

J. WHITING.
CIRCULATING DEVICE FOR MERCURY.
APPLICATION FILED DEC. 16, 1908.

938,191.

Patented Oct. 26, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

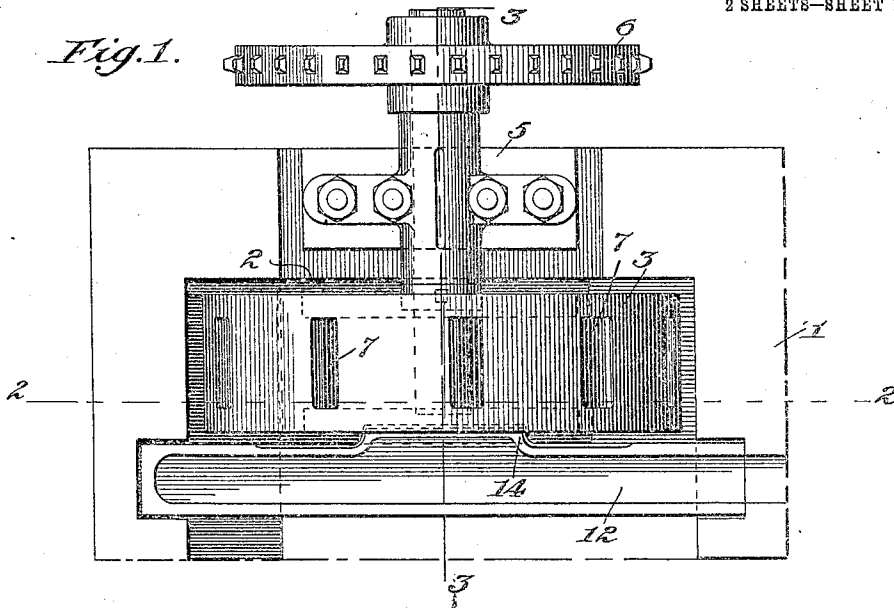


Fig. 2.

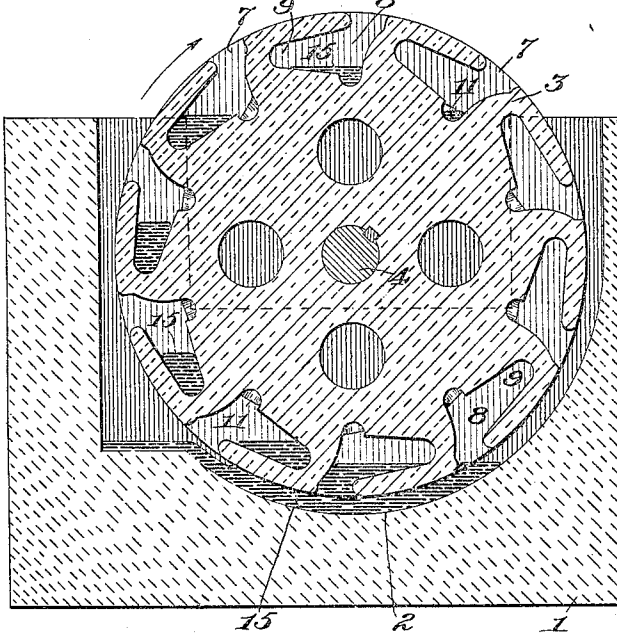
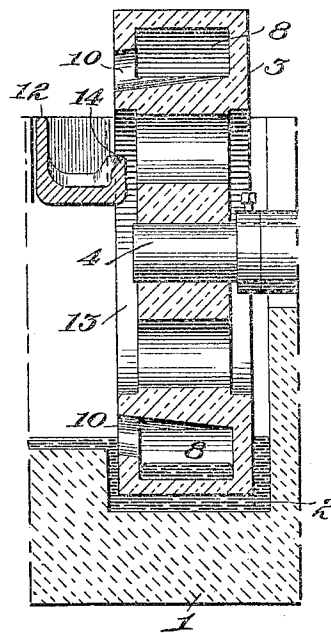


Fig. 3.



Witnesses:

Geo. E. Chubb
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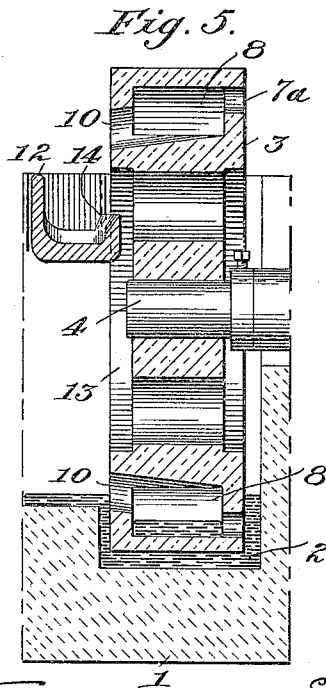
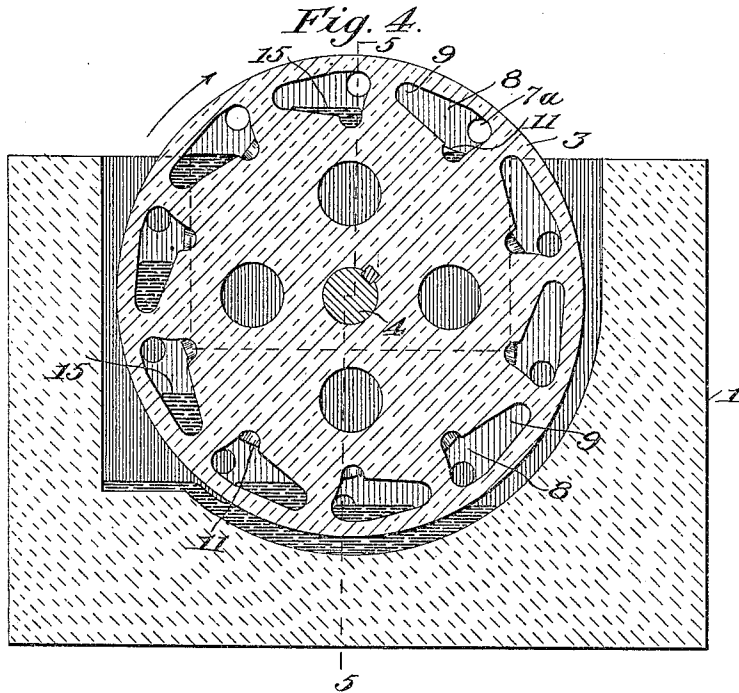
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2 SHEETS—SHEET 2.



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JASPER WHITING, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE WHITING COMPANY,
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CIRCULATING DEVICE FOR MERCURY.

938,191.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed December 16, 1908. Serial No. 467,848.

To all whom it may concern:

Be it known that I, JASPER WHITING, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Circulating Devices for Mercury, of which the following is a specification.

This invention relates to pumping or circulating liquid metal in connection with the operation of an electrolytic cell, and has special reference to that type of cell which is employed for the decomposition of alkali chlorids. The liquid metal commonly used for this purpose is mercury, and the pumping or circulating of this metal is in practice attended with serious difficulties. By reason of its high surface tension mercury or its amalgam with the alkali metals tends, if agitated, to separate into small globular particles, often so minute that they fail to re-unite with the main body of metal and are carried away by the electrolyte, thus entailing very considerable loss. Ordinary reciprocating or high-speed pumps or circulating devices are accordingly quite unsuited for the purpose described. It is also important that the circulating or elevating apparatus should be simple and reliable in construction and operation, and it should preferably be so designed that it may be constructed or molded of earthenware, cement or other material not injuriously affected by mercury, its alkali metal amalgams, the electrolyte, or the products of electrolysis. A construction fulfilling these several requirements is shown in the accompanying drawing wherein:—

Figure 1 is a plan view of one construction embodying my invention; Fig. 2 is a longitudinal vertical section thereof on line 2—2 of Fig. 1; Fig. 3 is a transverse vertical section on line 3—3 of Fig. 1; Fig. 4 is a longitudinal vertical section of a modified construction; and Fig. 5 is a transverse vertical section on line 5—5 of Fig. 4.

In the drawings, 1 represents the pump casing, which may consist of cement, concrete or the like, and may be formed integral with the body of an electrolytic cell, for example of the type illustrated in my copending application Ser. No. 467,847 filed December 16, 1908. At the bottom of the casing is a sump 2, above which a rotary disk pump or elevator 3 is mounted upon a

horizontal shaft 4 in a bearing 5 carried by the casing 1. This disk is rotated in the direction indicated by the arrows by power applied to the shaft 4, for example through a sprocket wheel 6.

In the form illustrated in Figs. 1, 2, 3 the pump comprises a disk 3 of earthenware, cement or other ceramic material, having a plurality of peripheral apertures 7 communicating with interior pockets 8. Preferably each pocket is formed with an extension 9 substantially in the line of rotation of the disk, these extensions greatly increasing the capacity of the pockets, as will be evident from the drawing. Each pocket is illustrated as provided with a lateral discharge orifice 10 for mercury, these orifices being preferably somewhat inclined toward the center of the disk as shown, and communicating with interior channels or trough-like depressions 11 similarly inclined. 12 is a trough or receptacle for receiving the mercury and conveying it to the desired point, for example the decomposing compartment of an electrolytic cell. This receptacle is placed as close as is practicable to the points of discharge of the mercury through the lateral orifices 10, and the dimensions of the several parts of the device, and the rate of rotation of the disk, are such as to avoid any breaking of the stream of mercury such as would result in a flouting action, in its passage from the pockets to the receptacle. Preferably the rotary disk is formed with a circular or annular recess 13, which permits the lip 14 of the trough 12 to extend beneath the lateral discharge orifices 10, when these are in their upper position, whereby the mercury may flow directly into the trough 12 without being projected over an intervening gap.

In the modified form illustrated in Figs. 4 and 5 the construction is similar in all respects except that the inlet apertures for mercury designated 7^a, are disposed in the side of the disk 3 in the peripheral portion thereof.

The operation of the pump is as follows:—Mercury is permitted to flow, for example from the oxidizing compartment of an electrolytic cell, to the sump 2, and thence into the lower pockets of the disk 3. By rotation of the disk in the direction indicated by the arrow (Figs. 2, 4) the mercury, indicated at 15, is raised without agitation and

as the pockets successively reach the level of the trough 12, the mercury flows therefrom through the orifices 10. The pockets and orifices are of such size, and such rate of rotation of the disk is maintained, that by the time the discharge orifice of any particular pocket has, in the course of its descent, again reached the level of the trough, all the mercury has been discharged from the pocket. In like manner all of the pockets are successively filled, raised and discharged.

It will be understood that the form of the pockets may be varied as desired, that these may be arranged to discharge on either or both sides of the disk, and that the apparatus may be otherwise modified without departure from the spirit of my invention.

I claim:

1. In combination with the decomposing and oxidizing compartments of an electrolytic cell having a cathode of mercury, a circulating device for mercury comprising a disk or cylinder mounted for rotation, pockets for mercury in the peripheral portion of said disk, lateral discharge orifices for said pockets, and a receptacle for mercury in proximity to said discharge orifices in their uppermost position.

2. In combination with the decomposing and oxidizing compartments of an electrolytic cell having a cathode of mercury, a circulating device for mercury comprising a disk or cylinder mounted for rotation, pockets for mercury in the peripheral por-

tion of said disk, lateral discharge orifices for said pockets, a recess in the side of said disk, and a receptacle for mercury extending into said recess and disposed in proximity to said discharge orifices in their uppermost position.

3. In combination with the decomposing and oxidizing compartments of an electrolytic cell having a cathode of mercury, a circulating device for mercury comprising a disk or cylinder of ceramic material mounted for rotation, pockets for mercury in the peripheral portion of said disk, lateral discharge orifices for said pockets, and a receptacle for mercury in proximity to said discharge orifices in their uppermost position.

4. In combination with the decomposing and oxidizing compartments of an electrolytic cell having a cathode of mercury, a circulating device for mercury comprising a disk or cylinder mounted for rotation, pockets for mercury in the peripheral portion of said disk, each pocket provided with an extension in the line of rotation of the disk, lateral discharge orifices for said pockets, and a receptacle for mercury in proximity to said discharge orifices in their uppermost position.

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

JASPER WHITING.

Witnesses:

JOHN G. PALFREY,
BERTHA S. CHASE.