T. A. SMITH & T. DEAKIN.

ELECTROPLATING BARREL APPARATUS.

APPLICATION FILED SEPT. 25, 1909.

951,662.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 3.

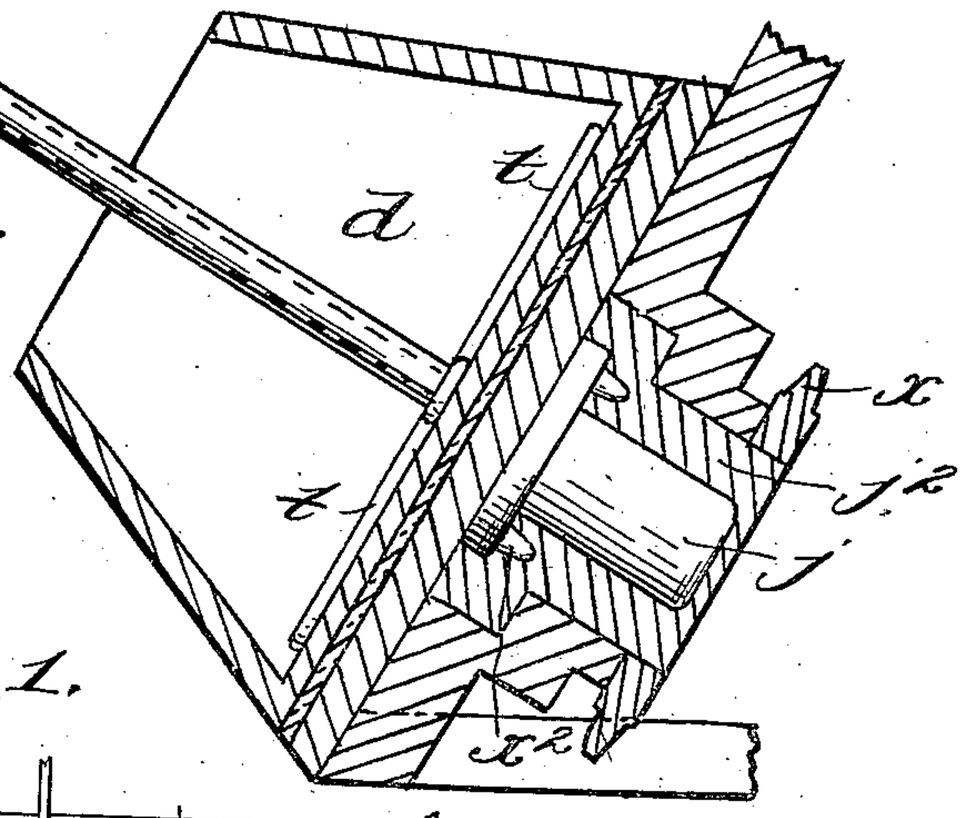
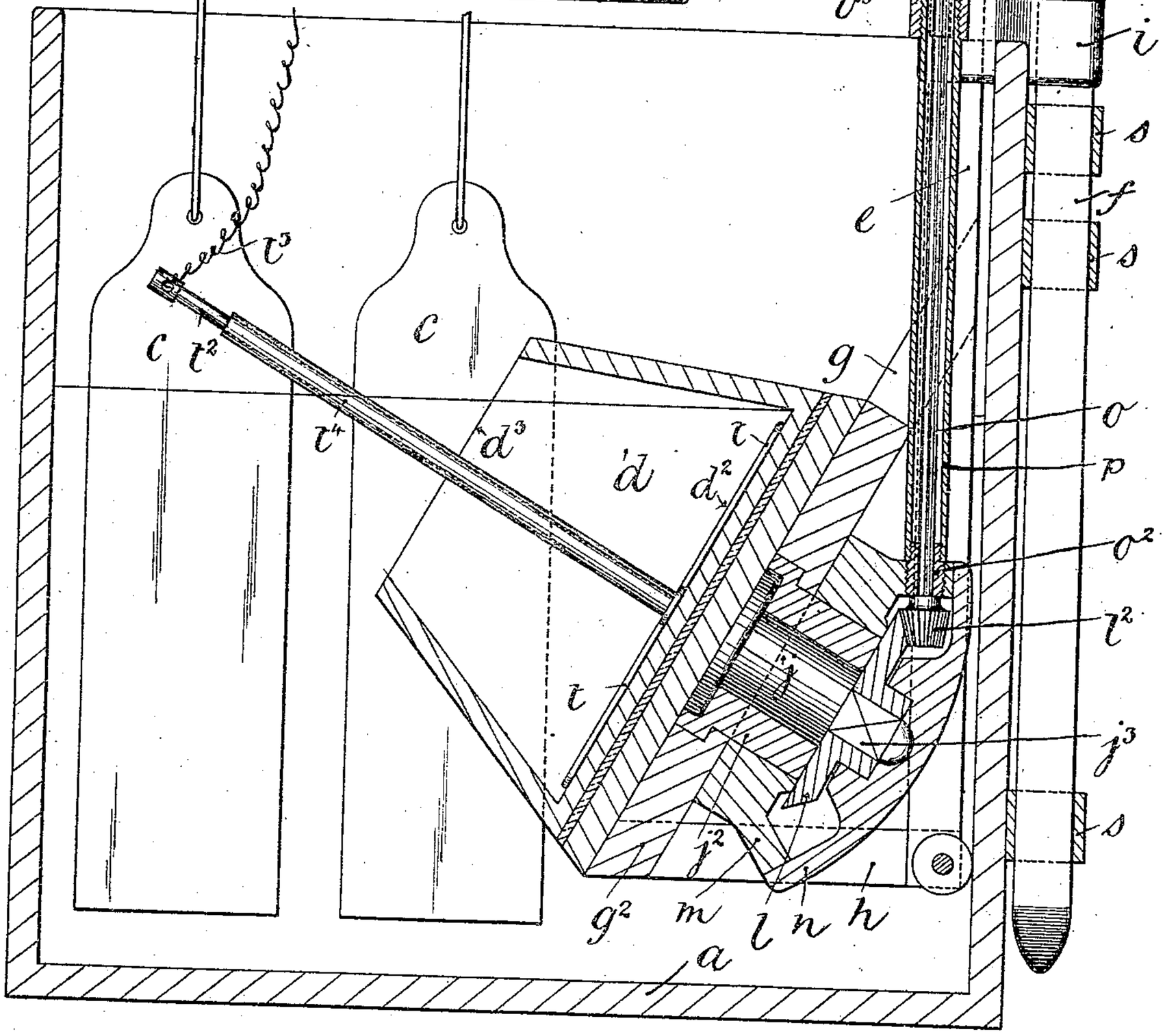


Fig. 1.



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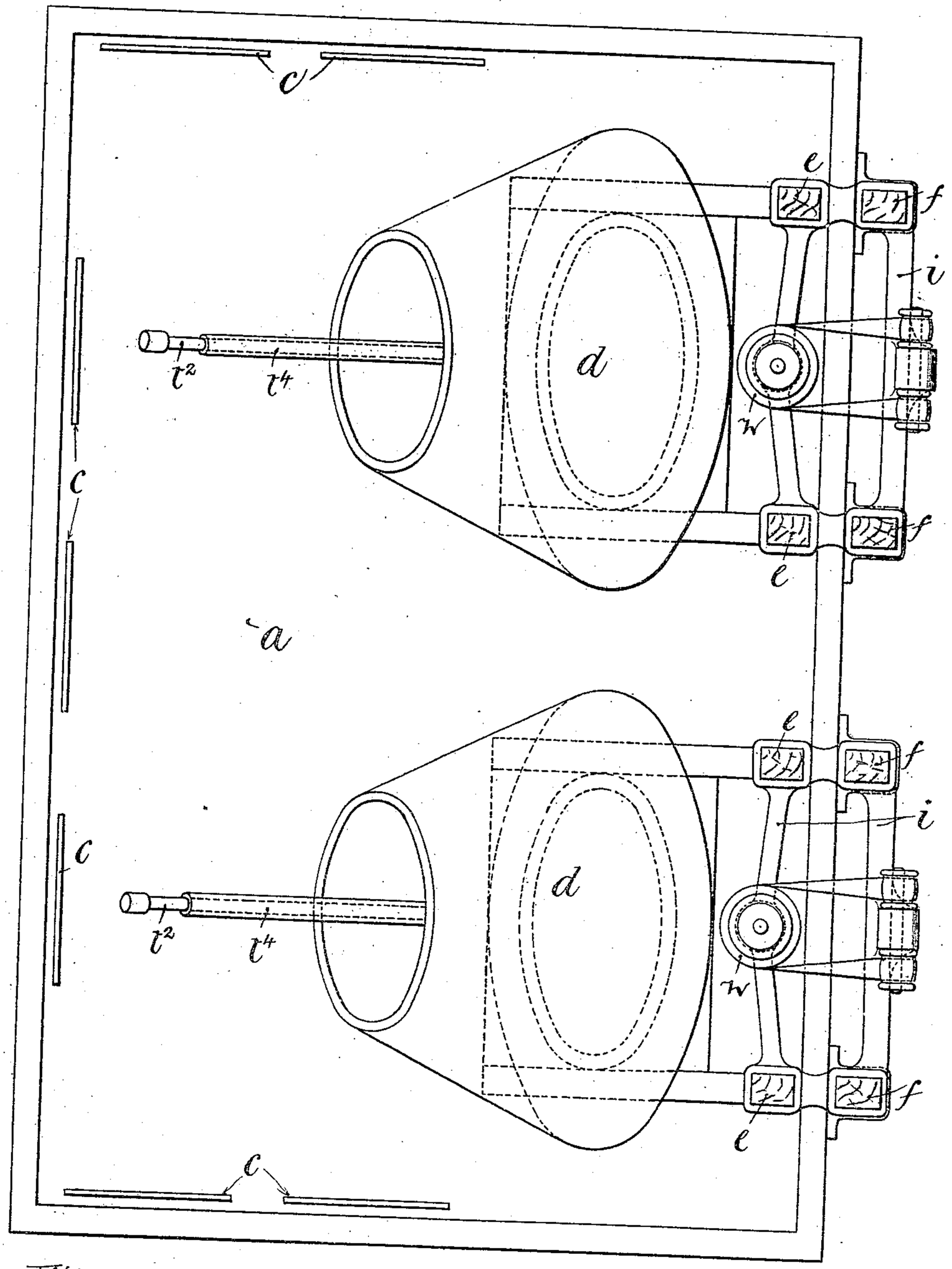
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

THOMAS ALFRED SMITH AND THOMAS DEAKIN, OF WALSALL, ENGLAND.

ELECTROPLATING-BARREL APPARATUS.

951,662. Specification of Letters Patent. **Patented Mar. 8, 1910.**

Application filed September 25, 1909. Serial No. 519,631.

To all whom it may concern:

Be it known that we, THOMAS A. SMITH and THOMAS DEAKIN, subjects of the King of Great Britain, residing at Walsall, Stafford county, England, have invented new and useful Improvements in Electroplating-Barrel Apparatus, of which the following is a specification.

Our invention relates to an apparatus for effecting electro-deposition of metals of the type wherein a work-containing barrel is rotatable within a stationary tank containing the solution and the anodes, which barrel has its axis of rotation inclined, its upper end open, and its lower end substantially closed, the said open end lying below the level of the solution.

According to the invention, the inclined and rotatable barrel is supported within the tank either wholly or mainly at or from its lower end only, so as to obtain a free flow of current from the anodes through said open upper end, and to permit the condition of the articles being plated to be easily examined without terminating the rotation of the barrel.

The mechanism for rotating the barrel is preferably located at the lower end of the barrel, in order that the upper end thereof may be open to the solution, as above stated.

The barrel is readily detachable from its support without necessitating the dislocation of the support or of the driving gear, there being a detachable connection between the barrel and said gear.

The barrel, the support therefor, and the driving gear aforesaid form a unit which may be bodily removed from or placed in position within the tank.

The invention also provides certain features in combination with the features aforesaid, all of which are hereinafter clearly described and set forth in the claims.

The invention in two of its forms is illustrated in the accompanying drawings, whereof—

Figure 1 is a vertical section through the tank and barrel. Fig. 2 is a plan view of the apparatus shown in Fig. 1. Fig. 3 is a sectional view of a modified form of drive mechanism for the barrel.

The tank *a* and the anodes *c* may be of the usual form, although it is advisable to arrange the anodes as nearly as possible directly in front of the open end of the barrel. The barrel or work container *d* (two of which are illustrated in one tank in Fig. 2), is of substantially frusto-conical shape, the lower or larger end d^2 being permanently closed, and the upper or smaller end d^3 open. The barrel is supported at its lower end by a frame comprising a number of bars *e*, *f*, *g*, and *h*, preferably of wood, which are connected at their upper ends and are arranged to hang upon the side of the tank, so as to support the axis of the said barrel at an angle of about 30° to the horizontal. The bars *e* and *f*, with their crown couplings *i*, form a fork which straddles the side of the tank and thus is capable of being raised or lowered upon the said side and of resting upon the top of the tank when lowered. The barrel *d* at its closed lower end d^2 is rigidly fixed to the end of a short shaft *j* having rotating and thrust bearings within a comparatively large sleeve j^2 carried by the back bar g^2 of the frame, the said shaft being removable from this bar. The extreme lower end of shaft *j* terminates in a squared shank j^3 which is removably fitted in a correspondingly shaped opening in a bevel gear *l*. This gear and the adjacent end of the sleeve j^2 extend into a hollow cylindrical or otherwise shaped wooden boss *m*, the outer end of which is closed by an attached lid *n*. Said boss is liquid-tight and is secured at its inner end to the supporting frame.

Gear *l* meshes with a bevel pinion l^2, (which is likewise arranged within the hollow boss *m*), driven from a vertical shaft *o* which extends through the bore of a vertical tube *p* constructed of fiber or other suitable insulating material. One end of this tube is connected to the boss *m* and the other end to the crown coupling *i*. The upper end of shaft *o* is provided with a speed pulley *w* for a belt or similar drive. The bearings for said shaft *o* are constituted by a metal ferrule o^2 carried by the boss *m* and to which ferrule the fiber tube *p* is also connected, and by a suitable machined part o^3 of the crown coupling *i*, such arrangement practically obviating any contact of the solution with the mechanism for driving the barrel. Those vertical members of the supporting frame which are external of the tank, namely, the bars *f*, slide in guide eyes *s* fixed to the adjacent side of the tank.

The cathode connection is constituted by a member comprising a number of conducting arms *t* detachably secured to the inner

face of the closed end d^2 of the barrel, and a central rod t^2 connected with these arms. Rod t^2 extends through the open end d^3 of the barrel and out of the solution, its outer end having the negative wire t^3 suitably connected thereto. Said rod is covered by a non-conducting tube t^4 so that only the arms t have physical contact with the work contained within the barrel. It will be seen that no part of the cathode connection passes through the closed lower end of the barrel.

The chief features of the apparatus are that the barrel is wholly detachable from the supporting frame without dislocation of said frame and the driving gear, that the gear is arranged at the closed end of the barrel and further that the support for the barrel is at the back of the closed end, so that the other end of the barrel is wholly open to the solution and the anodes, the cathode connection being axial of the barrel.

In the modification shown in Fig. 3, the shaft j carried by the barrel is detachably fitted in the sleeve j^2 mounted within the frame and rotated from a chain wheel x by a suitable chain gear, this arrangement effecting a rotation of the sleeve with said shaft, there being between said sleeve and shaft a peg and hole connection x^2 for the purpose of providing for the drive of these two parts.

Instead of the supporting frame fitting the side of the tank, as shown, it may be in the form of a fixture within the interior of the tank and may be so modified as to suit the chain drive of the construction shown in Fig. 3. This may be effected by mounting the frame in the middle of the tank, so as to permit a barrel to be fitted to either side of the frame, the two barrels being independent, although supported by a single frame with a separate drive for each barrel.

The sides of the barrel may be perforated or not, as may be desired.

We claim as our invention:

1. The combination, with a tank containing an electrolytic solution; of an inclined rotatable work-container arranged within the tank and having its upper end open and its lower end closed; and devices for supporting and driving said work-container at its lower end.

2. The combination, with a tank containing an electrolytic solution; of an inclined rotatable work-container arranged within the tank and having its upper end open and its lower end closed; means for supporting said work-container at its lower end; means for driving said container at such point; and detachable connections between said container end and said supporting means, for permitting the removal of the container without dislocating said supporting means or said driving means.

3. The combination, with a tank containing an electrolytic solution; of an inclined rotatable work-container arranged within the tank and having its upper end open and its lower end closed; a device for supporting said work-container at its lower end; means for driving said container at such point; a shaft connected to said container; and a sleeve connected to said supporting device and receiving said shaft, one element of said driving means being carried by said sleeve.

4. The combination, with a tank containing an electrolytic solution; of a rotatable work-container arranged within the tank; a supporting frame carrying said container and arranged for bodily movement into and out of the tank; and mechanism for driving said container carried by said frame and movable therewith.

5. The combination, with a tank containing an electrolytic solution; of an inclined rotatable work-container arranged within the tank and having its upper end open and its lower end closed; a supporting frame carrying said container at its lower end, said frame being arranged for bodily movement into and out of the tank; and mechanism for driving said container at such point carried by said frame and movable therewith.

6. The combination, with a tank containing an electrolytic solution; of an inclined rotatable work-container arranged within the tank; a supporting frame carrying said container at its lower end; and mechanism for driving said container at such point carried by said frame.

7. The combination, with a tank containing an electrolytic solution; of a supporting frame; a rotatable work-container arranged within the tank and supported at its lower end by said frame; and mechanism for driving said container at such point carried by said frame, said container being detachable from said frame and said mechanism.

In witness whereof we have hereunto set our hands in presence of two witnesses.

THOMAS ALFRED SMITH.
THOMAS DEAKIN.

Witnesses:
GEO. I. FUERY,
FRANCIS A. BINNS.