

No. 680,408.

Patented Aug. 13, 1901.

S. O. COWPER-COLES.

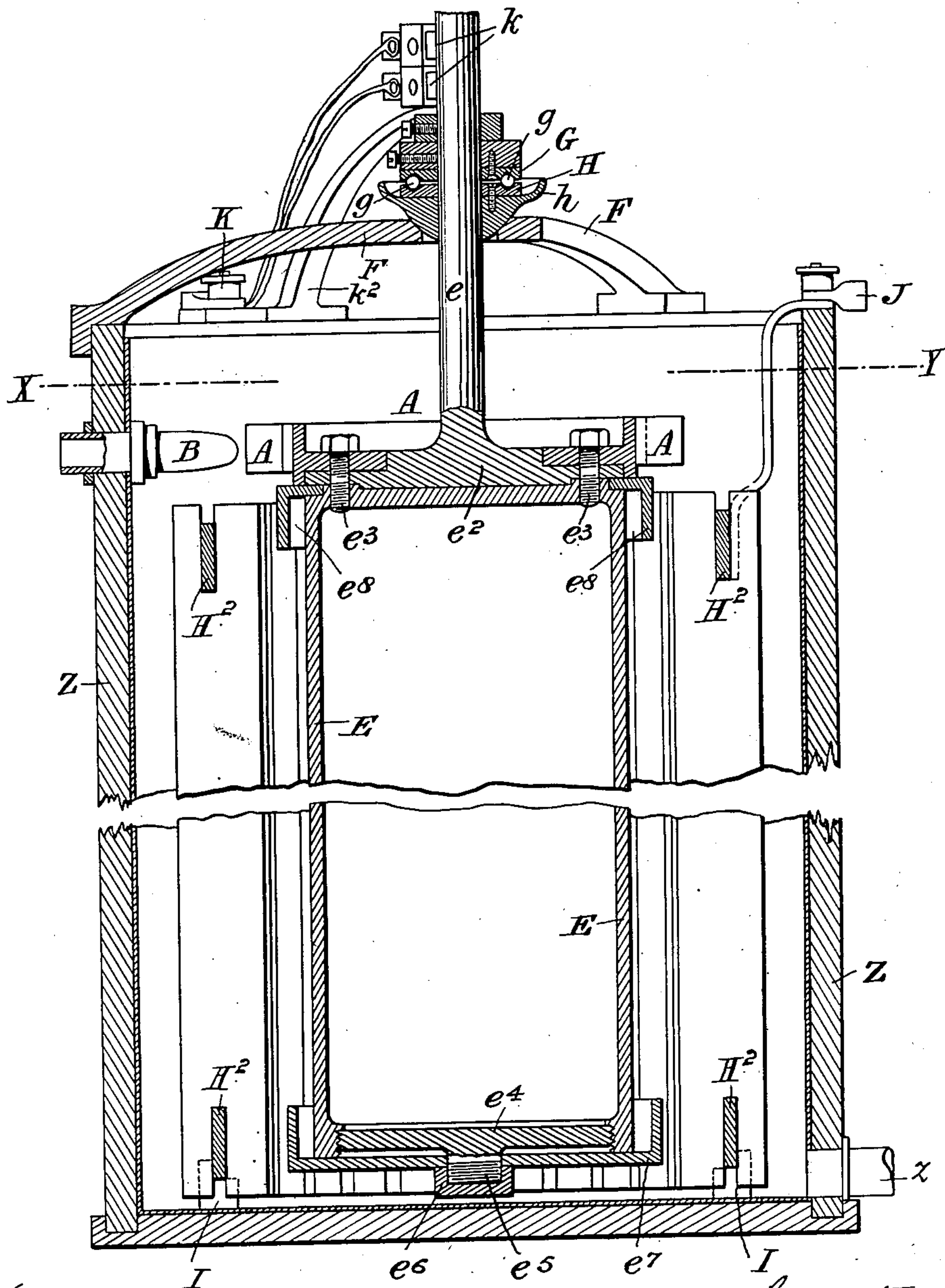
APPARATUS FOR USE IN ELECTRODEPOSITION OF METALS.

(Application filed Apr. 8, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses:—
W. B. Herkum

Inventor:—
Sherard O. Cowper-Coles
by *Philip Kanno*
his attorney

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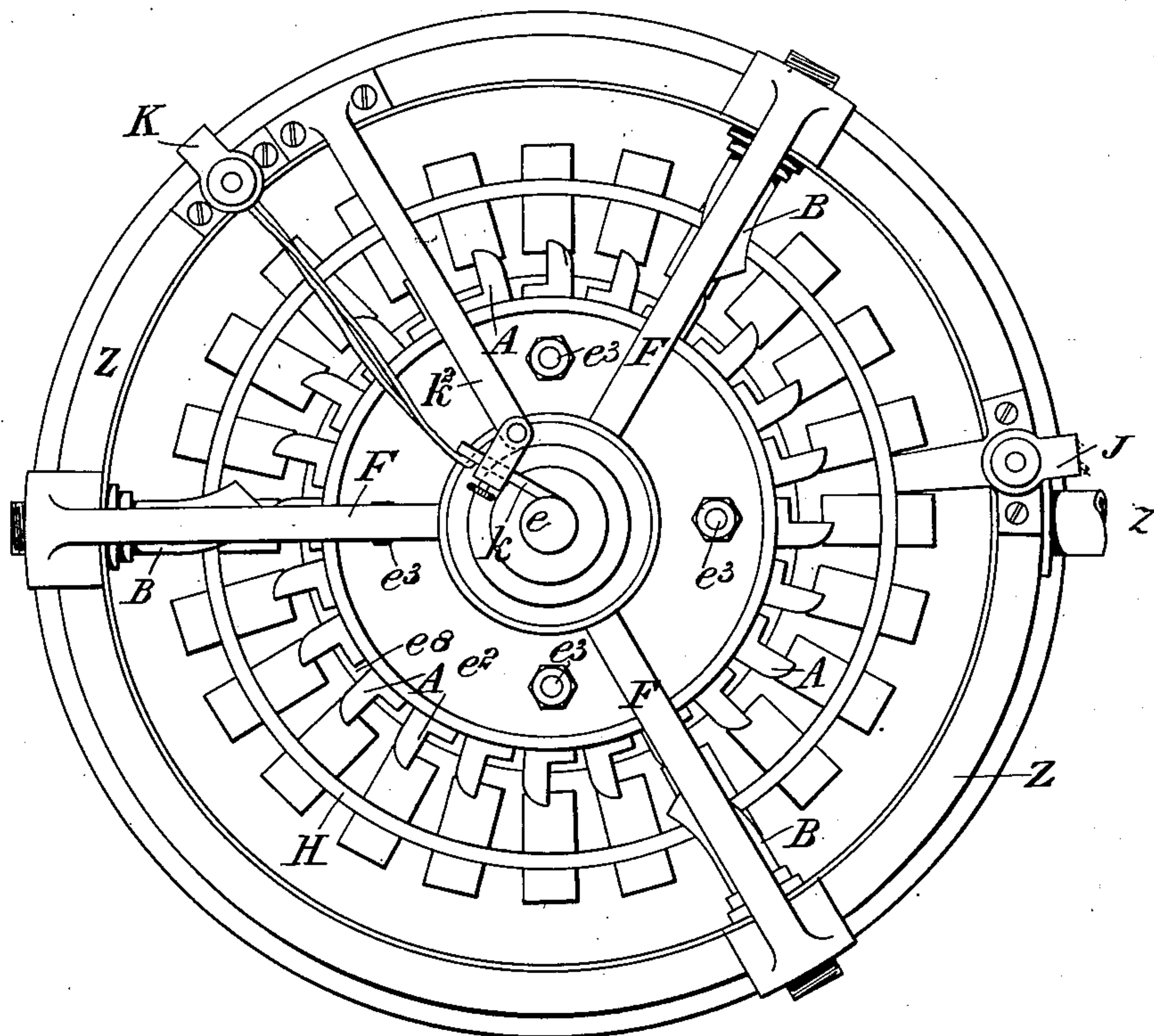
APPARATUS FOR USE IN ELECTRODEPOSITION OF METALS.

(Application filed Apr. 8, 1901.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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Inventor:—
Sherard Osborn Cowper-Coles,
by Philip Hanks
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UNITED STATES PATENT OFFICE.

SHERARD OSBORN COWPER-COLES, OF WESTMINSTER, ENGLAND.

APPARATUS FOR USE IN ELECTRODEPOSITION OF METALS.

SPECIFICATION forming part of Letters Patent No. 380,408, dated August 13, 1901.

Application filed April 8, 1901. Serial No. 54,878. (No model.)

To all whom it may concern:

Be it known that I, SHERARD OSBORN COWPER-COLES, engineer, a subject of the King of Great Britain and Ireland, residing at 26 and 27 Grosvenor Mansions, Victoria street, in the city of Westminster, England, have invented certain new and useful Improvements in Apparatus for Use in the Electrodeposition of Metals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the process of electrodeposition of metals forming the subject-matter of Letters Patent No. 644,029, dated the 20th day of February, 1900, granted to me, wherein the electrodeposition of metals is effected while a high speed of rotation is imparted to the cathode, as set forth in the specification of the said Letters Patent; and the object of my present invention is to provide an improved apparatus for use in the said process.

According to my invention the cathode is rotated in the depositing-vat by means of a wheel, against which the electrolyte is caused to impinge from suitable nozzles, the said electrolyte afterward passing from the depositing-vat and being returned to the nozzles with, if desired, intermediate regeneration and separation of impurities which it has taken up in the bleaching-vats or from the anodes.

A convenient construction of the apparatus is as follows; but I do not limit myself to the precise details.

I will describe the construction with reference to the accompanying drawings.

Figure 1 is a vertical section, and Fig. 2 a plan.

I provide a suitable depositing-vat Z, preferably a lead-lined vat, and projecting inward from the side toward the upper part thereof are injecting jets or nozzles, (I have shown three such jets or nozzles, marked B,) through which the electrolyte can be forced by a pump or other suitable means for applying the requisite pressure thereto and connected by a pipe and branch pipes with the said jets or nozzles. At the lower part of the depositing-vat is an outlet z, by which the electrolyte is

withdrawn by the pump for use again at the jets or nozzles B, as hereinbefore mentioned. The mandrel or the like (indicated at E) upon which the coating is to be formed is secured to a central shaft e, which may be done by providing the shaft e with a disk e², to which the mandrel E is secured by screws e³, the lower end of the mandrel having screwed into it a disk e⁴, carrying a screw e⁵, on which fits a cap or nut e⁶ to secure a baffle e⁷ in place, a baffle e⁸ being also secured around the upper end of the mandrel, as shown, these baffles e⁷ and e⁸ serving to prevent the formation of trees or nodules; but I do not limit myself to this way of securing the mandrel to the said shaft. The shaft e is suspended from an overhead bearing-bracket F, the said shaft being provided with a disk G, secured to the shaft, as shown. A bearing-disk H, carried by a piece or plate h, with a spherical lower side, rests in a corresponding recess in the bracket F, so that the shaft and cathode are free to swing somewhat. The disks G and H are grooved to receive ball or roller bearings g, upon which the disk G rotates with the shaft and cathode. To the shaft e is secured a water wheel or turbine A, which may be of the Pelton-wheel type, so situated that it is opposite the jets or nozzles B, projecting through the side of the depositing-vat. This wheel or turbine A can be secured by the screws e³ to the disk e², the said screws also serving to secure the baffle e⁸ by pinching it between the top of the mandrel E and the rim of the wheel A. The lower one of the rings H², supporting the anodes surrounding the mandrel E, is supported upon an insulating footstep-piece I, one conductor from the dynamo or source of electricity being connected at J with this anode, while the other conductor is connected at K to brushes k, which are carried by the arm k² and bear upon the shaft e, (carrying the mandrel E, which forms the cathode,) preferably at the upper end, protruding from the bearing, as shown. The anode is preferably formed of a number of radially or tangentially disposed plates carried by the rings H² and with spaces between them to allow free passage of the electrolyte. The anodes thus arranged act as baffles for the electrolyte. By the tangential projection of the

electrolyte upon the wheel or turbine A the shaft *e* and mandrel E carried by it are rotated at the high rate of speed required for securing a good and adherent deposit of metal upon the cathode or mandrel.

The invention may be applied to the formation of deposits composed entirely of one kind of metal—as, for example, copper deposited from an electrolyte of a copper salt—or to the formation of superposed deposits of different kinds of metal—such, for example, as for the manufacture of “Sheffield plate”—by depositing a layer of copper upon a layer of silver.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. In apparatus for the electrodeposition of metals, a vat, a revolubly-mounted cathode in the vat, a turbine located in the upper part of the vat for rotating the cathode, and means for projecting the electrolyte against the said turbine as it is introduced into the vat thereby rotating the cathode.

2. In apparatus for the electrodeposition of metals, a vat, a revolubly-mounted cathode in the vat, a turbine associated with the cathode, and one or more nozzles projecting into the vat for discharging the electrolyte against the turbine thereby rotating the cathode.

3. In apparatus for the electrodeposition of metals a cathode mounted so as to be capable of revolving and of swinging in its mounting

and provided with a turbine, and means for projecting the electrolyte against the said wheel or turbine so as to rotate the cathode substantially as hereinbefore described.

4. Apparatus for the electrodeposition of metals consisting of a vat having an outlet for the electrolyte, anodes mounted in said vat so as to leave a space between them for the passage of the electrolyte, jets or nozzles adapted to project the electrolyte into the vat, a vertically-disposed shaft, a supporting-bracket on the vat, a plate having an approximately spherical bottom resting against said bracket, ball-bearings interposed between the plate and shaft, a mandrel or cathode on the shaft, and a turbine associated with the mandrel and its shaft and adapted to be acted upon by the electrolyte projected into the vat to rotate the mandrel.

5. In apparatus for the electrodeposition of metals, a vat, a revolubly-mounted cathode in said vat, a turbine associated with the cathode, means for projecting the electrolyte into the vat against the turbine so as to rotate the cathode, and a plurality of anodes disposed at intervals about the cathode adapted to act as baffles for the electrolyte and allow it to pass between them.

In testimony whereof I affix my signature in presence of two witnesses.

SHERARD OSBORN COWPER-COLES.

Witnesses:

E. G. WOOLDRIDGE,
D. COLLIER.