

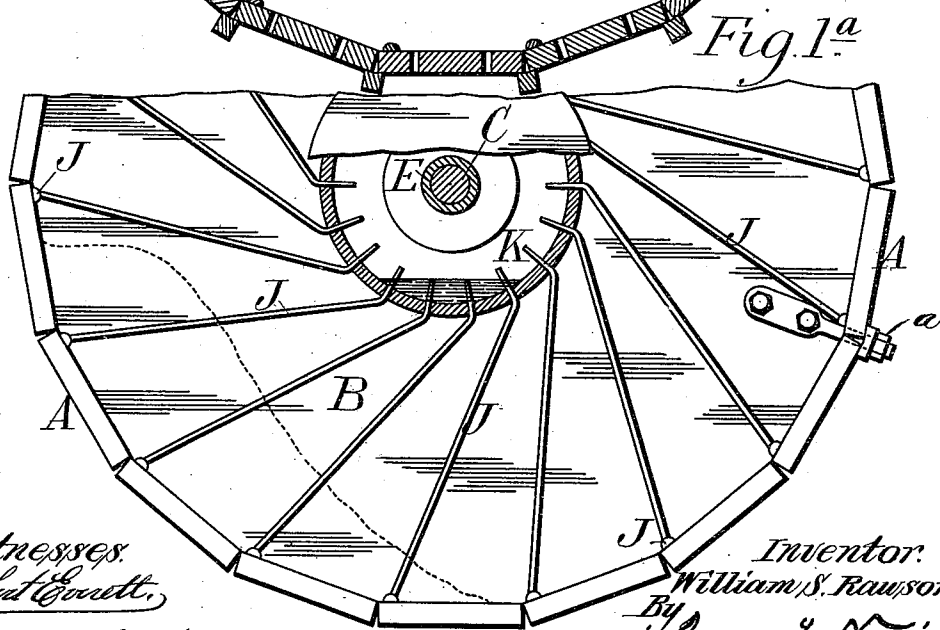
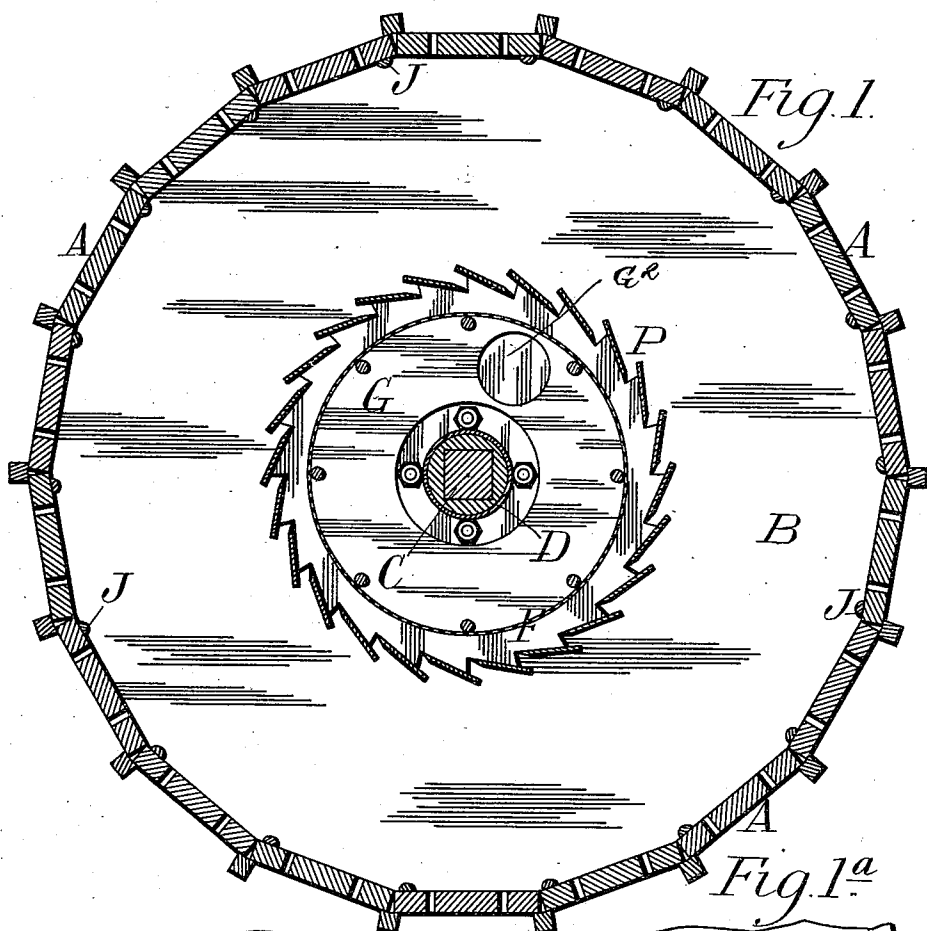
(No Model.)

3 Sheets—Sheet 1.

W. S. RAWSON.  
ELECTROLYTICAL APPARATUS.

No. 560,931.

Patented May 26, 1896.



Witnesses  
*Robert Consett,*  
*Dennis Sumby,*

Inventor  
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*Atty.*

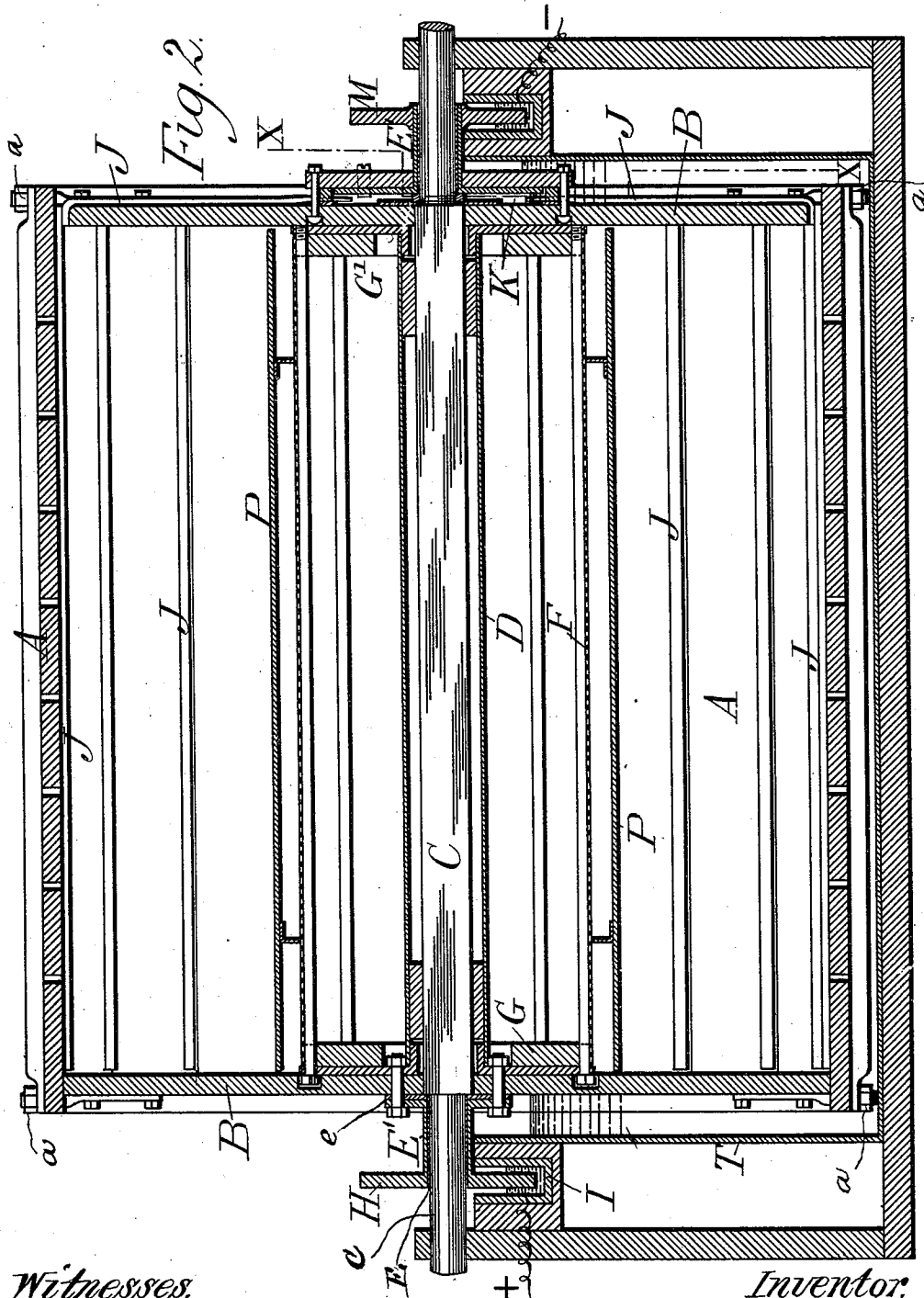
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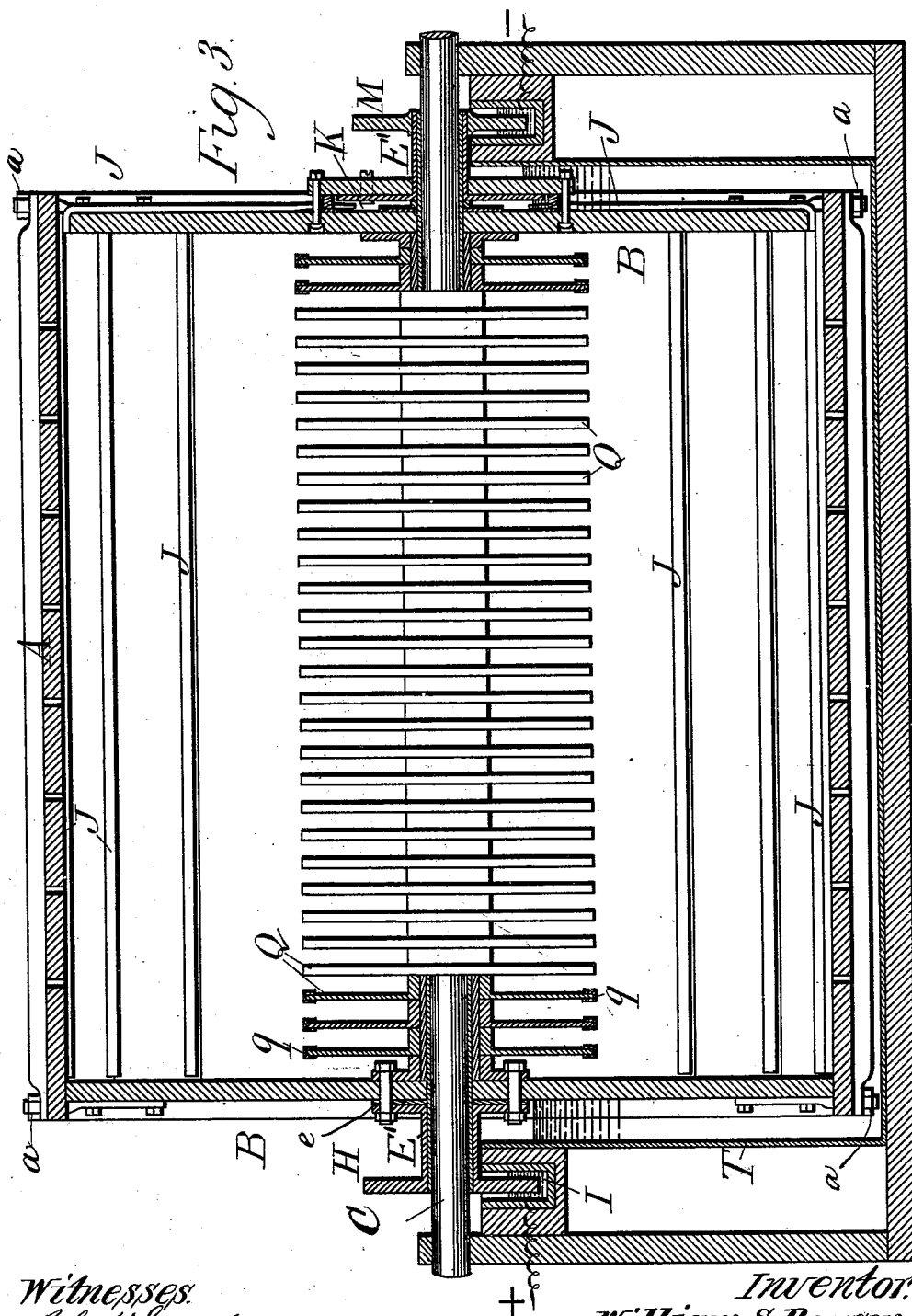
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# UNITED STATES PATENT OFFICE.

WILLIAM STEPNEY RAWSON, OF LONDON, ENGLAND.

## ELECTROLYTICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 560,931, dated May 26, 1896.

Application filed March 21, 1895. Serial No. 542,680. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM STEPNEY RAWSON, a citizen of England, residing at 86 York Street, Westminster, London, England, have  
5 invented certain new and useful Improvements in Electrolytical Apparatus, of which the following is a specification.

My invention relates to apparatus for effecting electrolytical deposit of metal upon  
10 such articles as can be rolled over and over in a revolving barrel, so arranged that these articles constitute the cathode as they roll on the periphery of the barrel, which is connected to the negative terminal of a dynamo or other  
15 source of electricity, while the anode is arranged in the central part of the barrel and connected to the positive terminal of the source of electricity. The anode may consist of small pieces of the metal which is to be deposited, which also roll over and over, or it  
20 may consist of larger pieces of the metal, which simply revolve with the barrel. In cases where the electrolyte is sufficiently rich in the metal to be deposited the anode may be of any suitable conducting material.

I shall describe the apparatus, referring to the accompanying drawings, which show, by way of example, apparatus specially adapted for electrolytically depositing a coating of  
30 zinc on articles of iron or steel.

Figure 1 is a transverse section, and Fig. 2 is a longitudinal section, of the apparatus arranged for an anode consisting of pieces of zinc contained in a cylinder of wire network or perforated plate. Fig. 3 shows the apparatus modified so as to have the anode consisting of revolving disks or pieces of zinc. Fig. 1<sup>a</sup> is a part transverse section at line X X, showing the electrical connections of the cathode-rods.

In all the figures like reference-letters are used as far as possible to denote like parts.

Referring first to Figs. 1 and 2, the barrel may be made, as shown, of polygonal sections  
45 consisting of wooden staves A, having holes through them, fixed to end disks B, (of insulating material,) by which the barrel is mounted on a central shaft C, the disks and a tube D, connecting the disks and surrounding the  
50 shaft, being insulated from the shaft, which extends beyond the ends of the barrel and is mounted in bearings E, provided on the ends

of the tank T, in which the barrel revolves. The tube D may be of any metal not acted on by the liquid. At some distance from the  
55 central tube D and in electrical connection therewith is fixed to end disks G G' a cylinder F, of network or perforated plate of iron or other suitable metal. The disk G is in electrical connection with an external flange  
60 H, which revolves in a mercury-trough I, connected to the + terminal of a dynamo or other source of electricity. The external flanges H are mounted upon sleeves E', having flanges  
65 e, which are secured to the disks B of the barrel. The bearings E lie within these sleeves and between them and the shaft, like bushings.

The cylinder F being charged, through covered openings G<sup>2</sup> in the ends, with scraps or  
70 fragments of zinc, these, being in contact with the network F, disks G G', and tube D, constitute with these parts the anode.

Along the staves A extend rods J, of half-round iron or other metal, which are bent up-  
75 ward and also sidewise, as shown in Fig. 1<sup>a</sup>, their upper ends passing through insulating material into an annular trough K, containing a quantity of mercury, which, as the barrel revolves, lies in the lower part of the  
80 annular trough in contact with the ends of several of the rods J. The parts of the rods J which are outside the barrel are preferably covered with insulating material. The side  
85 of the annular trough is in electrical connection with a flange M, which dips into mercury contained in a trough and connected with the negative terminal of the electric generator. Thus those of the rods J which have their ends  
90 covered by the mercury in K constitute cathodes, all the others of these rods being inert until they come around in the course of each revolution of the barrel to the position in which their ends are again covered by the  
95 mercury in K. The cylinder F is preferably protected by a louver-casing P.

The articles to be coated being charged into the barrel by openings provided with covers roll over and over as the barrel revolves, heaping themselves, as indicated by the dotted line  
100 in Fig. 1<sup>a</sup>, there being always some of them in contact with a few of the rods J, which are in connection with the negative terminal, and therefore are in the condition of cathodes.

As only those of the rods J which have articles on them are at any time connected to the negative terminal, there is no waste of electrical energy in passing through the parts of the apparatus where there are no articles to be coated.

The barrel is charged by inserting the articles to be coated through any suitable opening—as, for example, by unscrewing nuts *a*, which fasten the ends of the wooden staves A, and removing one of the staves, which is replaced after the articles are placed in the barrel.

When the solution in the bath is such as would corrode the cylinder F, the anode employed is that shown in Fig. 3—that is to say, a number of zinc plates or disks Q, fixed on the tube D, inclosing the shaft.

In order to prevent short-circuiting by the cathode articles touching the disks Q, the edges of the disks have stretched over them bands of caoutchouc *g*, which owing to their elasticity take a U form, inclosing the edges of the disks.

Although I have described the apparatus as applied to the depositing of zinc, it may obviously be employed to the depositing of other metals from solutions of their salts.

Although in what precedes I have described a flange H revolving in a mercury-trough, obviously a brush or rubber may be employed to make the required contact, and in like manner for the annular mercury-trough K may be substituted a commutator with brush or rubber outside the tank T, the rods J being insulated and connected to the segments of the commutator.

Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—

1. Electrolytical apparatus consisting of a tank for containing liquid electrolyte, a perforated barrel of non-conducting material mounted to revolve on a shaft therein, a perforated or network metal cylinder fixed on but insulated from the said shaft and connected by a suitable conductor to the positive terminal of a source of electricity, and bent metal rods fixed at intervals in the interior of the barrel and connected through a commutating device to the negative terminal of the source of electricity, substantially as described.

2. In electrolytic apparatus the combination with a tank to contain a liquid electrolyte, of a non-conducting barrel arranged to revolve partly within and partly outside of said tank and provided with openings to admit the fluid, an interior, concentric anode revolving with the shaft of the barrel, a series of cathode-rods, arranged at intervals upon the interior circular face of the barrel, a corresponding series of conductors connected at one end to the cathode-rods and a commutator arranged on the shaft to cut said conductors into circuit successively as they revolve with the barrel, the articles to be coated being placed in the barrel loosely to roll over and lie upon the cathode-rods which are brought into circuit by the commutator, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 26th day of February, A. D. 1895.

WILLIAM STEPNEY RAWSON.

Witnesses:

OLIVER IMRAY,

JNO. P. M. MILLARD.