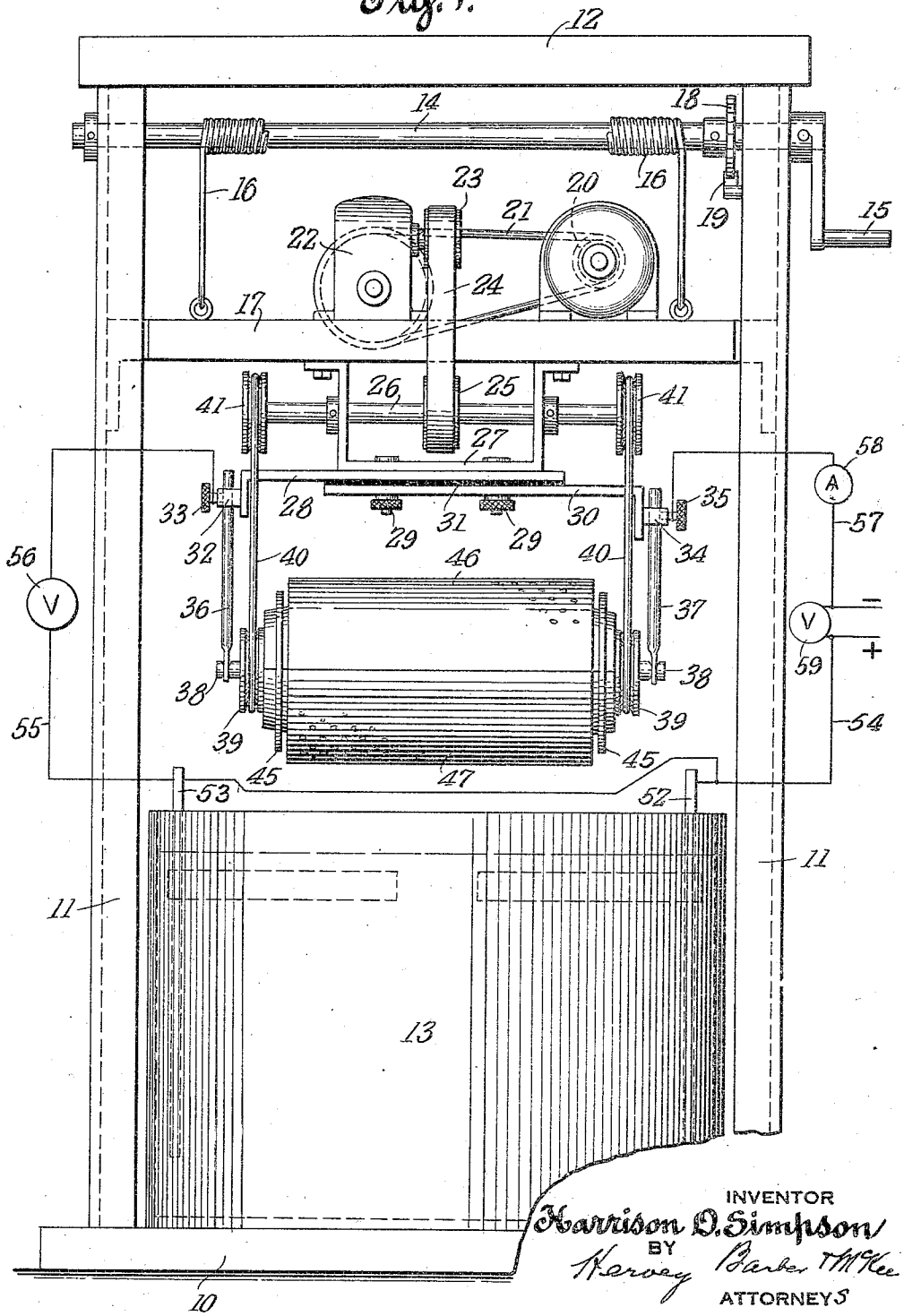
March 8, 1932. H. D. SIMPSON 1,848,391

TUMBLING DEVICE FOR ELECTROPLATING

Filed Jan. 29, 1929 2 Sheets-Sheet 1

Fig. 1.




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Filed Jan. 29, 1929 2 Sheets-Sheet 2

Fig. 2.

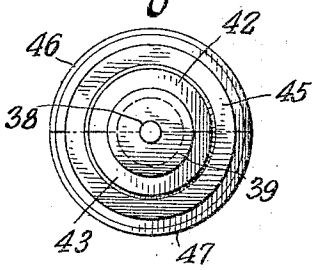



Fig. 3.

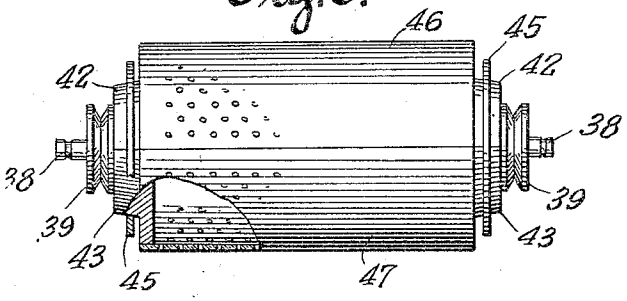



Fig. 4.

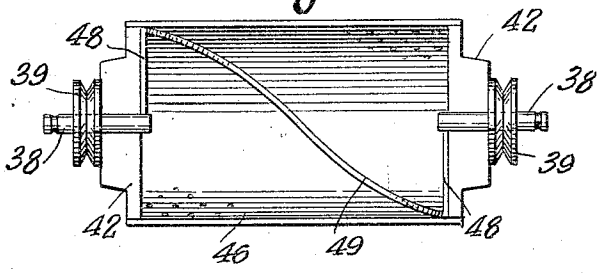
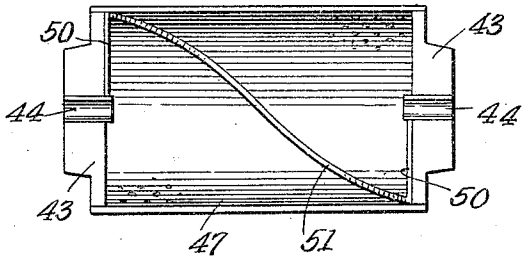



Fig. 5.




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Patented Mar. 8, 1932 1,848,391

# UNITED STATES PATENT OFFICE

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## TUMBLING DEVICE FOR ELECTROPLATING

Application filed January 29, 1929. Serial No. 335,890.

This invention relates to apparatus used in electrically depositing a coating of one metal upon articles made of another metal, the process being commonly called electroplating.

The present invention is specially appropriate for depositing the more precious metals, as gold, platinum, etc., upon small objects, such as finger rings, buttons, medals and like articles of jewelry made of less valuable material.

As such, the apparatus can be made in a small unit comprising a substantially non-metallic container for the articles to be plated, thus presenting a minimum of metallic surface to take a deposit from the chemical solution held in the tank in which the container is submerged, and the tank is also materially reduced in size from that commonly employed.

One object of the invention is to provide a barrel container made in two equal longitudinal parts which may be easily and expeditiously united or separated, thus rendering the contents readily entered and accessible, and in which the few metal parts are removable for replacement and refining to recover the plating which may have been deposited.

A further feature is in the means for supporting the barrel and conveying rotary motion to it without permitting working metallic parts to enter the bath.

Another purpose is to provide for current voltage measurement in the barrel rather than at the lead-in conductor so that the true condition of the current at its point of application can be ascertained.

These and analogous objects, which will presently appear, are accomplished by the novel construction, combination and arrangement of parts, hereinafter described and shown in the accompanying drawings, constituting an important part of this disclosure, and in which:

Figure 1 is a front elevational view showing an operative embodiment of the invention.

Figure 2 is an end view of the barrel.

Figure 3 is a side elevational view of the same partially broken away to show the formation.

Figure 4 is a plan view of one side of the barrel.

Figure 5 is a similar view showing the other side thereof.

As shown in Figure 1 the apparatus consists of a platform base 10 having two uprights 11, preferably of channel cross section, united at the top by a cross bar 12, and disposed on the base is a tank 13, of any preferred shape and capable of containing the chemical solution or bath by which plating is accomplished.

Rotatably mounted in the uprights 11, just below the cross bar 12, is a shaft 14, its extending ends being respectively provided with a collar and manually operable handle 15.

Fixed to the shaft are the ends of two spaced apart flexible cords 16 capable of being wound thereon, their free ends engaging in eyes set in a narrow platform 17 guided at its ends within the inreaching flanges of the uprights 11.

In order to support the weight of the platform and elements carried by it, a ratchet wheel 18 is fixed on the shaft 14 and provided with a detent 19 arranged to be turned out of the way when not required.

Mounted on the platform 17 is a motor 20, driving, by means of a belt 21, a speed reduction device 22, the driven pulley 23 of which conveys a relatively slow rotary motion, by the belt 24 and pulley 25, to a shaft 26 mounted in a double bracket 27 held suspended from the under side of the platform 17.

Held against the lower face of the bracket 27 is a bar 28, adjustable lengthwise therealong and clamped by a pair of binding screws 29.

A similar bar 30 is held in like manner by the same screws and interposed therebetween is a strip of insulation 31.

Both bars 28—30 are bent at right angles downwardly at their outer ends and fixed to these ends are lugs 32 and 34 respectively, the lugs being drilled and provided with hand clamp screws 33 and 35.

These screws impinge upon rods 36 and 37,

slidable in the lugs at their upper ends and being flattened at their lower ends, which are drilled or slotted to receive the pintles 38 of the tumbling barrel described hereinafter.

Fixed on the pintles are grooved pulleys 39 driven by belts 40 from corresponding pulleys 41 on the opposite ends of the shaft 26, which, as has been seen, is driven at a slow rate of speed by the motor 20.

It may be stated here that the rods 36—37 merely maintain the belts 40 in suitable driving tension and do not act as supports for the barrel, the weight of which is taken by the belts.

The tumbling barrel, shown in detail in Figures 2 to 5, includes a pair of semi-cylindrical heads 42—43 at each end, each having outstanding semi-conical projecting ends.

The half heads 42 have fixed axially in them the pintles 38, carrying the pulleys 39, and are grooved annularly to engage the ends of the rods 36—37 by which they are guided.

The opposite half heads 43 have fixed in them half bushings or sleeves 44 to receive the exposed portions of the pintles 38 therein, the face portions of the heads making intimate contact when the barrel is assembled.

These half heads, which are preferably made of wood or some other non-metallic material, are held when assembled by bands 45 forced over the conical portions of the heads, these bands being relatively narrow and of such diameter as to permit the entrance of a lever bar between them and their flanged portions when it is desired to disconnect the barrel sections.

The flanged portions of the half heads have attached to them semi-cylindrical, perforate casings 46—47, through which liquid may easily flow, these casings, like the heads being non-metallic.

Fixed on the inner surfaces of the heads 42, to extend in opposite directions, are conductor strips 48 connected at their ends by wires 49 arranged sinuously against the casing 46, the strips being in contact with the pintles 38.

In a similar manner corresponding strips 50, in contact with the sleeves 44, extend through the casing to be connected by a wire 51.

Within the tanks 13 are any preferred number of anodes 52—53, receiving current from a lead-in wire 54, connected by a wire 55 to the binding screw 33.

A voltmeter 59 is shunted between the positive and negative line wires to measure the potential before entering the apparatus, and an ammeter 58 is connected between the binding screw 35 and the lead-out wire 57, to measure the current passing through the entire circuit.

Another voltmeter 56, is connected in the circuit by a wire 55, connected to the positive circuit, and by another wire to the contact screw 33, the current passing through binding post 32, rod 36, pintle 38, to the contact wires 48 and 49, which are in the negative circuit. The object of this second voltmeter is to measure the drop in potential between the rod 37, and the pintle 38, which is readily ascertained by comparing it with voltmeter 59. Thus the effective voltage between the articles in the bath and the anodes can be ascertained. It is important to know this voltage as it controls the quality of the deposit in all plating work.

In operation the bars 28—30 are adjusted to suit the length of the barrel to be used, the barrel supplied with the articles to be plated and thereafter firmly secured by the bands 45, whereupon they are adjusted as plainly indicated in Figure 1.

By lowering the platform 17 and its several attached parts, by turning the handle 15, the barrel with its contents is easily lowered so that its lower portion enters below the surface of the plating bath.

Upon starting the motor 20, the barrel will be slowly rotated, causing its contents to be subjected to the bath and an electric current of suitable voltage passed through the articles to deposit a coating of any desired degree in accordance with the time period of immersion.

It is to be noted that the pintles 38, sleeves 44, and lower ends of the conductor bars 36—37, together with the connections inside the barrel, only are subjected to possibly receive a coating, thereby reducing loss of metal and efficiency to a minimum, and that the plating may be recovered from these parts by means commonly employed.

Due to the arrangement of the voltmeter the actual effective fall of potential at its point of application is readily ascertained at all times.

As the barrel is constantly rotated the resultant effect upon the articles undergoing treatment is unusually uniform and satisfactory.

It is further apparent that the simplicity of the apparatus is such that no difficulty should be encountered in its operation, even by unskilled labor.

Although I have described my improvements with considerable detail and with respect to certain particular forms of my invention, I do not desire to be limited to such details since may changes and modifications may well be made without departing from the spirit and scope of my invention in its broadest aspect.

Having thus described the invention, what is claimed as new and desired to secure by Letters Patent, is:—

1. In an electro-plating apparatus, an article container comprising a barrel made of non-conducting material, heads fixed in said barrel and having conical extensions, the

walls and heads being split longitudinally to produce to equal sections and said walls being perforate, rigid bands engageable on said conical extensions to unite the sections, pintles extending from said heads, pulleys on the pintles, guides for the pintles, and belts to drive said pulleys, said belts also supporting the barrel.

2. In an electroplating apparatus, an article container comprising a barrel having outstanding conical heads, said barrel being composed of two equal longitudinal sections, bands on said conical heads constraining the sections as a unit, all of said elements being wholly composed of con-conducting material, metal pintles fixed axially in said heads, metal guides for the pintles, said guides being in an electric circuit, means for conducting current between said pintles through the barrel, and combined means for supporting and rotating the barrel.

3. In an electroplating apparatus, an article container comprising a sectional barrel wholly composed of non-conducting material and having perforate walls, removable means for clamping the sections of said barrel together, metallic pintles passing through the heads of said barrel, metallic guides for the pintles, conductors carried by said heads in contact with the pintles, said conductors reaching within the barrel from one pintle to the other, and flexible supports for said barrel engaging said pintles, said supports being operative to convey rotary motion to the barrel.

4. An electro-plating apparatus comprising a base having a pair of uprights, a tank on said base, a platform guided by said uprights, a tumbling barrel for articles to be plated, motor driven means on the platform including a belt drive at each end of the barrel to cause its rotation, said belt drives acting to support the barrel, manual means for raising and lowering the platform and barrel relative to said tank, and means for conducting an electric current through said tank and barrel.

5. An electro-plating apparatus comprising a base having a pair of uprights, a tank on said base, a platform guided by said uprights over the tank, a perforate tumbling barrel to contain the articles to be plated, said barrel being wholly made of non-conducting material, a motor driven shaft having supports carried by said platform, belt connections between said shaft and barrel ends, said connections supporting the barrel, insulated bars on the shaft support, guide rods for said barrel adjustable in said bars, manual means for raising and lowering the platform and barrel relative to said tank, and means for conducting an electric current through said tank and barrel.

6. An electro-plating apparatus comprising a base having a pair of uprights, a tank on said base, a platform guided by said uprights over the tank, a perforate tumbling barrel to contain the articles to be plated, said barrel being wholly made of nonducting material, a motor driven shaft on said platform, belts connecting said shaft and barrel ends to convey rotary motion and support the barrel, a winch to raise and lower said platform relative to the tank whereby said barrel may be immersed in plating bath in said tank, anodes in said bath, said anodes, bath and barrel being in series in same electric circuit, and a voltmeter disposed in shunt circuit between anode and barrel.

In testimony whereof I have hereunto affixed my signature.

HARRISON D. SIMPSON.