(No Model.) 4 Sheets—Sheet 1.

A. W. HOFMANN.

METHOD OF AND MEANS FOR ORNAMENTING WATCH CASE BACKS AND COVERS AND OTHER LIKE ARTICLES.

No. 435,836. Patented Sept. 2, 1890.

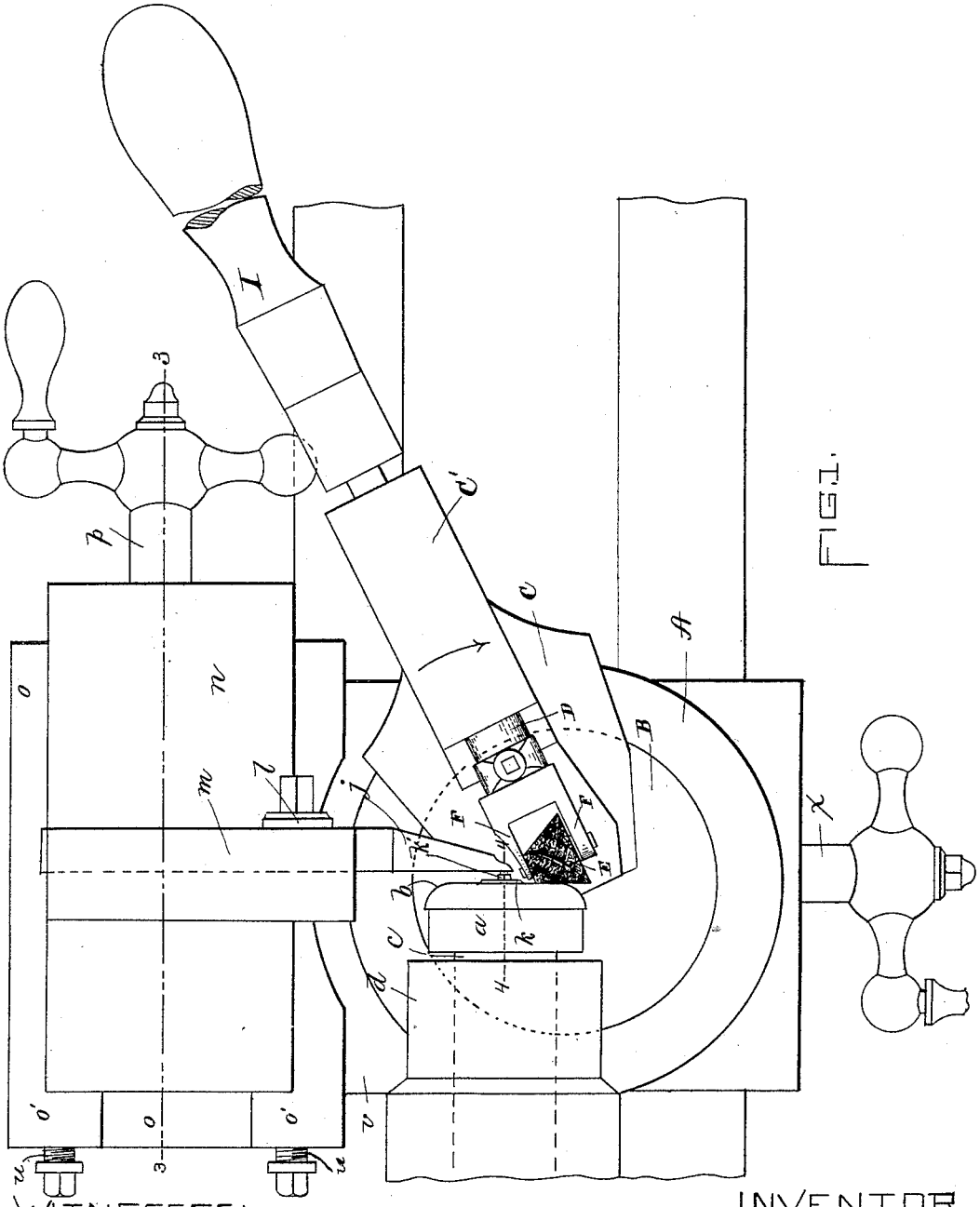


FIG. 1.

WITNESSES:
A. D. Harrison
K. E. Brown

INVENTOR
A. W. Hofmann
by Wright Brown Quinby & Atty.

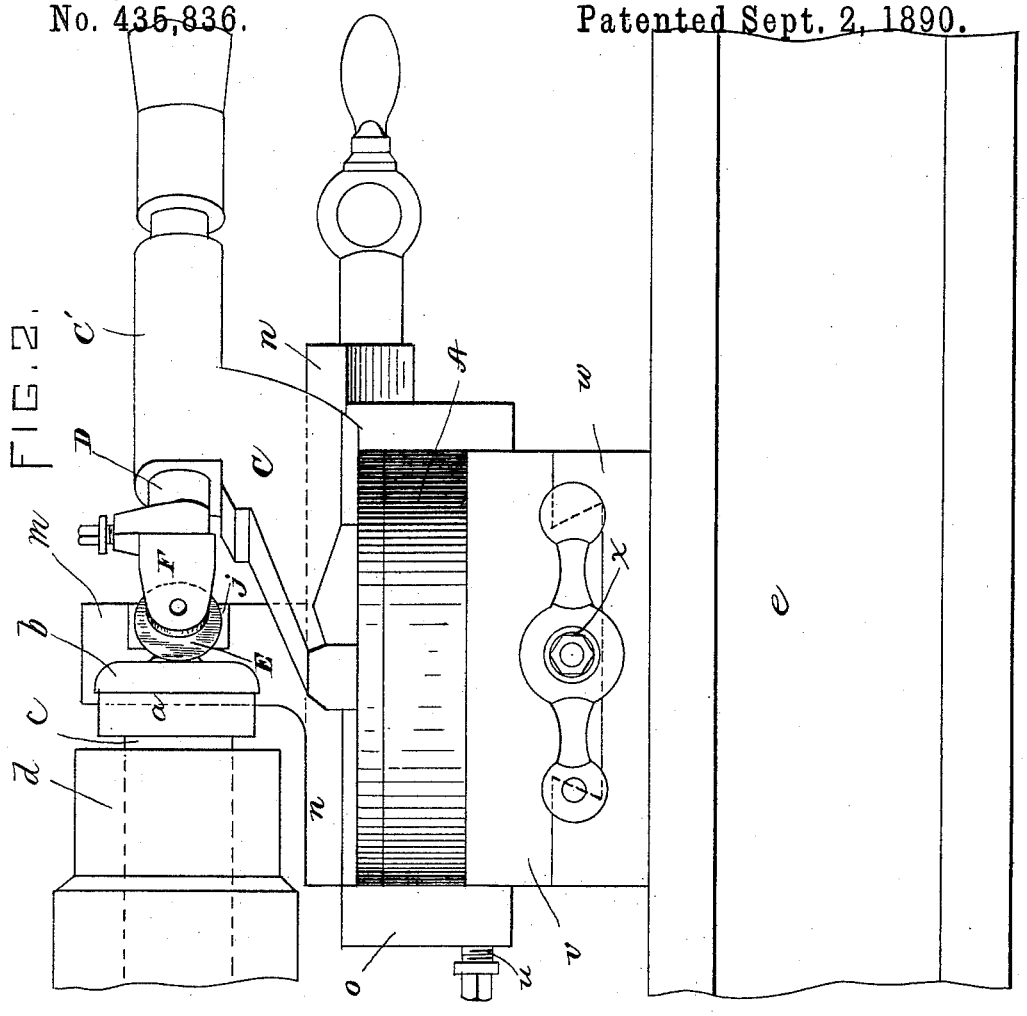
(No Model.) 4 Sheets—Sheet 2.

A. W. HOFMANN

METHOD OF AND MEANS FOR ORNAMENTING WATCH CASE BACKS AND COVERS AND OTHER LIKE ARTICLES.

No. 435,836. Patented Sept. 2, 1890.

FIG. 2.



WITNESSES:
Alex. F. Stewart.
E. L. Smith.

INVENTOR:
A. W. Hofmann
by Wright Brown Quinby & Atty.

(No Model.) 4 Sheets—Sheet 3.

A. W. HOFMANN.

METHOD OF AND MEANS FOR ORNAMENTING WATCH CASE BACKS AND COVERS AND OTHER LIKE ARTICLES.

No. 435,836. Patented Sept. 2, 1890.

FIG. 3.

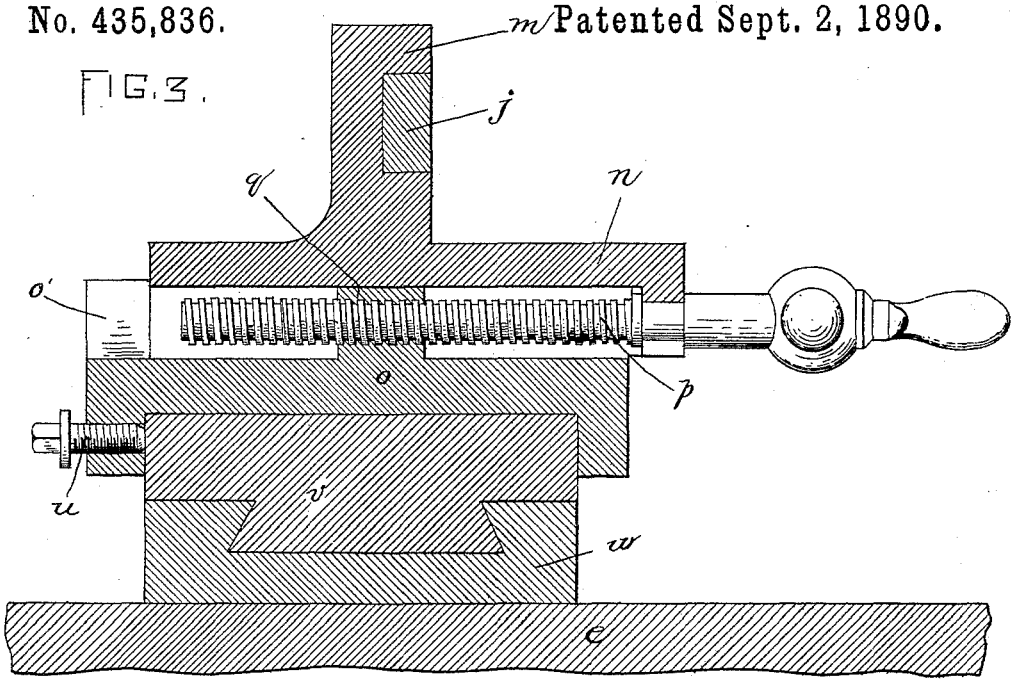
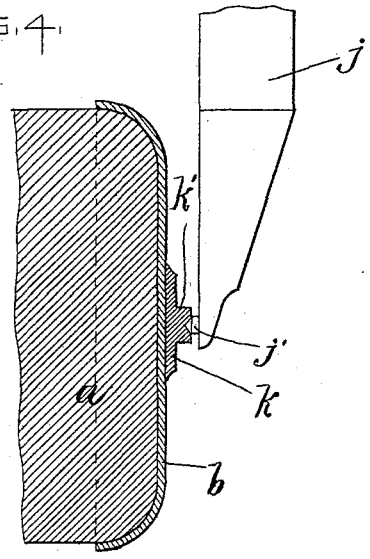


FIG. 4.



WITNESSES:
A. D. Harrison.
H. E. Brown.

INVENTOR:
A. W. Hofmann
by Wright Brown Quinby & Atty.

(No Model.) 4 Sheets—Sheet 4.

A. W. HOFMANN.

METHOD OF AND MEANS FOR ORNAMENTING WATCH CASE BACKS AND COVERS AND OTHER LIKE ARTICLES.

No. 435,836. Patented Sept. 2, 1890.

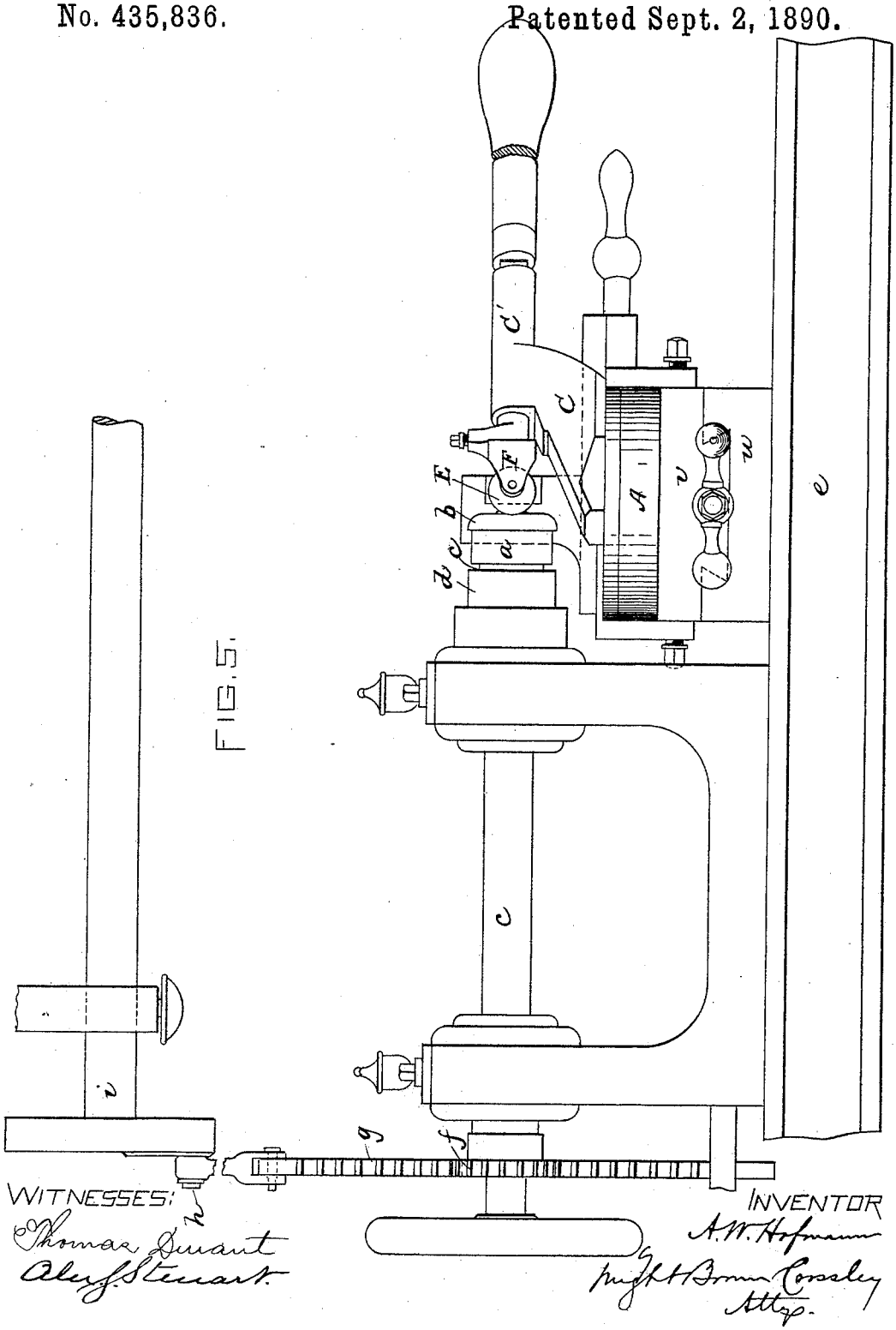


FIG. 5.

WITNESSES:
Thomas Smart
Alex. F. Stewart.

INVENTOR
A. W. Hofmann
by Wright Brown Quinby & Sawyer
Attys.

UNITED STATES PATENT OFFICE.

ADOLPH W. HOFMANN, OF BROOKLYN, ASSIGNOR TO ROBBINS & APPLETON, OF NEW YORK, N. Y.

METHOD OF AND MEANS FOR ORNAMENTING WATCH-CASE BACKS AND COVERS AND OTHER LIKE ARTICLES.

SPECIFICATION forming part of Letters Patent No. 435,836, dated September 2, 1890.

Application filed November 9, 1889. Serial No. 329,726. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH W. HOFMANN, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Methods of and Means for Ornamenting Watch-Case Backs and Covers and other Like Articles, of which the following is a specification.

This invention relates to the ornamentation of watch-case backs or covers by pressing an engraved roll against the work or article to be ornamented and causing the roll to form a circular or annular path of ornamentation extending around the work either by rotating the work on its own axial center and holding the roll at a given point in rolling contact with the work, or by holding the work stationary and revolving the roll about it, the roll being rotated by its contact with the work while revolving about it.

In two applications for Letters Patent filed by me December 31, 1887, Serial Nos. 259,495 and 259,496, I have described a method which involves rotating the work and holding the roll at a given point, the roll having no revolving motion about the work, and in another application filed August 4, 1888, Serial No. 281,921, I have shown means for revolving the roll about the work, the latter being held stationary, the roll being caused in each case to ornament the work in a path that is concentric with the center thereof, said path being widened by a swinging movement of the roll until the entire surface is ornamented. The motion which causes the roll to form said circular path of ornamentation is described in said applications, as alternating—that is, progressing first in one direction and then in the opposite direction—the movement in each direction being sufficient to cause the roll to form a continuous circular path of ornamentation around the work. The object of the alternating rotary motion is to enable the roll to make sufficiently deep indentations in the work by being held at the same point until its action on the same portion of the path of ornamentation has been repeated several times, the alternating motion enabling the relief-lines of the roll to remain in engagement with the indentations made thereby in the work, so that at each pass or movement of the work the roll deepens the indentations made during the preceding pass until the ornamentation is sufficiently deep. If the rotary motion of the work were continuous or always in the same direction, there would be much liability of failure of the relief-lines of the roll to coincide with the initial indentations made in the work after the first complete rotation, and in the event of such failure the ornamentation would be destroyed.

In my former applications above referred to the ornamenting-roll is shown as adapted for the ornamentation of the crowning peripheries of watch-case centers, the roll being cylindrical and of uniform diameter from end to end. The present invention relates particularly to the ornamentation of surfaces such as the sides of watch-case backs in which the surface to be ornamented or a part thereof extends substantially at right angles with the axis or center of the motion that causes the roll to make the circular path of ornamentation, so that a cylindrical roll of uniform diameter such as is shown in my former applications cannot be used, because such a roll when held against the side of a case-back with its axis substantially at right angles with the axis of rotation of said back would slip on parts of the surface of the work and thus mar or destroy the ornamentation.

My invention therefore consists, first, in the employment of a conical or tapering roll or preferably formed as a cone frustum, the apex of which if continued would be at the center of the surface to be ornamented when one side of the roll is in operative relation to said surface, so that the roll will indent the surface and form the path of ornamentation thereon without slipping upon said surface.

The metal of watch-case backs is usually so thin that its area is extended by the pressure of the conical ornamenting-roll against it; and my invention has for its further object to prevent the displacement of the metal caused by its extension or the enlargement of its area from distorting the back or disk-shaped piece of work while it is being ornamented. The invention therefore consists, also, in clamping the center of the work firmly to the chuck, leaving its marginal portion free to expand or creep outwardly under the pressure of the

conical ornamenting-roll and then applying said roll first to the portion of the work immediately adjoining the clamped center and moving the roll to carry its place of contact with the work outwardly as the operation progresses, the work being given at the same time an alternating rotary motion, so that the path of ornamentation widens outwardly from the center, and the metal displaced by the ornamenting action creeps outwardly to the free margin of the work, the extension of the area of the work being thus permitted without causing the work to bulge or buckle, as it would do if rigidly confined at its margin.

The invention also consists in the improved means for clamping the central portion of the work and for supporting the ornamenting-roll, all of which I will now proceed to describe.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a portion of the lathe spindle or chuck which supports and rotates the work, together with the work-clamping devices, the ornamenting-roll, and the means for supporting and moving said roll. Fig. 2 represents a side elevation of the parts shown in Fig. 1. Fig. 3 represents a section on line 3 3, Fig. 1. Fig. 4 represents an enlarged section on line 4 4, Fig. 1. Fig. 5 represents a side elevation of the mechanism shown in Figs. 1 and 2 with mechanism for reversely rotating the work-support.

The same letters of reference represent the same parts in all the figures.

In the drawings, *a* represents a chuck or spindle, which is formed to support the inner or concave side of a watch-case back *b*, and is attached to a shaft *c*, which is journaled in bearings *d*, supported by the bed or supporting-frame *e*. Means are provided for giving said spindle an alternating rotary motion, such means being, for example, a pinion *f*, affixed to the shaft *c*, and a rack *g*, which is suitably connected to an eccentric wrist-pin *h* on a driving-shaft *i*, as shown in Fig. 2, and in my prior application above referred to. The chuck is simply a solid support for the inner surface of the case-back *b* or other work to be ornamented, and is not constructed to grasp and rigidly hold said back unaided. The back is confined upon the chuck by means of a rigidly-supported adjustable arm *j*, having a projection or pivot *j'*, and a clamping plate or button *k*, having a step or socket *k'*, which receives said pivot, and is held thereby against the outer surface of the back *b* at the center of the latter, the pivot *j'* being on the axial line of the chuck, so that the clamping plate or button *k* is free to rotate with the chuck and back. The arm *j* is attached by a set-screw *l* to a post *m* on a slide *n*. Said slide is adjustable in a direction parallel with the axis of rotation of the chuck, so that the arm *j* can be moved toward and away from the chuck to clamp and release the back. The slide is fitted to move between dovetail guides *o' o'* in a supporting-base *o*, and is provided with a screw *p*, which is engaged with a nut *q*, formed on said base, Fig. 3, so that the rotation of the screw moves the slide *n* and the arm *j* and adjusts the latter, as above described. The arm *j* is capable of exerting sufficient pressure on the clamping plate or button *k* to enable the latter to clamp the central portion of the back *b* so firmly against the chuck *a* as to keep the back operatively engaged with the chuck, so that the back will necessarily rotate with the chuck. The back is, however, thus clamped only at its central portion, its marginal portion being free to expand or be extended by the action of the ornamenting-roll, as hereinafter described.

The supporting-base *o* is attached by screws *u u* to a slide *v*, which is fitted to move at right angles with the axis of the chuck in guides on a bed-piece *w*, which is securely affixed in any suitable way to the lathe-bed *e*, and is adjustable by a screw *x*, journaled in the slide *v*, and suitably engaged with the bed-piece *w*, so that by its rotation it will adjust the slide *v* and the parts carried thereby.

To the slide *v* is rigidly affixed a circular socket A, in which is fitted to rotate freely a horizontal circular plate B. To said rotary plate is attached an arm C, having a horizontal socket *c'*, through which passes a longitudinally-movable stud D.

E represents the ornamenting-roll, the periphery of which is tapering, and is here shown as a frustum of a cone, engraved with the design to be imparted to the back *b*, the proportions of the roll being such that when it is held in operative relation to the work, as shown in Fig. 1, the apex of the cone if continued would be at the center of rotation of the work. Said roll is journaled in ears F F at one end of the stud D, and is adapted to be pressed by said stud against the back *b*. The arm C and stud D are adapted to move horizontally in the arc of a circle, the plate B, to which said arm is attached, permitting such movement, so that the roll E can be first held in the position shown in Fig. 1 with its periphery in contact with the back at a point in close proximity to the clamping plate or button *k*, and can then be moved to cause its periphery to act on the curved marginal portion of the back *b*.

In practice with the apparatus organized as here shown and described, after the back *b* has been clamped to the chuck and the alternating rotary motion has been imparted to the chuck, the operator holding the roll E in the position shown in Fig. 1 by means of the handle I, attached to the stud D, presses the roll against the back, and thus causes the relief-lines of the roll to sink into the back and form an annular path of ornamentation close to the clamping plate or button *k*, the roll being held in one position until the ornamentation is sufficiently deep. The position of the roll is gradually changed by swinging the arm

C in the direction indicated by the arrow in Fig. 1 until the path of ornamentation is widened to the margin of the case. The displacement of metal by the compressing action of the ornamenting-roll is entirely outward, or from the center toward the margin, and as the margin is unconfined there can be no distortion of the back, which would tend to separate it from the chuck, the back being kept in close contact with the chuck and only changed by the slight enlargement of the circle of its margin.

I do not limit myself to the employment of the conical or tapering ornamenting-roll in connection with means for rotating the work, as the roll may be given a revolving motion about the work by any suitable means. Neither do I limit myself to the use of said roll in connection with means for centrally clamping the work, as I may use it in connection with any other suitable work holding or clamping devices.

It is obvious that the advantages resulting from the employment of a conical roll as the means of forming a circular path of ornamentation on a surface which is substantially at right angles with the axis or center of the motion which causes the roll to make said path—viz., the freedom from liability of the roll to slip on and mar the surface being ornamented—would be the same if the said motion were continuous instead of alternating. Hence I do not limit myself to the use of a conical roll in connection with an alternating movement of the work or of the roll.

Although I have not here shown means for imparting an alternating motion to the roll to carry the same back and forth about the work, yet it is obvious that the mechanism shown in my above-named application, No. 281,921, filed August 4, 1888, can be readily adapted to carry a conical roll.

I claim—

1. The combination, with a support for a watch-case back or other like article to be ornamented, of means for giving an alternating reciprocating motion to said article to be ornamented, a conical or tapering ornamenting-roll, and means for pressing said conical roll against the article to be ornamented, and for imparting rocking motion to said roll while it is held pressed in contact with said article, substantially as described.

2. The improved method, hereinbefore described, of ornamenting watch-case backs and other articles of like form, the same consisting in presenting a conical or tapering ornamenting-roll to said articles, causing the roll to form a circular path of ornamentation by an alternating motion either of the roll or of the article being ornamented, and rocking the roll while in contact with said article to widen the path of ornamentation, as set forth.

3. The improved method, hereinbefore described, of ornamenting watch-case backs and like disk-shaped articles, the same consisting in clamping the said article at its center only to a supporting-chuck, leaving the marginal portion unconfined, rotating the chuck and the back clamped thereon, and pressing an ornamenting-roll against the back, beginning at a point in close proximity to the center of the back and moving the roll to carry its point of contact with the back outwardly from the center to or toward the margin, as set forth.

4. The combination of the chuck or work-support, a clamping plate or button formed to bear upon the outer surface of a piece of work on said chuck, a pivot engaged with said plate, and means for exerting pressure through said pivot on said clamping-plate, as set forth.

5. The combination of the chuck or work-support, a clamping plate or button formed to bear on the outer surface of a piece of work on said support, a movable arm having a pivot engaged with said plate, and means for adjusting said arm and holding it at any position to which it may be adjusted, as set forth.

6. The combination of the chuck or work-support, the clamping plate or button, the arm *j*, having a pivot or projection engaged with said plate, the slide *n*, having a post supporting said arm, and the adjusting-screw engaged with said slide and with the support on which the latter bears, as set forth.

7. The combination of the chuck or work-support, means for securing a watch-case back or other like article thereto, the slide *v*, adjustable at right angles to the axis of rotation of the chuck, a socketed arm affixed to a supporting plate or base which is fitted to rotate in a socket on said slide, a stud supported by and movable in said arm, and an ornamenting-roll journaled in ears on said stud, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of November, A. D. 1889.

ADOLPH W. HOFMANN.

Witnesses:
J. E. SEARING,
C. H. WALKER.