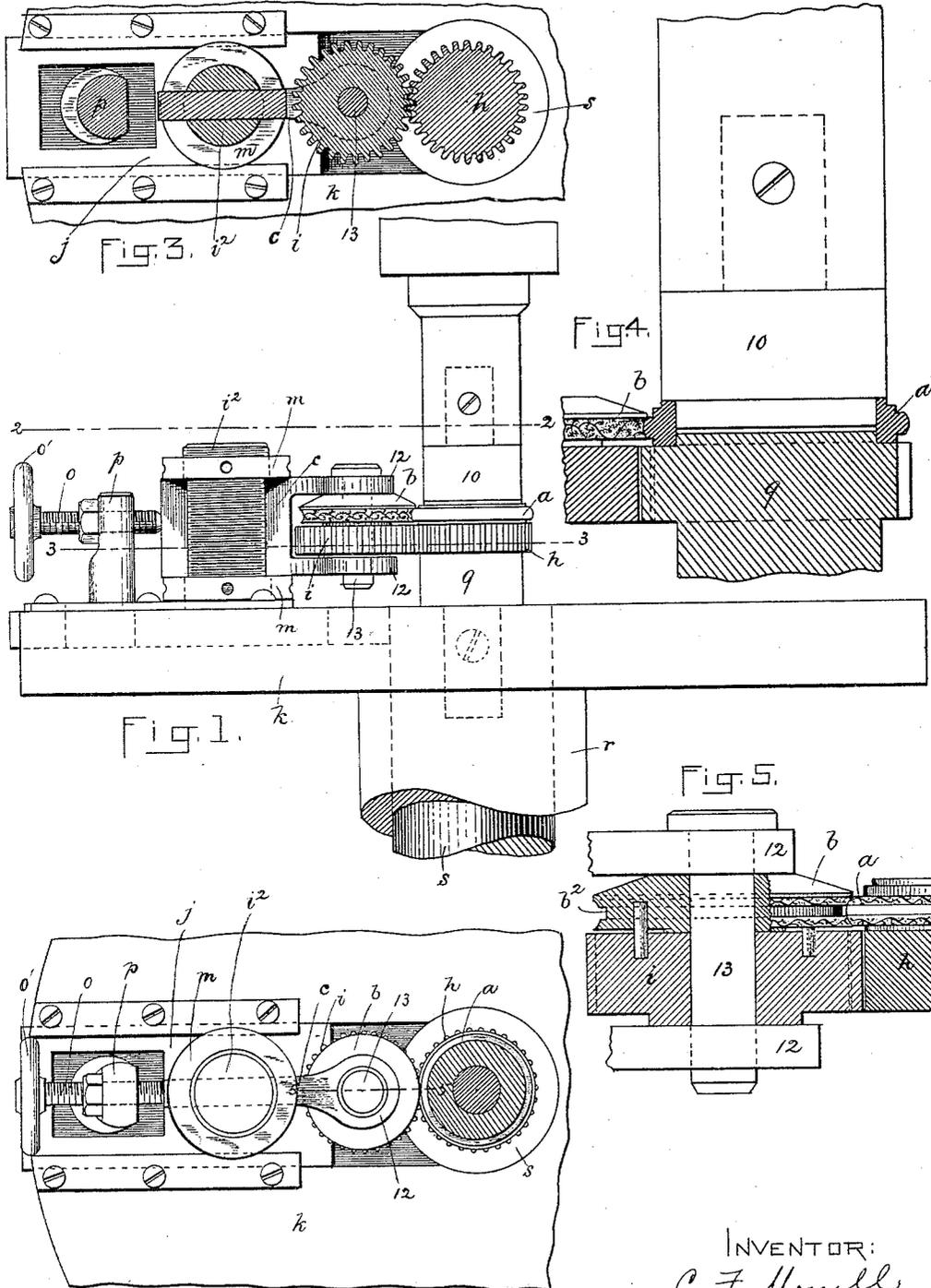


C. F. MORRILL.

MACHINE FOR ORNAMENTING WATCH CASES, &c.

No. 454,283.

Patented June 16, 1891.



WITNESSES:
A. J. Harrison.
Ernest W. Hauler.

FIG. 2.

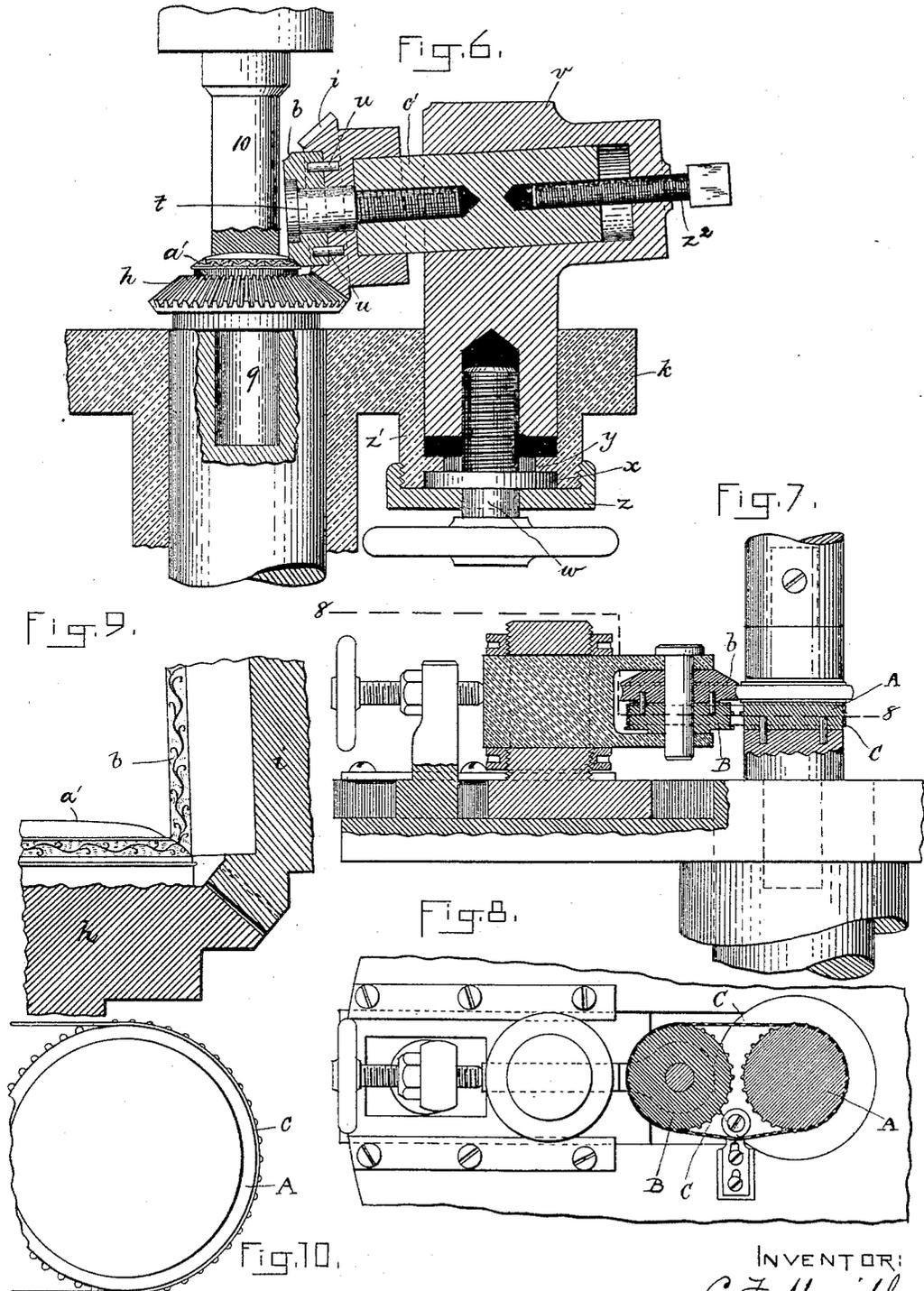
INVENTOR:
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UNITED STATES PATENT OFFICE.

CHARLES F. MORRILL, OF BOSTON, MASSACHUSETTS.

MACHINE FOR ORNAMENTING WATCH-CASES, &c.

SPECIFICATION forming part of Letters Patent No. 454,283, dated June 16, 1891.

Application filed September 13, 1890. Serial No. 364,858. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. MORRILL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Ornamenting Watch-Cases and other Like Articles, of which the following is a specification.

This invention relates to the application of ornamentation composed of irregular or fine lines to the surfaces of watch-cases and other articles of like form—such, for example, as the well-known vermicelli ornamentation—by the use of a rotary knurl or roll the periphery of which is engraved with the design which it is desired to impart to a watch-case surface.

The invention has for its object to enable ornamentations of this class to be formed by a continuously-rotating roll or knurl presented to the surface of the watch-case and to permit the roll to pass over the surface being ornamented as many times as may be required to produce the desired depth of ornamentation without the possibility of marring the ornamentation produced during one passage of the roll over the surface by failure of the relief-lines of the roll to properly coincide with the indentations made thereby in the surface being ornamented during a preceding passage of the roll over said surface, it being of course important that at each pass of the roll over the surface of the work the relief-lines of the roll coincide exactly with the indentations already formed in said surface, so that each pass will deepen the lines made during the preceding pass.

My invention consists, chiefly, in the combination of a chuck or holder for the article to be ornamented, an ornamenting knurl or roll so arranged relatively to the chuck as to bear on the surface to be ornamented, and gears connecting the said chuck and roll, said gears being formed so that the roll and chuck will necessarily rotate synchronously, or, in other words, so that a complete rotation of the roll will cause it to make a line of ornamentation extending exactly around the article held by the chuck, and each succeeding rotation will cause a deepening of the lines made by the previous rotation or rotations without the possibility of failure of the relief-lines of the roll to coincide with the indentations made

by said lines during a preceding rotation, all of which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a chuck or work-holder, an ornamenting-roll and a holder therefor, and gears connecting said roll and chuck, the same constituting one embodiment of my invention. Fig. 2 represents a section on line 2 2, Fig. 1, looking downwardly. Fig. 3 represents a section on line 3 3, looking downwardly. Fig. 4 represents enlarged vertical section of the chuck or work-holder and a portion of the roll or knurl. Fig. 5 represents an enlarged section on line 5 5, Fig. 2, showing a modification of the form of the ornamenting-roll. Fig. 6 represents a partial side elevation and partial vertical section of a chuck or work-holder and an ornamenting-roll and its holder, said parts being arranged so that the axis of the roll is substantially at right angles to that of the chuck, instead of being parallel, as in the preceding figures. Fig. 7 represents a partial side elevation and partial vertical section of a chuck or work-holder and an ornamenting-roll and its holder, showing a modification of the means for connecting the roll-holder with the chuck. Fig. 8 represents a section on line 8 8, Fig. 7. Fig. 9 represents a partial side elevation and partial section of portions of the chuck and roll shown in Fig. 6. Fig. 10 represents a top view of one of the wheels shown in Fig. 8.

The same letters and numerals of reference indicate the same parts in all of the figures.

In carrying out my invention I provide a stationary or non-rotating chuck adapted to hold a watch-case center *a*, or a watch-case back or cap *a'*, or any other circular article to be ornamented. Said chuck is preferably composed of two sections 9 10, arranged to clamp the work between them, the form of said sections being adapted to the form of the work to be held. In Figs. 1, 2, and 7 the chuck is shown as formed to hold a case-center *a*, while in Fig. 6 the chuck is shown as formed to hold a case back or bezel.

b represents the ornamental roll or knurl, which is supported by a suitable holder, which in Figs. 1, 2, 3, 7, and 8 is designated by the letter *c* and in Fig. 6 by the letter *c'*, said holder being adapted to revolve so as to carry

the roll in a circular path about the non-rotating chuck. The holder *c* is provided with ears 12 12, in which are bearings for a stud or shaft 13, on which the roll or knurl *b* is fitted to rotate.

To the chuck and roll are affixed gears *h* and *i*, the gear *h* being affixed to the chuck and therefore held from rotating, while the gear *i* is affixed to the roll and has a planetary motion around the latter. Said gears are each provided with the same number of teeth, so that during a single revolution of the movable gear about the fixed gear, said movable gear and the roll affixed thereto make a complete rotation, and no more and no less than a complete rotation, so that the roll presented to the surface of the work necessarily moves in such manner as that during each revolution of the roll after the first the entrance of the relief-lines of the roll into the indentations formed by said lines by the first rotation of the roll is insured, it being understood that each revolution of the roll causes it to form a line of ornamentation around the work. It is of course essential that the roll be made as nearly as possible of the same diameter as the work; but in practice it is difficult to secure exact uniformity in the diameter of the two parts. Heretofore the roll has not been positively rotated—that is to say, the roll has been mounted to rotate idly and has been rotated by its contact with the work, the latter being positively moved by a power applied to its chuck or holder. While for many forms of ornamentation the idly-mounted ornamenting-roll is adequate, particularly for such forms of ornamentation as are composed of regular lines, it is not adequate in forming irregular ornamentation, such as vermicelli work, as the indentations produced by the initial passage of the roll over the work are not of such nature as to accurately coincide with the relief-lines of the roll during a succeeding passage unless the roll and work be exactly of the same diameter. There is therefore great liability of the relief-lines of the roll marring or chewing the ornamentation made by it during a preceding passage of the roll over the work when a loosely-mounted roll is employed.

I have found that by connecting the roll with the work-holding chuck, so that the roll is positively rotated and given a planetary motion, as described, the liability of the lines of the roll of the ornamentation made during a preceding passage or rotation is presented, the said lines being kept in engagement with the indentations already made during each passage of the roll over the work after the first passage. It will be seen that the positive connection between the roll and the chuck corrects any slight variations that may exist between the diameters of the roll and the work, so that injury to the work from such slight variations is impossible.

The construction of the roll-holder and of the chuck, the arrangement of the roll with

relation to the work on the chuck, and the means for causing the roll to travel over the work may be variously modified.

The holder *c* (shown in Figs. 1, 2, 3, 7, and 8) is inserted in a slot in a vertical screw-threaded stud *i*², which is attached to a slide *j*, fitted to move in a guide or way in a horizontal bed or support *k*, the holder being clamped in place by annular nuts *m m*, engaged with the periphery of the stud *i*². The slide *j* is movable toward and from the chuck, and may be forced toward the chuck to increase the pressure of the roll against the work and deepen the ornamentation during the progress of the operation by means of a feeding-screw *o*, mounted in a stud *p*, affixed to the bed or support *k*, said screw having a hand-wheel *o'*. The bed *k* is in this case affixed to a tubular shaft *r*, which surrounds a fixed shaft *s*, that supports the section 9 of the chuck. The shaft *r* and the bed thereon may be rotated by power applied to said shaft in any suitable way to cause the roll and its holder to revolve about the chuck, the latter and the work thereon remaining stationary. I do not limit myself, however, to this arrangement, and may hold the bed *k* stationary and rotate the shaft *s* and the chuck connected thereto, so that the work and the roll will both rotate on their own axes, the roll having no planetary motion.

In the construction shown in Fig. 6 the axis of the roll *b* is substantially at right angles with that of the chuck, and the acting face of the roll is made slightly concave in cross-section to adapt it to the crowning marginal portion of a watch-case back or bezel *a'*. In this case the holder *c'* is provided with a stud *t*, on which the roll and the gear *i*, affixed thereto, are fitted to rotate, said roll and gear being connected by pins or dowels *u*. The holder *c'* is inserted in a socket in a standard *v*, which is vertically adjustable in the bed or support *k* by means of an adjusting-screw *w*, which is engaged with the lower end of said standard, and is provided with a collar *x*, which is adapted to rotate between a shoulder *y* and a cap *z* on a boss or socket *z'* on the bed *k*, as shown in Fig. 6. By rotating the screw *w* the standard *v* may be raised or lowered and the roll *b* moved from or toward the work, as the case may be. The holder *c'* is adjustable lengthwise in the standard *v* by means of the screw *z*². The gears *h* and *i* are in this case bevel-gears.

I do not limit myself to the employment of intermeshing gears of the form shown in Figs. 1, 2, 3, 6, and 9, but may connect the roll and chuck by any other suitable means which will produce the described result. In Figs. 7 and 8 I show a chuck and roll as provided with sprocket-wheels A B, which are connected by a band or chain C.

The periphery of the roll may be interrupted by a groove or recess *b*³ in its central portion, as shown in Fig. 5, said groove dividing the ornamenting portion of the roll into

two parts or bands, so that the ornamentation imparted to the work is similarly divided or separated by an unornamented band.

It will be seen that in all cases the chuck is fixed and the roll revolved about the work. The fixed chuck enables the work to be held more firmly and with less liability of slipping accidentally on the jaws or members of the chuck than if the chuck were rotated, it being practicable to exert a very powerful pressure on the work by the non-rotating parts or members of the chuck.

I claim—

1. In a machine for ornamenting watch-cases and other like articles, the combination of a chuck provided with means for positively holding or clamping the article to be ornamented, an ornamenting roll or knurl arranged to bear on the surface of the article held by the chuck, and a positive connection between the chuck and roll, such as two intermeshing gears affixed the one to the chuck and the other to the roll, the positive connection between said roll and the chuck or holder being such as to insure the proper engagement of the relief-lines of the roll with the indentations made by them in the work during each successive rotation of the roll, as set forth.

2. In a machine for ornamenting watch-cases and other like articles, the combination of a fixed or non-rotating chuck provided with means for positively clamping the article to be ornamented, an ornamenting roll or knurl arranged to bear on the surface to be ornamented, a holder for said roll, adapted to revolve about the chuck, so that the roll has a planetary motion, and a positive connection between said roll and the chuck or holder, such as a gear affixed to the roll and another gear affixed to the chuck, whereby the proper engagement of the relief-lines of the roll with the indentations made by them in the work during each successive revolution of the roll about the work is insured, as set forth.

3. In a machine for ornamenting watch-cases and other like articles, the combination of a non-rotating chuck or holder provided with means for positively clamping the article to be ornamented and an ornamenting knurl or roll arranged to bear on the surface to be ornamented, a holder for the roll, adapted

to revolve about the chuck, the roll rotating on its holder and having a planetary motion, and gears, each having the same number of teeth, attached, respectively, to the chuck and to the roll, whereby the engagement of the relief-lines of the roll with the indentations made thereby in the work is insured during each successive revolution of the roll, as set forth.

4. In a machine for ornamenting watch-cases and other like articles, the combination of a fixed or non-rotating chuck or holder provided with means for positively clamping the article to be ornamented, a gear affixed to said chuck, an ornamenting roll or knurl on which said roll is mounted to rotate, said holder holding the roll in contact with the article held by the chuck and being adapted to revolve about the chuck, thus giving the roll a planetary motion, a gear affixed to said holder and engaged with the gear on the chuck, said gears having the same number of teeth, and means for adjusting said holder toward and from the chuck, as set forth.

5. In a machine for ornamenting watch-cases and other like articles, the combination of a fixed or non-rotating chuck or holder provided with means for positively clamping the article to be ornamented, a gear affixed to said chuck, an ornamenting roll or knurl, a holder adapted to hold the roll in contact with the article held by the chuck, a gear affixed to said holder and engaged with the gear on the chuck, said gears being adapted to cause the synchronous rotation of the roll and chuck, a slide supporting the roll-holder, and a revolving bed supporting said slide and provided with an adjusting-screw, whereby the slide and the holder thereon may be moved to press the roll against the article to be ornamented, the revolving bed and the gears giving the roll a planetary motion about the work, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 11th day of September, A. D. 1890.

CHARLES F. MORRILL

Witnesses:

C. F. BROWN,
A. D. HARRISON.