

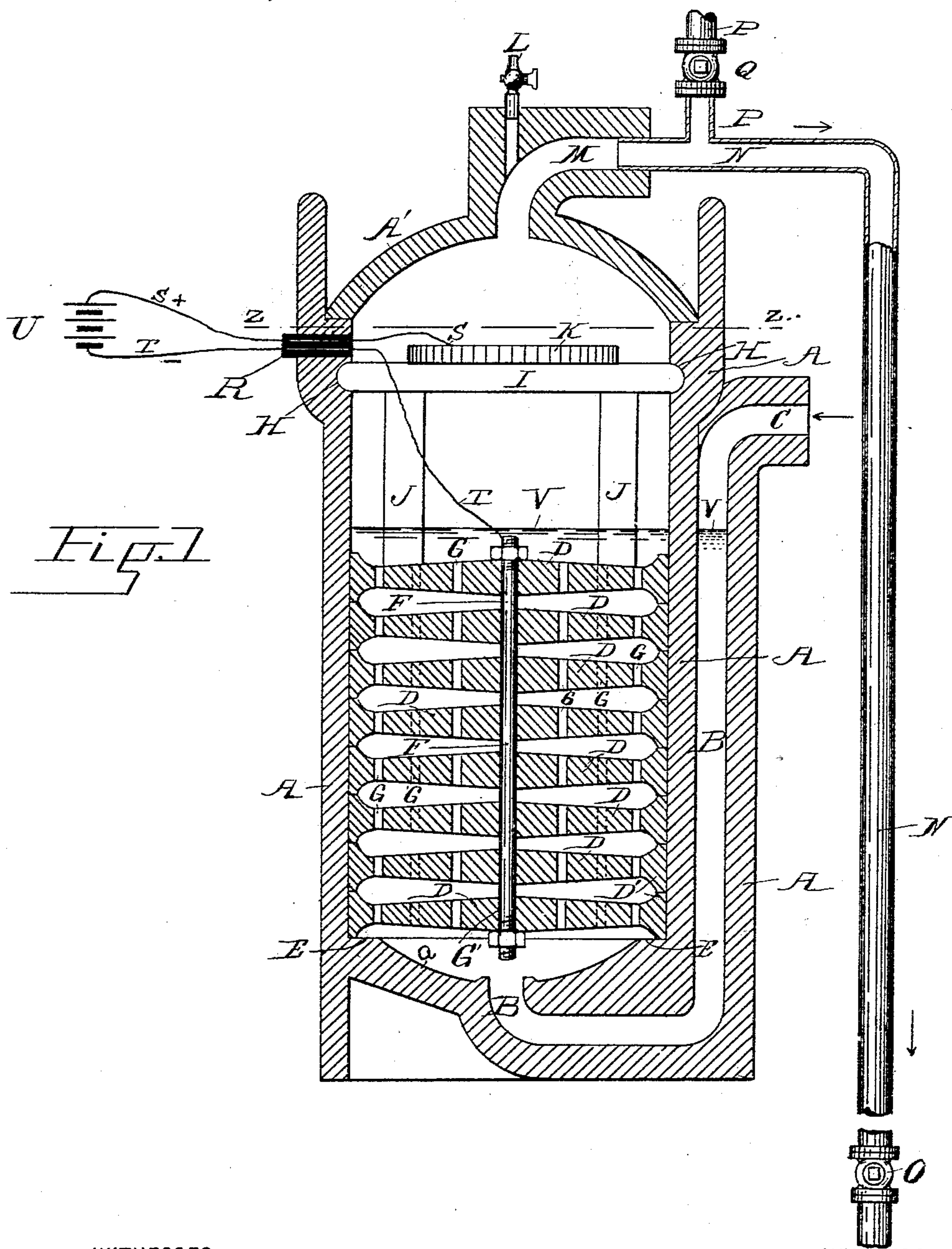
(No Model.)

2 Sheets—Sheet 1.

W. M. FULLER.  
AMALGAMATOR.

No. 504,678.

Patented Sept. 5, 1893.



WITNESSES:

Walter F. Amaris  
J. H. Jochem Jr.

INVENTOR:

Willard M. Fuller,  
BY  
Collamer & Co.,  
ATTORNEYS.

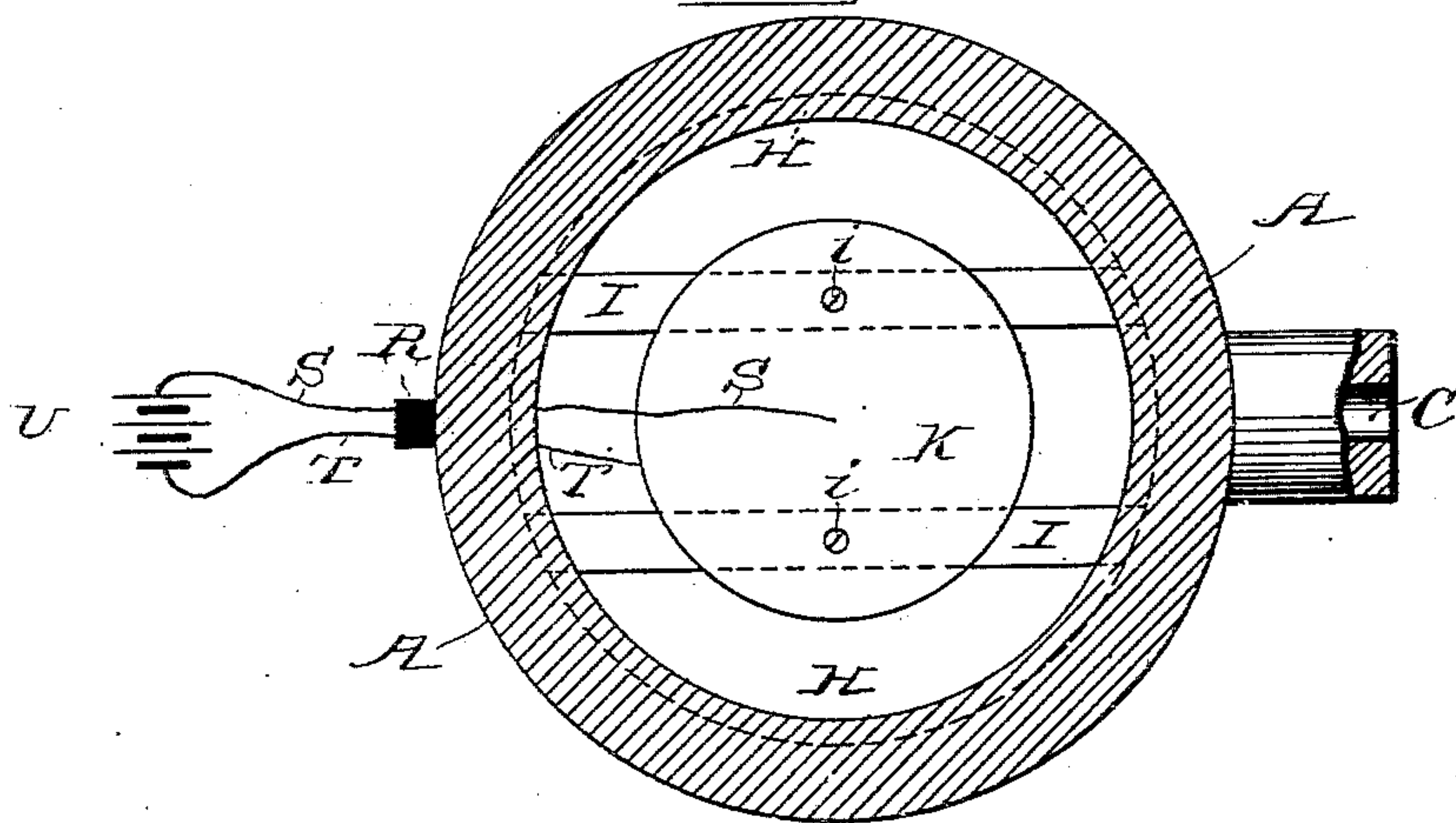
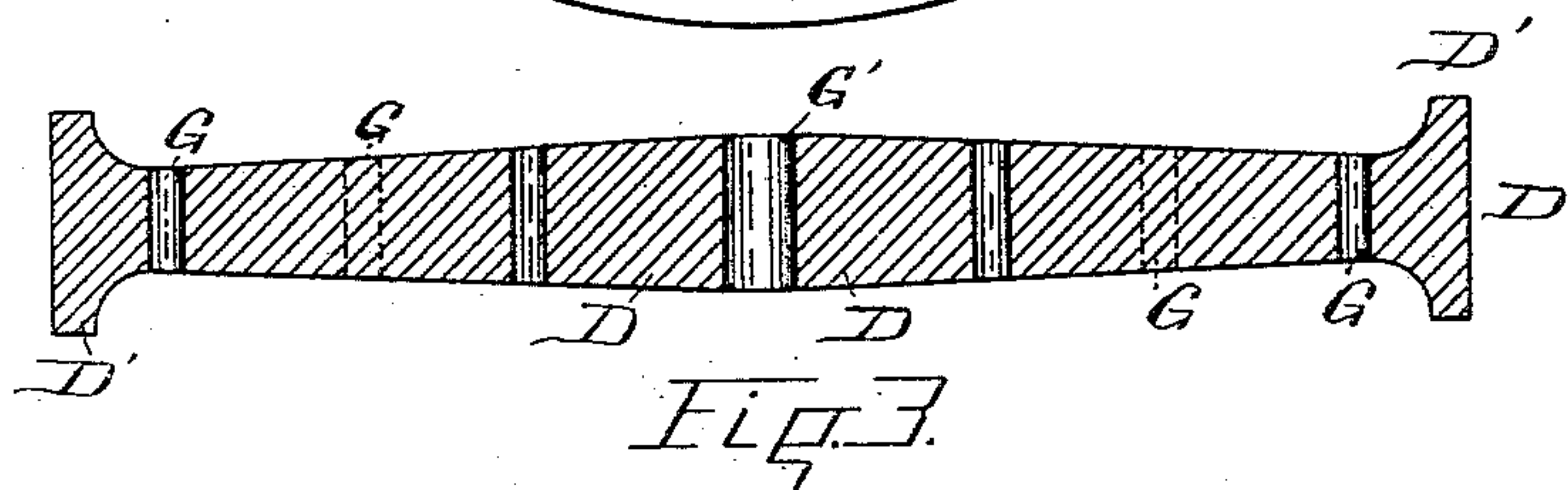
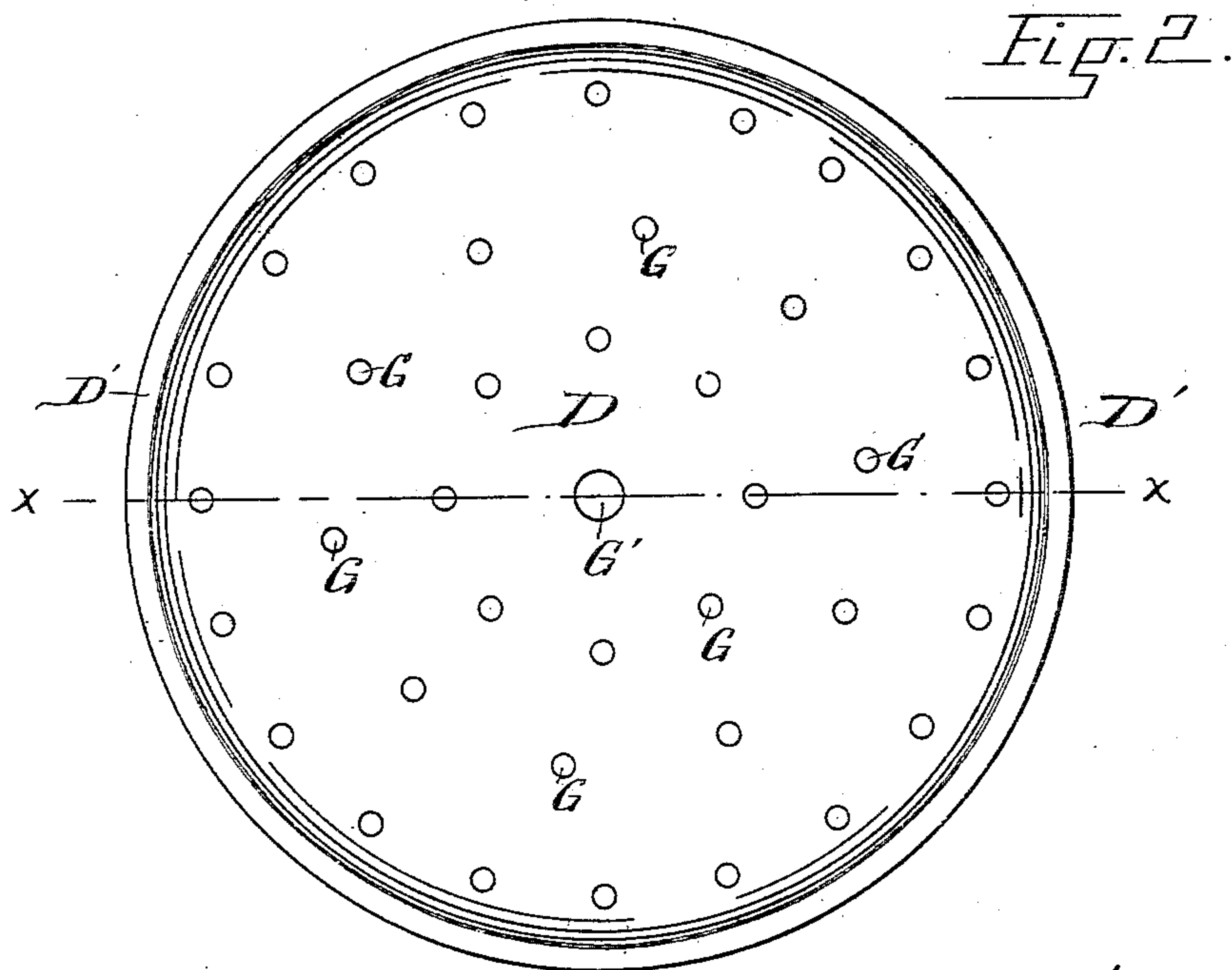
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Walter F. Marice,  
J. W. Johnson Jr.

*Fig. 4.*

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Willard M. Fuller,

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ATTORNEYS.



# UNITED STATES PATENT OFFICE.

WILLARD M. FULLER, OF DENVER, COLORADO.

## AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 504,678, dated September 5, 1893.

Application filed November 22, 1892. Serial No. 452,838. (No model.)

*To all whom it may concern:*

Be it known that I, WILLARD M. FULLER, a citizen of the United States, and a resident of Denver, Arapahoe county, State of Colorado, have invented certain new and useful Improvements in Amalgamators; and my preferred manner of carrying out the invention is set forth in the following full, clear, and exact description, terminating with claims particularly specifying the novelties.

This invention relates to amalgamators, and more especially to that class thereof which employ quicksilver or mercury for separating precious metals from ores; and the object of the same is to provide an improved device for this purpose.

To this end the invention consists in the construction hereinafter set forth, and as illustrated in the drawings, in which—

Figure 1 is a central vertical section of this improved amalgamator. Fig. 2 is an enlarged plan of one of the disks. Fig. 3 is a cross-section of said disk on the line  $x-x$  of Fig. 2. Fig. 4 is a cross section of Fig. 1 on the line  $z-z$  thereof.

Referring to the said drawings, the letter A designates a vessel, preferably of earthenware, in order that it may be kept clean, that metals and dirt shall not adhere thereto, and that when an electric current is used the vessel shall not be a conductor so as to interfere with the desired passage of the current. The vessel also preferably has a concave bottom  $a$  as shown, and with this bottom communicates an inlet pipe B which may be of the ordinary construction, or cored into the body of the vessel as shown, and opening through the side thereof as at C. The concavity of the bottom of the vessel is such as to leave an annular shoulder E within the same; and upon this shoulder is piled a series of disks D—also preferably of earthenware. Each disk (Figs. 2 and 3) has an annular rib D' on top and bottom, the combined thickness of which is greater than at any other part of the disk, so that the lower rib of the lowermost disk rests on the shoulder E, and the lower rib of the next disk above on the upper rib of the lower disk, and so on throughout the series, which preferably comprises about eight of these disks. Each disk has a central bolt-hole

G' and a number of other holes or perforations G extending vertically through its body; and through the aligned bolt-holes is passed a long bolt F which secures the disks of the series tightly together as one—yet permits of their removal when desired.

The letter H designates an interior annular groove in the vessel A near its upper end; and I I are two strips as of wood, of a proper length to be inserted horizontally within the vessel, their ends seated in this groove, and then their bodies separated as shown in Fig. 4—after which a carbon plate K is placed upon and secured to the strips I I by screws  $i i$  or other suitable means. If desired, wedges or braces J J may be placed on end on the series of disks and then the strips I I inserted—the braces being of proper length to fit between the strips and the uppermost disk, so as to hold the series of disks securely in place in the vessel and upon the shoulder E therein. The braces J J may be of wood as well as the strips I I, although the materials of these parts are not vital.

The cover A' of the vessel A is preferably domed as shown, and cored therein is a passage M which connects with the exit pipe N, the latter having a cock O and opening at a point lower than the inlet C so as to form a siphon.

P is a water-supply pipe communicating with the exit pipe N, and having a cock Q.

L is an air-cock in the dome-cover of the vessel.

It will be understood that the three pipes C, N, and P are properly connected with their respective tanks, as set forth as necessary in the description of the operation below, although such parts are not shown in the drawings.

When it is desired to employ electricity to assist the process of amalgamation, a cork or other insulator R is inserted in the side of the vessel, and through the same is led a positive wire S which is connected with the carbon plate K, and a negative wire T which is connected with the bolt F through the center of the disks; and these wires are connected at their outer ends with a suitable battery U as indicated in diagram.

The above described parts are of the desired shapes, sizes, and materials except as



specified; and considerable change from the exact construction noted may be made without departing from the spirit of my invention.

The operation of this improved amalgamator, is as follows: The disks D are assembled in a pile of the desired height and the bolt F passed through them to lock them together. The cover A' being removed from the vessel, these disks are placed in the same upon the shoulder E. The braces J J are then inserted, and next the strips I I which hold the braces down; and the carbon plate K is then secured in place, and the electrical connections made, if they are to be used. All these parts may be removed for cleaning or repair when necessary. The cover A' is then applied, and fastened if desired, and the pipes connected properly as above described; and the whole is ready for use. Quicksilver or mercury is then passed into the interior of the vessel—possibly through the pipe P—and allowed to rise therein to the line V above the uppermost disk D. The cock O is then closed and the air-cock L opened. The ore, which is in a powdered or pulverized state mixed with water to a proper consistency to permit it to flow freely, is led from a vat into the inlet C, whence it passes down pipe B into the interior of the vessel A, thence diverging into small particles passes through the perforations G in the lowermost disk D, thence through the quicksilver above that disk, and so on to and through all the disks and quicksilver. Finally it rises above the carbon plate within the vessel A, and at last passes off through exit pipe N whose lower end is lower than the vat or the inlet opening C so as to cause the flow of the pulp; and all the fine particles of precious metal will be retained and caught by the quicksilver. If the electric current is used, it keeps the quicksilver bright and active as well known in the art; and the quicksilver by its greater specific gravity always remains at the bottom of the vessel A—not passing out the exit pipe N with the waste ore, as will be understood. From time to time the quicksilver and precious metals amalgamated are removed, and a fresh supply provided.

What is claimed as new is—

1. In an amalgamator, the combination with a vessel having cored in its side an inlet pipe with an inlet opening near the top of the vessel, and an exit pipe leading from the top of the vessel to a point below the inlet opening; of a series of disks arranged in a pile within the vessel and provided with perforations for the flow of liquid there-through, and quicksilver in the jar to a height above said pile but below said inlet opening, as and for the purpose set forth.

2. In an amalgamator, the combination with a vessel having an annular shoulder at its bottom inside, an inlet pipe communicating with said bottom, and an exit pipe leading from the top of the vessel; of a series of disks fitting closely but removably within

the jar or vessel, each disk having on its upper and lower faces annular ribs whose combined thickness is greater than that of the body of the disk, and said body being provided with central bolt-holes and additional perforations, and a bolt passing through all said bolt-holes, as and for the purpose set forth.

3. In an amalgamator, the combination with a vessel having inlet and outlet openings and provided with an interior annular groove near its top, and a shoulder at the bottom of and within said vessel; of a series of disks having perforated bodies with annular ribs, the lowermost resting upon said shoulder and the others superimposed thereon, two strips removably placed across said vessel with their ends in said groove, a plate detachably mounted on said strips, and braces between said strips and the uppermost disk, as and for the purpose set forth.

4. In an amalgamator, the combination with a vessel having a concave interior bottom, an ore-inlet pipe cored in the side of said vessel and leading from said concave bottom to a point near the top of the vessel, and a series of perforated disks detachably fixed within said vessel; of a removable cover for the vessel, an air-cock therein, an exit-pipe leading from said cover to a point below the inlet opening of said ore-pipe, a cock in this pipe, a water-supply pipe communicating with said exit pipe, and a cock in the water-pipe, all as and for the purpose set forth.

5. In an amalgamator, the combination with an earthenware vessel, inlet and outlet pipes connected therewith, and a series of earthenware disks within said jar; of a bolt connecting said disks, quicksilver in the vessel to a height above the disks and bolt, a carbon plate supported in the vessel above the quicksilver, an insulator in the side of the vessel, and wires leading from a battery through said insulator respectively to said bolt and plate, as and for the purpose set forth.

6. In an amalgamator, the combination with an earthenware vessel, inlet and outlet pipes connected therewith, a series of perforated earthenware disks piled within said vessel, a bolt passing through all said disks, and quicksilver in the vessel to a height above said disks and bolt; of strips removably secured in the vessel above the disks, a carbon plate removably secured thereon, braces between said strips and the uppermost disk, said strips and braces being non-conductors of electricity, and wires leading from a source of electric supply respectively to said plate and bolt, as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my signature on this the 18th day of November, A. D. 1892.

WILLARD M. FULLER.

Witnesses:

WILLIAM N. MCBIRD,  
N. M. LAWS.