(No Model.)

F. W. WETHERBEE.

MACHINE FOR ENAMELING THE FACES OF WATCH DIALS.

No. 512,136. Patented Jan. 2, 1894.

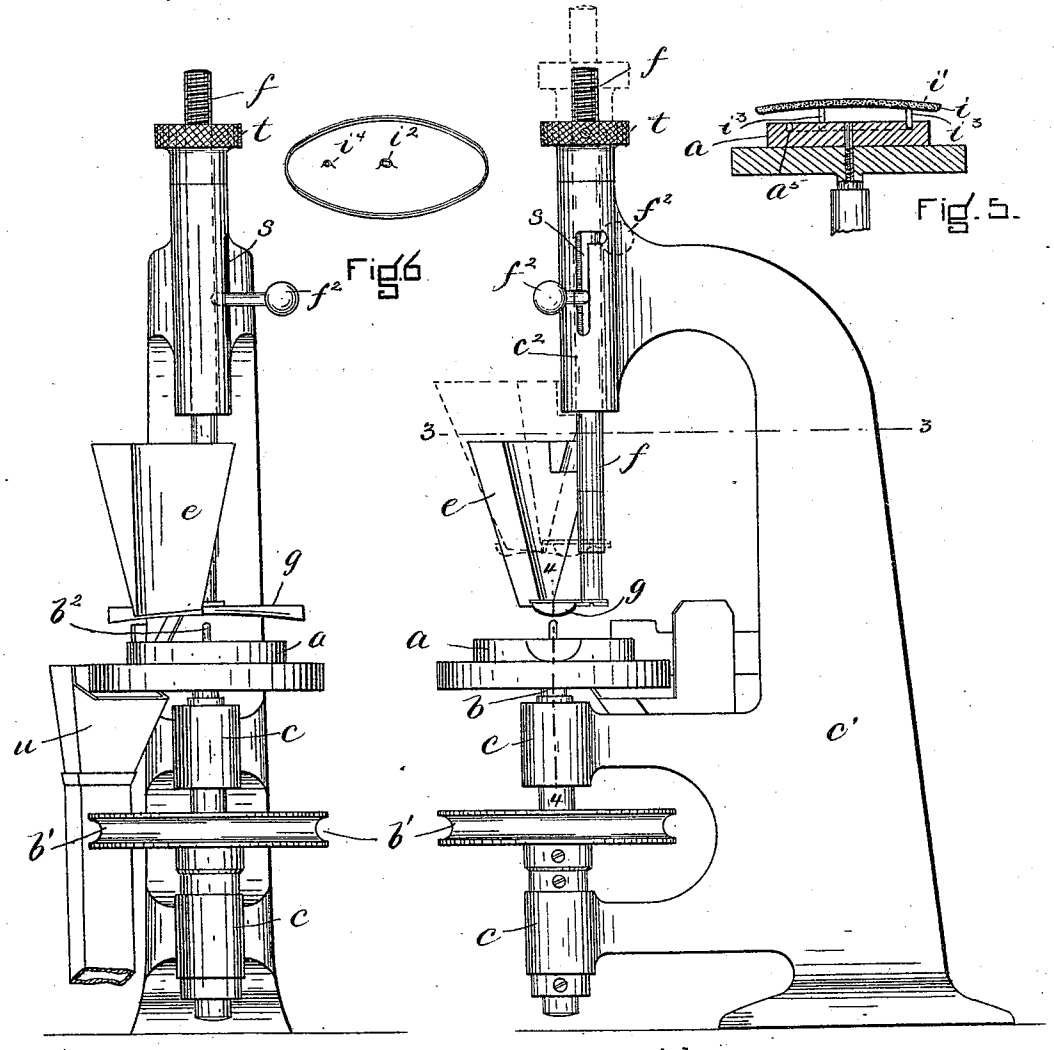

Fig. 1.

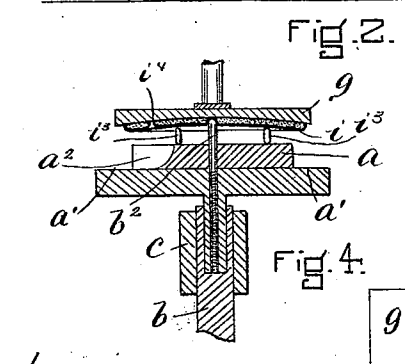

Fig. 2.

Fig. 6.

Fig. 5.

Fig. 4.

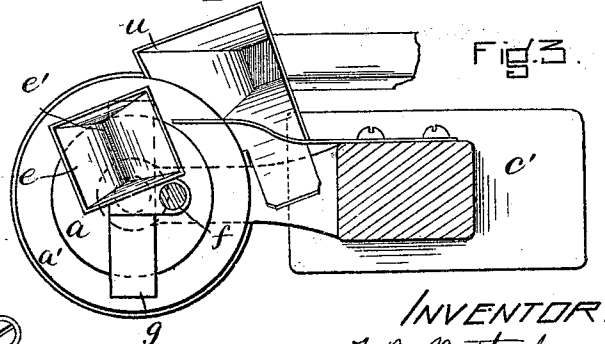

Fig. 3.

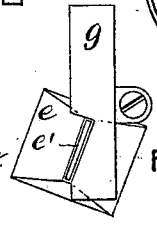

Fig. 7.

WITNESSES.

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FRANK W. WETHERBEE, OF WALTHAM, MASSACHUSETTS.

MACHINE FOR ENAMELING THE FACES OF WATCH-DIALS.

SPECIFICATION forming part of Letters Patent No. 512,136, dated January 2, 1894.

Application filed August 27, 1891. Serial No. 403,857. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. WETHERBEE, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Enameling the Faces of Watch-Dials, of which the following is a specification.

This invention has for its object to provide a simple and effective machine for applying powdered enamel to the faces of the sheet-metal disks which constitute the backs of watch dials, and it consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of my improved enameling machine. Fig. 2 represents a front elevation of the same. Fig. 3 represents a section on line 3 3 of Fig. 1, and a top plan view of the parts below said line. Fig. 4 represents a section on line 4 4 of Fig. 1, showing the dial back and its coating of enamel. Fig. 5 represents a sectional view of the dial back and its coating, and the support on which it rests during the coating operation. Fig. 6 represents a perspective view of the dial back, before the same is coated. Fig. 7 represents a bottom plan view of the former and of the enamel receptacle.

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

Watch dials are composed of a disk of sheet copper of circular form provided with an upwardly-turned rim at its margin, and an upwardly-turned sleeve surrounding the hole at its center, and a coating of enamel placed upon the upper surface of said disk and secured thereto by fusing the enamel. The sheet-metal disk is technically known as the "copper," and for the sake of convenience I shall so designate it in this specification.

Various methods have been adopted for applying the powdered enamel to the copper, it being desirable to apply a uniform quantity to each copper, so that the dials may be of uniform thickness. A common method has been for a workman to hold the copper in one hand and with the other hand manipulate a spatula by which the powdered enamel, converted into a paste by the mixture of water, is spread upon the copper as evenly as may be. This method is objectionable owing to the difficulty of obtaining uniformity in the amount of enamel spread upon the different coppers, and of even distribution over the entire surface. Another method is disclosed in Letters Patent No. 452,150, granted to the American Waltham Watch Company, May 12, 1891; said method consisting in holding a number of coppers with their faces upward in a horizontal position under a sieve containing a supply of powdered enamel, and agitating the sieve by giving it a predetermined number of blows to cause a predetermined quantity of enamel to fall upon the upper surface of the coppers. The last-named method, while an improvement on the first, is not sufficiently accurate and rapid, and does not leave the upper surface of the body of enamel in as smooth and firm a condition as is desirable.

In carrying out my present invention I mount a copper face upward upon a rotating table, the center of the copper being at the center of rotation of the table, and while the copper is being rapidly rotated I discharge upon its upper surface a quantity of dry powdered enamel, and at the same time pack and mold the upper surface of the deposit by means of a stationary former which is arranged over the rotating copper, said former giving the upper surface of the deposit of enamel the desired slightly convex form.

Referring to the drawings: *a* represents the bed or table which is affixed to a vertical shaft *b* journaled in bearings *c c* on a frame or standard *c'* which is suitably affixed to a bench or table. The shaft *b* is provided with a pulley *b'* upon which runs the driving belt which rotates the shaft and bed.

e represents a receptacle or hopper for the powdered enamel, said receptacle being located above the bed *a* and suitably affixed to a vertically movable bar *f* which is adapted to slide in a vertical guide or socket c^2 on the standard *c'*.

g represents a former or templet which is affixed to the bar *f*, and extends horizontally across the bed *a*, its center being directly over the center of said bed. The under side of the former or templet *g* is of concave form, as shown in Figs. 2 and 4, and is arranged so that when a copper *i* is placed upon

the bed a, and a supply of powdered enamel is poured upon the upper surface of the copper, said former will distribute the enamel over the upper surface of the copper, and will form a convex surface on the deposit i' of enamel.

The enamel receptacle e is arranged in close proximity to the former g, and is preferably of tapering form, as shown in Figs. 1, 2 and 3, said receptacle or reservoir e having a narrow slit or mouth e' at its lower end arranged to discharge enamel upon the upper surface of the copper i at a point in close proximity to the former g.

The copper i is provided with the usual central opening i^2 (Fig. 6) which receives a stud or pin b^2 affixed to and projecting upwardly from the bed a, said pin being at the center of the bed, and by its engagement with the opening i^2 holding the copper central upon the bed.

The operation of the described mechanism is as follows: A copper i to be enameled is placed upon the bed a, the usual feet i^3 on the back of the copper resting upon the upper surface of the bed, while the central opening i^2 is placed upon the pin b^2. A charge of enamel sufficient for one coating is placed in the reservoir e. Said reservoir and the presser g are adjusted so that the presser is at the required height above the upper surface of the copper to impart the exact thickness desired to the deposit of enamel. The copper being now rotated, the enamel flows from the narrow mouth of the receptacle e upon the copper, and is spread thereon both by the rotary motion of the copper and by the action of the former g, said former and the reservoir remaining stationary during the operation. It will be seen that the former acts to stroke and compress the deposit of enamel, and to impart thereto a convex upper surface, as shown in Figs. 4 and 5. It may here be remarked that the convexity of the copper and of the enamel coating, and the convexity of the former, are somewhat exaggerated in the drawings, the actual curvature being in practice considerably less than is here shown. The quantity of enamel supplied to the reservoir e is such that the supply will be exhausted directly after the deposit has reached the desired thickness, and has been formed as described by the former, allowance being made for the waste occasioned by the overflowing of the enamel from the margin and through the orifices of the copper, the latter having the usual orifice i^4 for the arbor of the seconds hand. As soon as the operator observes that all the enamel has escaped from the reservoir, and that the top of the deposit has been properly formed, he raises the former and reservoir by means of a handle f^2 attached to the bar f, and supports said parts in the raised position indicated by dotted lines in Fig. 1, by turning the handle f^2 into the horizontal upper end of a plate s formed in one side of the socket c^2. The former and reservoir are thus sufficiently removed from the bed a to permit the raising and removal of the copper and its formed deposit of enamel, the same being afterward inserted in a furnace for firing. After another copper has been placed upon the bed a the bar f is turned to permit the reservoir and former to descend to their operative position, which is determined by means of an adjustable nut t affixed to the screw-threaded upper end of the bar f, said nut being adjusted to permit the former to descend to any desired height above the copper, so that the thickness of the deposit formed upon the copper may be varied by adjusting the nut t.

The bed a is preferably provided with a recess a^2 under the orifice i^4 in the copper, said recess receiving the enamel that escapes through said orifice i^4. The enamel falling through said orifice and over the margin of the copper accumulates on the upper surface of a flange a' surrounding the bed a, and may be brushed from said flange into a fixed hopper u which conveys the waste enamel into a suitable receptacle.

In Fig. 4 I show the feet i^3 of the copper resting directly upon the upper surface of the bed a, while in Fig. 5 I show said bed as provided in its upper surface with an annular groove a^5 to receive said feet, said groove being used when there is no central opening i^2 in the copper to receive the central stud b^2, the copper being held in a central position by the engagement of its feet with the groove a^5, which is concentric with the axis of rotation of the bed.

I do not limit myself to the rotating table or support a and stationary former or templet g, as arranged, but may make the table a stationary and the templet or former g rotatable without departing from the spirit of my invention.

I claim—

1. In a dial enameling machine, the combination with a dial holder of an enamel spreader and former located above and extending entirely across said dial holder and adapted to shape a deposit of enamel thereon, one of said parts being adapted to rotate, and mechanism for rotating the same, substantially as set forth.

2. A rotary bed or table adapted to support a dial copper, combined with a non-rotary enamel reservoir located above said bed, and a non-rotary former or templet also located above the bed, as set forth.

3. A rotary bed or table adapted to support a dial copper, combined with a former located over said bed, and means for raising and lowering said former, as set forth.

4. A rotary bed or table adapted to support a dial copper, combined with a former located over said bed, means for raising and lowering said former, and an adjustable stop to limit the downward movement of the former and

regulate the thickness of a deposit of enamel shaped on the copper by said former, as set forth.

5. A rotary bed or table adapted to support a dial copper, combined with an enamel reservoir and a former, both located above said bed, a vertically movable bar supporting said reservoir and former, a stop to arrest said bar in an elevated position, and an adjustable stop to determine the depressed position of the bar and former, as set forth.

6. The combination of the bed, the former adapted to shape a mass of enamel deposited on a copper on the bed, and a receptacle arranged to receive the surplus enamel from said bed, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 22d day of August, A. D. 1891.

FRANK W. WETHERBEE.

Witnesses:

GEORGE F. BALLORD,

ROBERT M. STARK.