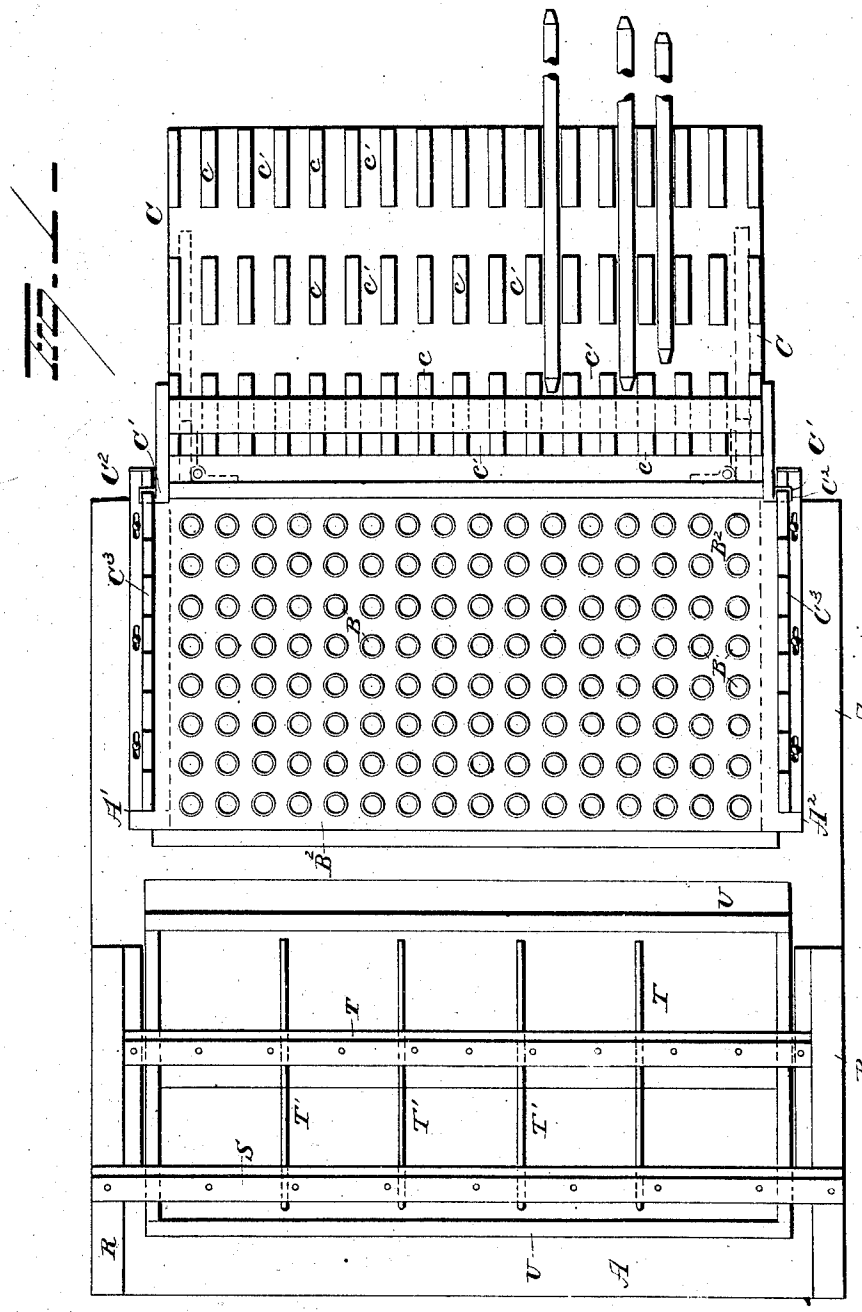
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APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

No. 441,894. Patented Dec. 2, 1890.



Witnesses
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G. F. Downing

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William J. Possons.

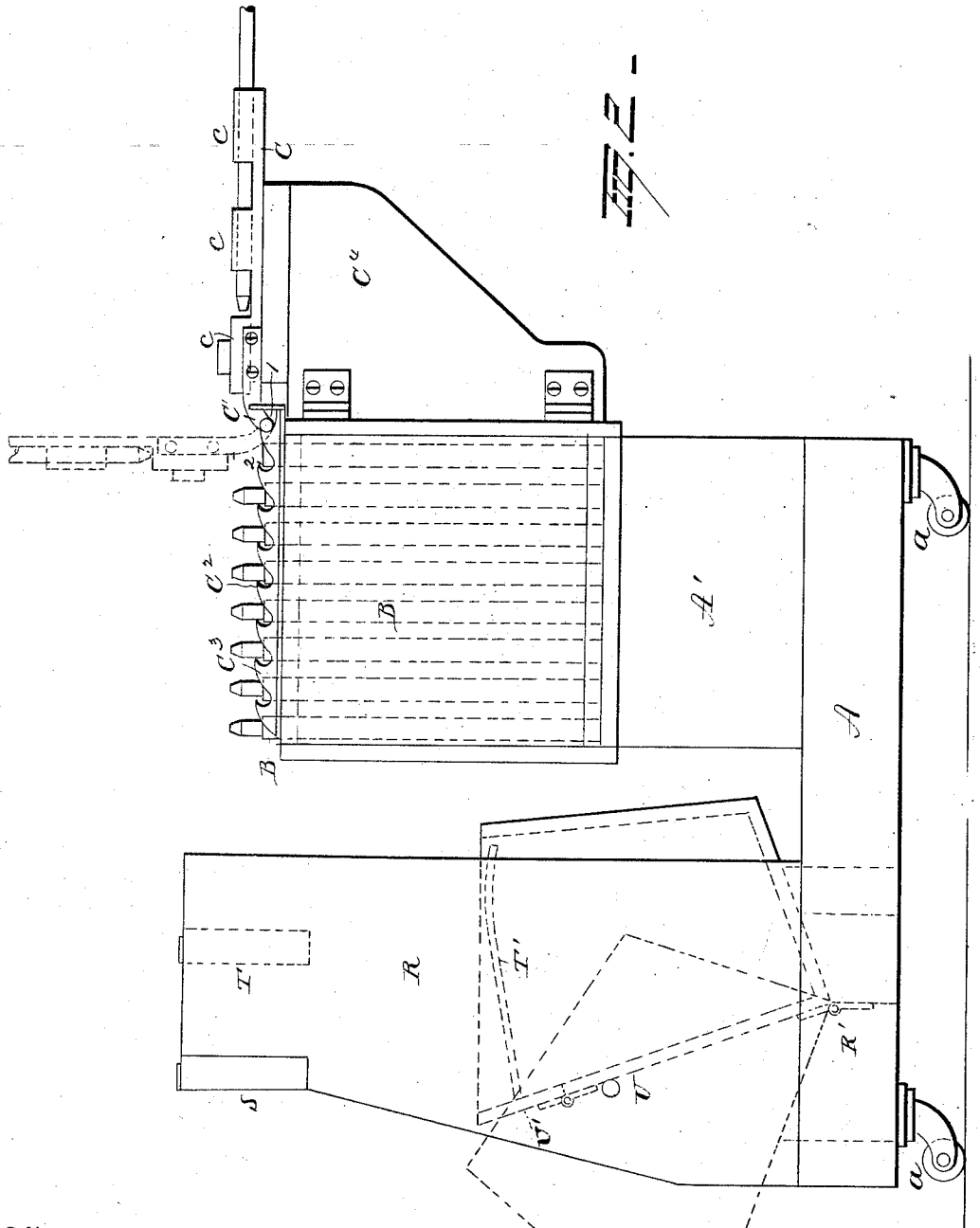
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APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

No. 441,894. Patented Dec. 2, 1890.



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(No Model.) 7 Sheets—Sheet 3.

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APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

No. 441,894. Patented Dec. 2, 1890.

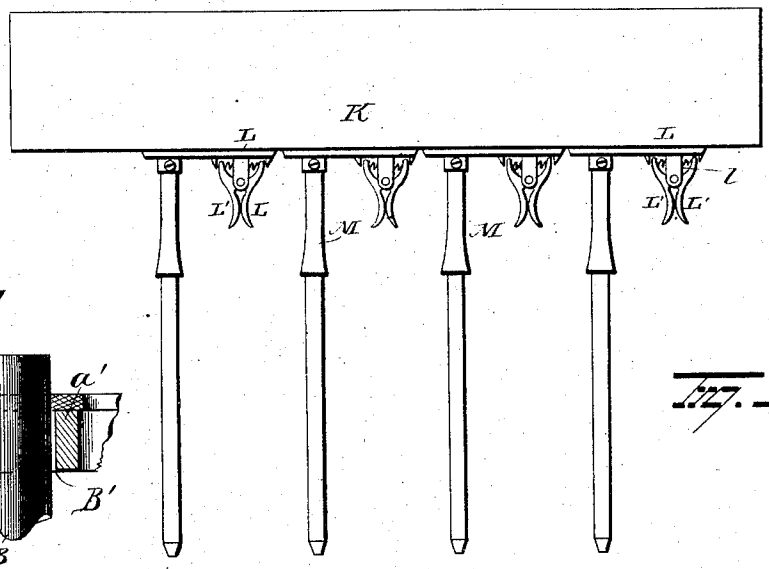
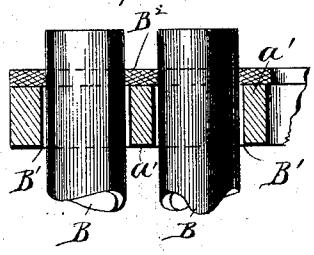
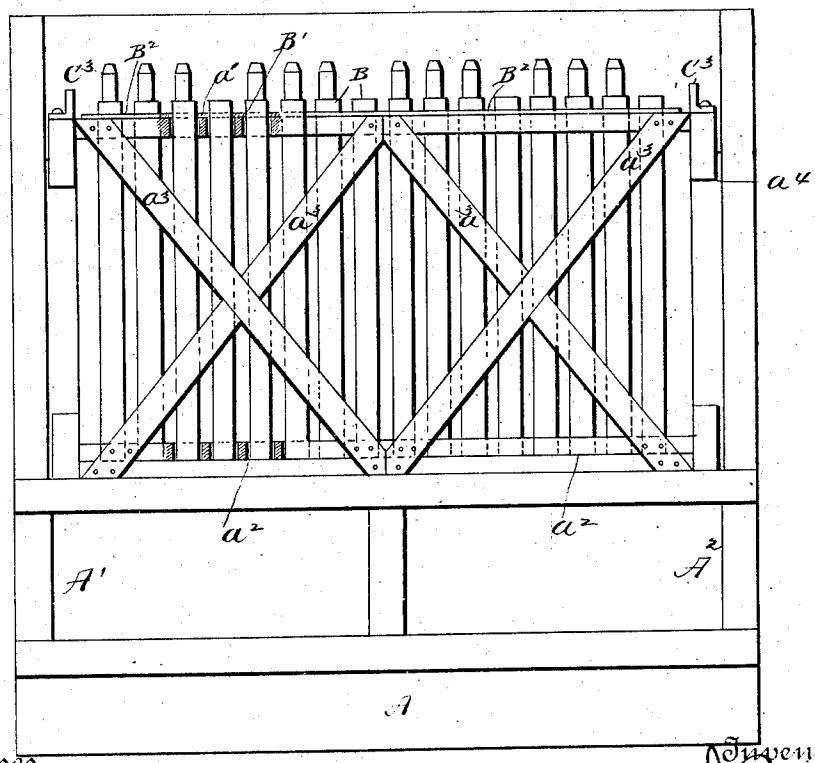


Fig. 3.

Fig 10





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APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

No. 441,894. Patented Dec. 2, 1890.

Fig. 4.

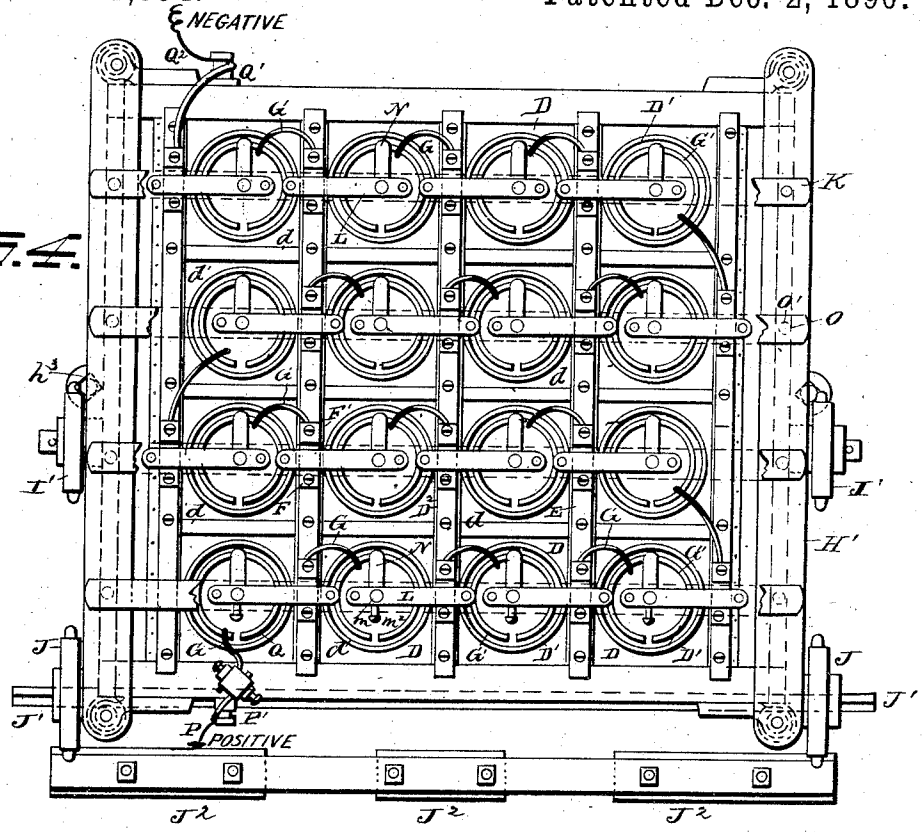


Fig. 8.

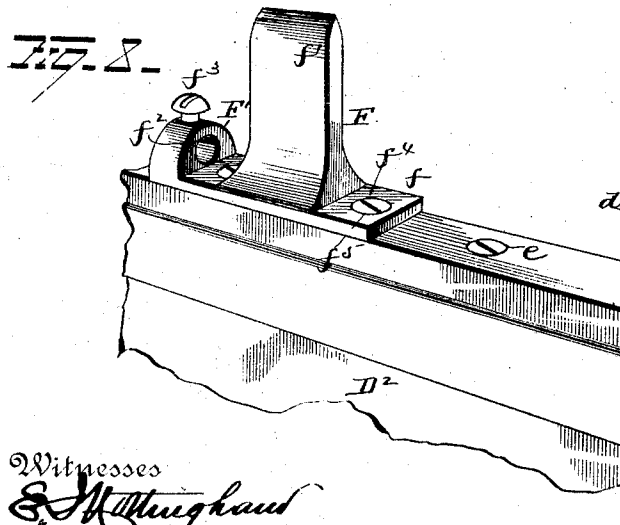
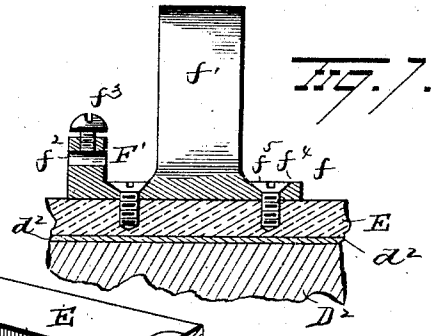


Fig. 7.



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No. 441,894. Patented Dec. 2, 1890.

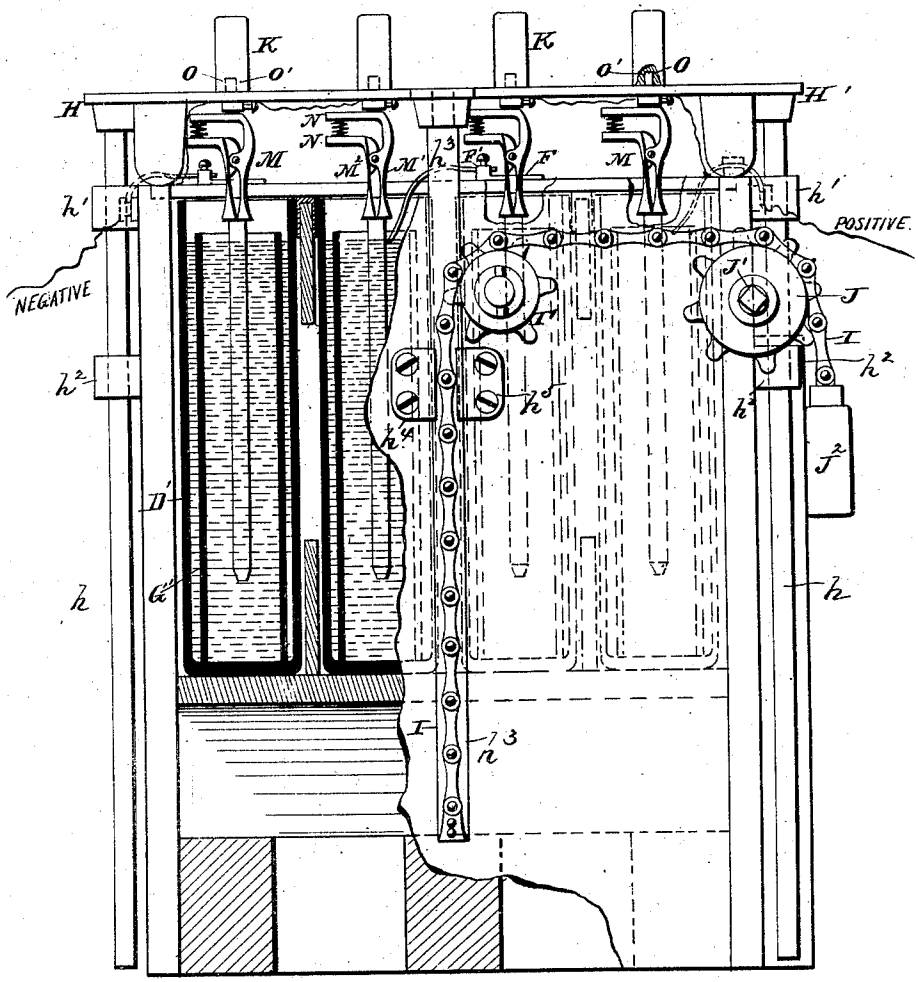


Fig. 5.

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APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

No. 441,894. Patented Dec. 2, 1890.

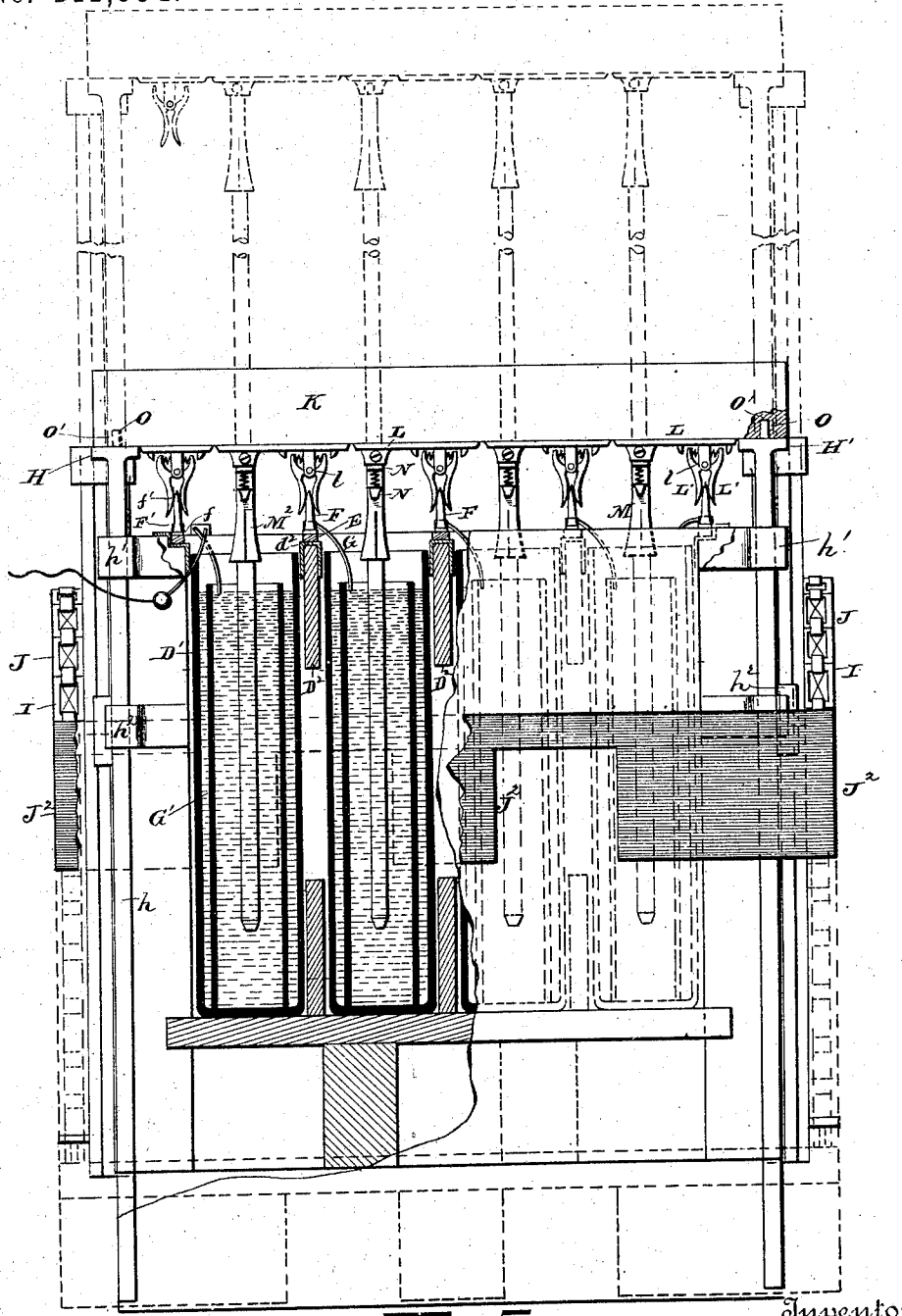


Fig. 5.

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APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

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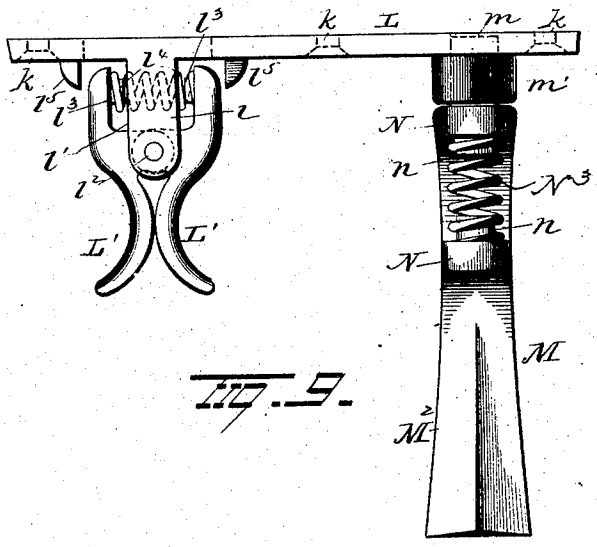


Fig. 9.

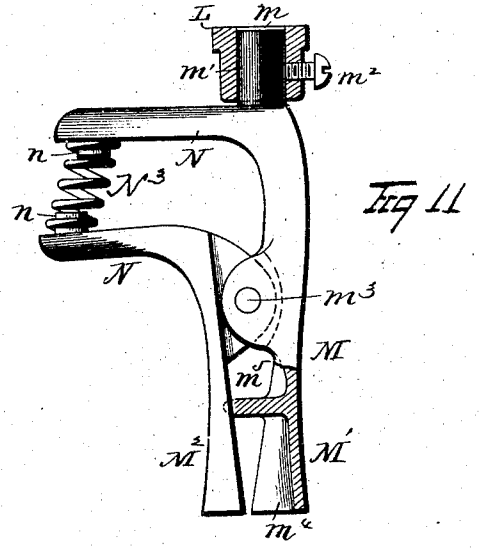


Fig 11

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UNITED STATES PATENT OFFICE.

WILLIAM J. POSSONS, OF CLEVELAND, OHIO, ASSIGNOR TO THE BRUSH ELECTRIC COMPANY, OF SAME PLACE.

APPARATUS FOR ELECTROPLATING CARBONS OR OTHER ARTICLES.

SPECIFICATION forming part of Letters Patent No. 441,894, dated December 2, 1890.

Application filed October 17, 1889. Serial No. 327,294. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. POSSONS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Electroplating Carbons or other Articles; 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 an improved apparatus for electroplating carbons or other articles.

Heretofore electric-light carbons have been electroplated in multiple arc and in series, and when the latter system has been adopted they have been electroplated in the following manner: A vertically-adjustable rack or bar provided with a series of clamps is located above a row of plating-jars, which latter are connected "in series" by a conductor from the dynamo or other current-generator. An attendant takes the raked carbons after they are suitably prepared for plating and forces a carbon into each one of the clamps, which latter serves to hold them in a vertical position. The rack or bar is then lowered, and the series of carbons suspended therefrom is lowered, each one of the carbons entering one of the plating-jars, where it remains until electroplated, when the bar and its attached carbons are raised, and the carbons are extracted singly from their clamps. The carbons, after being electroplated, are then piled on a rack and immersed in a bath of boiling water to cleanse them of the plating solution, when they are placed in a furnace and thoroughly dried, when they are ready for use.

While carbons can be electroplated quite rapidly and economically by the method above described, the object of my invention is to provide an apparatus by which the carbons may be handled with much greater rapidity and safety, and thus to materially reduce the expense of electroplating them.

With these ends in view the invention consists in certain features of improvement in the process and apparatus, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a carbon-charging rack and holder and discharging rack and receiver. Fig. 2 is a view in side elevation of the same. Fig. 3 is a view in end elevation, which also shows one of the carbon-holding racks after it has been raised. Fig. 4 is a plan view of the plating apparatus. Fig. 5 is a view, partly in end elevation and partly in section, of the plating apparatus. Fig. 6 is a view, partly in side elevation and partly in section, of the same. Figs. 7 and 8 are detached views of the stationary electrical contacts. Fig. 9 is a view in perspective of one of the combined clamps and contacts. Fig. 10 is a detail view of the upper ends of two of the tubular holders, the perforated top board, and the rubber cloth; and Fig. 11 is a view, partly in side elevation and partly in section, of one of the clamps.

A represents a rectangular supporting-frame of the charging apparatus, which may, if desired, be supported on casters *a* to enable it to be readily moved from one place to another.

A' A^2 are uprights fastened at their lower ends to the supporting-frame A and forming the ends of the frame in which are mounted the tubular holders. This frame consists of the top and bottom boards a' a^2 and suitable diagonal braces a^3 and cleats a^4. Tubular holders B, which may be made of straight brass tubes cut into proper lengths, are supported at their lower ends on the bottom board, while their upper ends project through holes B' formed in the top board, the holes B' being sufficiently larger than the tubular holders to enable the upper and free ends of the latter to have a certain amount of free lateral movement in all directions.

B^2 is a rubber cloth or sheet of rubber placed upon the top board a', and is perforated for the reception of the upper ends of the tubular holders B. The rubber cloth fits snugly around the upper end of each one of the tubular holders, and, while serving to retain each one in the center or substantially

in the center of the hole in the top board, allows the upper end of each holder a certain amount of lateral movement or adjustment, for a purpose which will be hereinafter described.

Tubular holders B are arranged in parallel rows, consisting of any desired number, the space between the holders of each row and between each row being sufficient simply to allow of the desired lateral adjustment of the upper ends of the holders.

C represents a rack consisting of a board provided with parallel strips *c*, forming intervening grooves *c'*, each of which is of the proper width to admit of a carbon rod or stick. The rack is constructed with grooves *c'*, equal in number to the tubular holders in one row in the charging apparatus. At the opposite ends of the rack and at one side are fastened the trunnions C', which fit into the groove C^2, formed in the metal rack-bars C^3, which are fastened to the opposite ends of the frame of the charging apparatus.

C^4 are hinged brackets on which the rack C is supported.

Having described the construction of the charging apparatus, I will now explain the manner in which it is filled or charged with carbons. The trunnions C' of the rack C are first placed in the grooves or notches 1 at the front ends of the metal rack-bars, the rack being supported in a horizontal position. A workman then takes a pile of naked carbon rods or sticks and places the pile on the rack, and by imparting a slight to-and-fro rolling movement to the carbons causes them to drop into and fill each one of the grooves *c'*. The surplus carbons are then removed and the rack is raised. The notches 1 are so located with relation to the front row of tubular holders that when the rack is raised to a vertical or nearly vertical position the carbons in the grooves *c'* will be brought into alignment with the open ends of the tubular holders and slide therein by gravity, and hence it is the work of an instant only to fill an entire row of holders with carbons. The trunnions of the rack are then moved and inserted in notches 2 of the metal rack-bars and the grooves *c'* filled as before. The rack is then tilted and the second row of tubular holders is filled with carbons. In this way all of the tubular holders are filled with carbons, and, as will be readily appreciated, but little time or labor is called for in doing the work.

The tubular holders are two or three inches shorter than the carbon sticks or rods, so that the latter project above the upper ends of the tubes, as shown in the drawings, so that they may be readily grasped by the clamps on the bars of the plating apparatus.

I will now proceed to describe the construction and mode of operation of certain other features of improvement in my electroplating apparatus.

In Figs. 4, 5, and 6, D represents a tank, which is subdivided by partitions *d* into any desired numbers of receptacles *d'*, each one of which contains a glass jar D' or other suitable receptacle. The drawings illustrate a tank furnished with but comparatively few jars, while in practice I employ a much larger number. At the opposite sides of the tank and between the rows of jars are secured the parallel wooden strips D^2, the upper edges of which are covered with strips d^2 of sheet-rubber or rubber cloth, while upon such strips are fastened hard rubber insulating-bars E, which are secured in place by screws *e*. Upon the insulating-bars E are placed the stationary contacts F, enlarged views of which are illustrated in Figs. 7 and 8. Each of the contacts F consists of a base-piece *f*, an upright contact projection *f'*, which is beveled to an edge at its upper end, and a perforated lug F' at one end of the base for the attachment of the electric conductor, which latter is fastened within the hole f^2 by a set-screw f^3. The base-piece *f* is formed with screw-holes f^4 for the reception of the fastening-screws f^5, which latter, as will be observed by reference to Fig. 7, do not extend through the insulating-bar E, and hence the contacts are thoroughly insulated from any conducting part of the tank and also insulated one from another. Each contact is electrically connected by a conductor G with a cylindrical copper anode G' in one of the glass jars.

H H' are vertically-adjustable bars located at the opposite ends of the tank. Each adjustable bar is provided at its opposite ends with a depending guide-rod *h*, which moves in guides *h'* h^2, attached to the tank. The center of each bar is provided with a depending guide-rod h^3, which moves in a guide formed of the brackets h^4 h^5. To each of the center guide-rods and at its lower end is fastened one end of a chain I, which is extended upwardly and over a sprocket-wheel I', which is journaled on a short stud secured to the end of the tank, and over a sprocket-wheel J, fixed to a shaft J', the latter being common to both sprocket-wheels J, whereby the latter rotate in unison with one another. To the end of the chain is attached a weight J^2, which nearly counterbalances the adjustable frame and its attached parts, thereby rendering it an easy matter for a workman to quickly raise and lower such parts of the apparatus.

K are clamp-bars, each of which has secured to its lower edge a series of combined clamps and contacts, an enlarged view of one of such clamps and contacts being shown in Fig. 9.

L is a base-plate provided with screw-holes *k k k*, by which it is firmly secured by screws to the lower edge of the clamp-bar. Base-plate L has formed integral therewith two depending lugs *l l'*, the lower ends of which are connected by a pin or rivet l^2, on which are journaled the jaws L' L' of the spring-actu-

ated contact. The lower ends of the jaws are constructed with an outwardly-flaring plate, whereby there is formed a converging mouth for the reception of the stationary contact F. Each of the jaws is provided at its upper end and on its inner side with a stud l^3, upon which are mounted the opposite ends of a spiral spring l^4, which by its outward pressure operates to force the upper ends of the jaws apart and the lower and contact ends into contact with each other.

l^5 l^5 are depending stops formed on the base-plate and serve to limit the outward movement of the contact-jaws.

M is a carbon-clamp, and is provided at its upper end with a stud m, which is received within a socket m', formed on the base-plate L, and is secured therein by a set-screw m^2. Clamp M consists of the stationary jaws M′ and movable jaw M^3, the latter being pivoted to the former at m^3. The lower ends of the jaws are constructed with V-shaped engaging surfaces m^4, which are outwardly beveled at their lower edges. The stationary jaw is provided with a stop m^5, which serves to limit the upward movement of the carbon rod or stick therein. Each jaw is constructed with a laterally-projecting arm N, having a stud n formed thereon, and a spiral spring N^3, the opposite ends of which are mounted on the studs n, serves to force the arms apart and the engaging ends of the jaws toward each other. The engaging surfaces of the lower ends of the jaws are so shaped as to readily receive the end of the carbon rod or stick and to center it in such manner that it will be held in a vertical position.

Each one of the clamp-bars K is provided with any desired number of combined clamps and contacts, and the clamp-bars are mounted upon the adjustable bars H′ H′ and retained against displacement thereon by means of studs O on bars H H′, which enter correspondingly-shaped sockets O′ in the clamp-bars. By lifting the the clamp-bars off from the studs O they may be readily removed from the tank.

The clamps are charged with carbon sticks or rods in the following manner: A workman at each end of one of the clamp-bars places the latter over one of the rows of tubular holders and then lowers the clamp-bar, moving it longitudinally, as may be necessary, to cause the clamp at each end to register and receive one of the projecting ends of the carbon sticks in a holder. The clamp-bar is then pressed down, the effect of which is to cause a carbon stick to enter each one of the clamps and be retained therein by the action of the springs tending to force the jaws together. The clamp-bar is then raised and carried to the plating-tank and placed on the adjustable bars H H, care being taken to so adjust the clamp-bars that studs O will enter the sockets O′ formed therein. Another clamp-bar is then forced downwardly on the remaining carbons in the same row of tubular holders and the clamps filled as before. This operation is continued until all of the carbons in that particular row have been removed, when the carbons are taken from the next row, and so on, until the charging apparatus is empty and requires refilling.

The tubular holders are located in close proximity to each other, and one hundred or more may, if desired, be arranged in each row. As to the clamps, they must be situated farther apart, and hence the tubular holders are located at such a distance apart that the intervening space shall be a multiple of the space between the clamps. For instance, if one hundred tubular holders are arranged in each row and only ten clamps are arranged on each clamp-bar, the space between the adjacent holders is one-tenth the space between the clamps. It therefore follows that when the clamp-bars are forced down on the carbons in the tubular holders the clamp-bar can be adjusted so that the clamps will register with the carbons until an entire row of carbons has been removed.

In forcing the clamps onto the projecting ends of the carbons and in extracting the carbons from their holders the carbons will not always exactly register with the clamps, and hence if the tubular holders were held rigidly in place they would often break either by their engagement with the clamps or by becoming bound in the holders. I obviate all such trouble and damage by mounting the upper ends of each of the tubular holders in a yielding bearing, so that when the clamp engages the end of the carbon the latter will readily yield laterally in any direction and adjust itself to the clamp, and in the withdrawal of the carbons from their holders the latter will adjust themselves so as to be in alignment with the direction of the movement of the clamps when raised, and thus insure the ready removal of the carbons without danger of their binding or breaking.

After all the clamps of the clamp-bars of a plating-tank have been charged with carbons and the bars have been properly mounted on the vertically-movable frame, which latter is in its raised position, as illustrated in Fig. 6, the frame is lowered to the position shown in Fig. 5, which operation causes each carbon to enter one of the glass jars, which is nearly filled with plating solution and contains a cylindrical copper anode. When the clamp-bars are lowered, the movable contact-jaws L L′ connected therewith, receive the upright stationary contacts F and form an extended and intimate electrical contact therewith. The electric current enters the apparatus through a conductor P, connected with the positive binding-post P′, and from thence flows by a conductor G to the copper anode in the jar Q, and from thence through the plating-bath to the carbon, which results in forming an electro-deposition of copper on the carbon. The current passes

up the carbon to the clamp, and from thence through the movable and stationary contacts and conductors G, connected with the latter to the copper anode in the next adjacent jar of the series, and so on, passing successively through all of the jars in the tank to the negative binding-post Q′ and conductor Q^2, the latter being connected to the negative pole of the generator.

After the carbons have been electroplated for a sufficient length of time to form a film of copper of the desired thickness on their surfaces the frame supporting the clamp-bars is raised, thereby simultaneously raising all of the plated carbons from the tank and into the position shown in dotted lines in Fig. 6. Each clamp-bar is then removed from the frame and carried to a discharging apparatus, which is constructed as follows:

R R are uprights fastened at their lower ends to the supporting-base A of the charging apparatus. The upper ends of the uprights are connected by cross-bars S T. A receptacle U, located between the lower ends of uprights R R, is hinged at its lower and front corner by the hinge R′, so that it may be tilted back into the position shown by full lines and receive the carbons as they are discharged from the clamps, and may be tilted over into the position indicated by the dotted lines to facilitate the removal of the carbons. The front wall of the receptacle is hinged at its upper end U′ and is provided with rearwardly-projecting spacing-wires T′.

After the carbons have been electroplated and raised from the tank, as explained, each clamp-bar with the plated carbons attached to its clamps is carried to the discharging apparatus, and the ends of the clamp-bar placed over the upper end of the uprights R R, and the clamps arranged so that their laterally-projecting arms will rest upon the cross-bar S. The clamp-bar is then forced down, so as to exert a sufficient pressure on the yielding arms of the clamps to open the jaws of the latter and thereby simultaneously release the carbons from their clamps. The carbons in falling strike the inclined front wall of the receiving-box, which checks their descent and prevents them from breaking. The wires T′ serve as deflectors, preventing the carbons from falling sidewise into the box, and also serve to retain the discharged carbons in piles arranged parallel to one another. After the receptacle has been filled or the carbons of a plating-tank have been discharged therein it is tilted forward, the hinged section U is unlocked, and the carbons are removed, after which they are washed and dried in any approved apparatus.

It is evident that many articles other than electric-light carbons might be electroplated in accordance with my invention, and, further, that many changes in the construction and arrangement of parts might be resorted to without departing from the spirit of the invention, and hence I would have it understood that I do not restrict myself to the particular construction and arrangement of parts shown and described; but,

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an electroplating apparatus, a charging apparatus comprising a series of tubular holders, substantially as set forth.

2. In an electroplating apparatus, a charging apparatus comprising a series of laterally-yielding holders, substantially as set forth.

3. In an electroplating apparatus, the combination, with a series of holders, of a rack for charging the series simultaneously, substantially as set forth.

4. In an electroplating apparatus, the combination, with a series of holders and yielding supports for the upper or open ends of the holders, of a hinged rack for simultaneously charging all the holders of a row or series, substantially as set forth.

5. In an electroplating apparatus, the combination, with two or more rows or series of tubular holders, of an adjustable hinged rack constructed with grooves for holding and guiding the articles to the holders, substantially as set forth.

6. In an electroplating apparatus, the combination, with a frame and two or more rows of tubular holders mounted therein, of a hinged rack and a rack-bar for pivotally supporting the rack in proper position for simultaneously charging the holders of each row, substantially as set forth.

7. In an electroplating apparatus, the combination, with a frame provided with upper and lower supports, of two or more series of tubular holders mounted in said frame, and a sheet of elastic material for imparting a yielding bearing to the upper and open ends of the holders, substantially as set forth.

8. In an electroplating apparatus, the combination, with the partitions of a plating-tank, of a strip of hard rubber secured to the edge of the partition, and a contact fastened to the strip of hard rubber by screws that extend only partly through the hard-rubber strip, substantially as set forth.

9. In an electroplating apparatus, the combination, with the partitions of the plating-tank, of a strip of flexible rubber placed on the edge of the partition, a strip of hard rubber fastened over the flexible rubber strip, and contacts secured to the hard-rubber strip, substantially as set forth.

10. In an electroplating apparatus, the combination, with a plating-tank, of vertically-movable bars or a frame and clamp-bars independently and detachably secured to said bars or frame, substantially as set forth.

11. In an electroplating apparatus, a clamp provided with a laterally-projecting movable arm connected with the movable clamping-jaw, substantially as set forth.

12. In an electroplating apparatus, the combination, with a base-plate, of a clamping-jaw and contact-jaws, substantially as set forth.

13. In an electroplating apparatus, the combination, with a plating-tank and two or more rows of plating-jars, each furnished with a stationary contact, of two or more clamping-bars provided with clamps and contact-jaws, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM J. POSSONS.

Witnesses:
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W. F. SAYLE.