

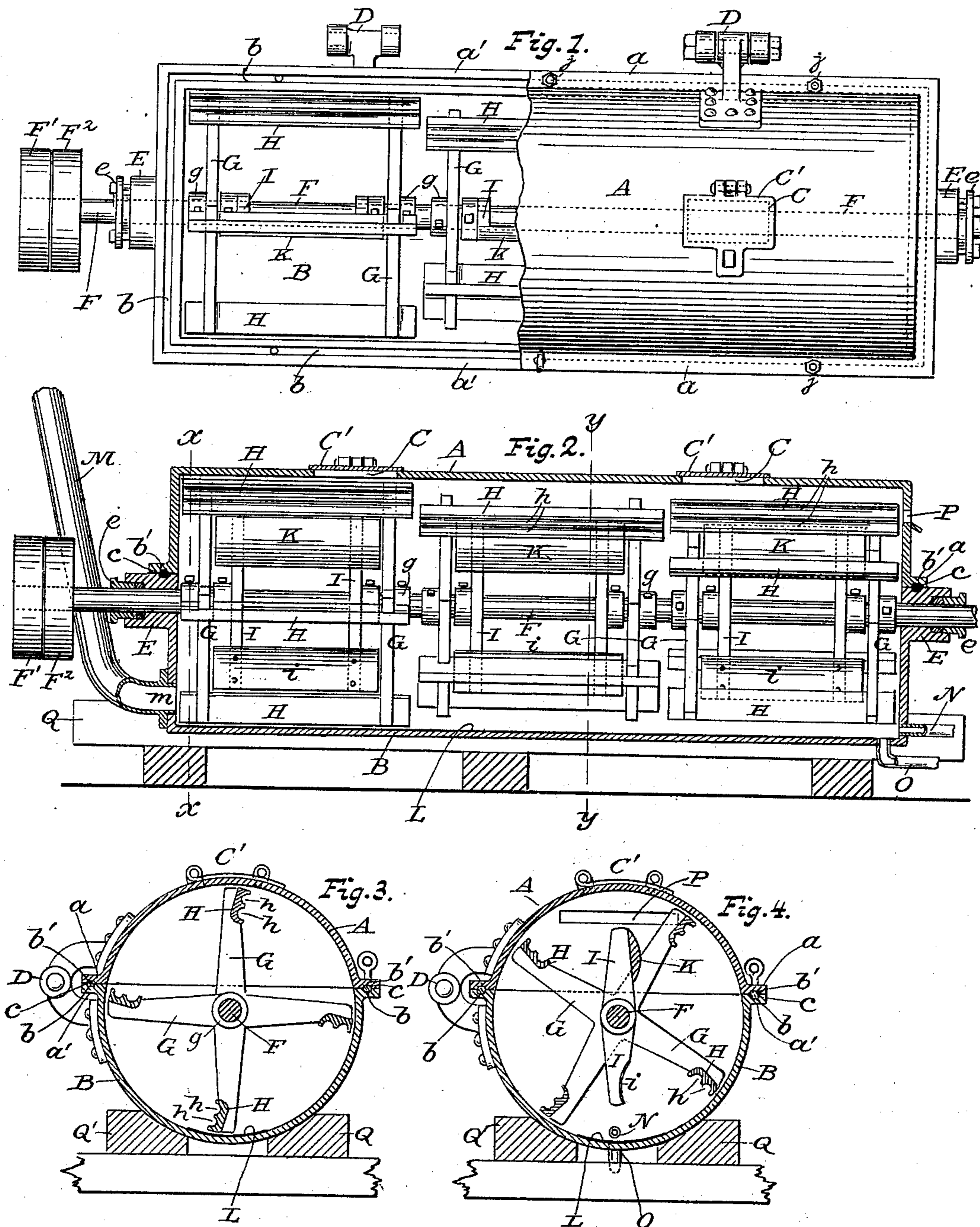
No. 719,161.

PATENTED JAN. 27, 1903.

J. E. SUTPHEN.  
ORE AMALGAMATOR.

APPLICATION FILED MAR. 20, 1902.

NO MODEL.



*Witnesses.*

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# UNITED STATES PATENT OFFICE.

JOHN E. SUTPHEN, OF ALBANY, NEW YORK, ASSIGNOR TO NEWTON  
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## ORE-AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 719,161, dated January 27, 1903.

Application filed March 20, 1902. Serial No. 99,150. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. SUTPHEN, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented a new and useful Ore-Amalgamator, of which the following is a specification.

My invention relates to improvements in amalgamating-machines in which the gold and silver bearing materials are brought into intimate contact with mercury by mechanical movement in conjunction with the particular construction of the apparatus therefor; and the objects of my improvement are, first, to provide an amalgamator adapted to thoroughly and economically extract the gold and silver from ores and materials containing those metals; second, to afford facilities for a continuous feed and discharge of the material subjected to the operation of the mercury upon the gold and silver for the extraction of such metals from such material as it passes through such amalgamator, and, third, to reduce or counteract the tendency of the mercury to flour and be carried off with the discharging material and become foul or clogged with foreign substances, and thereby inoperative as the active agent of amalgamation. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view with part of the cover broken away; Fig. 2, a vertical longitudinal section of the device shown in Fig. 1, taken on the axial line of the cylinder; Fig. 3, a vertical cross-section taken on the line  $x x$  of Fig. 2, and Fig. 4 a vertical cross-section taken on the line  $y y$  of Fig. 2.

Similar letters refer to similar parts throughout the several views.

As illustrated in the drawings, A B represent an outer shell or cylinder supported on plates or foundations Q Q', preferably constructed of the upper portion A, detachable from the lower portion B, so that it may be lifted back on hinges D, giving access when open to all the contained apparatus and to the contents of the lower portion B. The upper portion of this shell or cylinder is provided with flange  $a$ , carrying groove  $b$ , and the lower portion is provided with similar

flange  $a'$ , provided with groove  $b$ , one of which grooves will carry packing  $c$ , and when closed said flanges, grooves, and packing meet, and the shell or cylinder is made tight and secure by bolts or screws  $j$ . I do not wish to confine myself to the illustrated method of making the two portions of the cylinder tight, as any usual known and suitable method may be employed. The cylinder is further provided with hand-holes C, securely closed by hand-hole covers C', through which access may be had to the interior of the shell or cylinder when it is desired to do so without drawing down the contents below the opening-line at flanges  $a$  and  $a'$ , for which drawing down provision, however, is made through outlet N. The heads of the shell or cylinder are provided with journals E and stuffing-boxes  $e$  to carry the shaft F, provided with driving-pulley F' and loose pulley F<sup>2</sup>. Fixed to this driving-pulley F are arms G, carrying paddles H, which paddles are provided with longitudinal cups  $h h$ , and such arms and paddles are preferably provided in two or more sections, with the arms of each section fixed at a different angle on the shaft from the arms of the other section or sections, all arranged to revolve within said shell or cylinder, said paddles H traveling near the inner surface of such shell or cylinder. Within the arms G G are provided arms I I, swinging loose on shaft F, carrying float K at the upper end of said arms I I and carrying silver plate  $i$  at the lower end of the arms I I, which arms are held in a practically perpendicular position by the greater weight of said silver plate  $i$  over said float K and said arms playing loosely on shaft F. Said arms I I are constructed of a length to permit paddles H to revolve around them and are to occur within each section of paddles H, carried by arms G G.

L represents a silver plate lining a lower section of the whole length of the shell or cylinder A B.

M represents a feed-pipe through which materials to be treated may be forced into the amalgamator through opening  $m$ , and P is an opening through which said materials or the waste thereof may be discharged by reason of pressure at the point of feed and agitation from revolution of paddles H.

N illustrates an opening where the materials may be drawn off to a point below the opening-line of the machine when it is desired to open the same or may be drawn off down to the mercury when it is desired to clean up the result of work done, and O represents an opening where the mercury may be drawn off. The introduction of mercury into the machine may be through the feed-pipe M and opening *m*, or through the hand-holes C, or when the machine is opened.

When the amalgamator is in operation, the ore, sand, or other gold and silver bearing material, reduced to a powder and mixed with a suitable amount of water and with other substances, if desired, is charged through the feed-pipe M, being forced by pressure, preferably of gravity, into the cylinder A B, wherein a suitable quantity of mercury has been placed. Such mercury being of greater specific gravity than the materials to be treated rests in the lower portion of the cylinder, which lower portion is preferably lined with a sheet of silver L, between which silver and mercury there is such action as tends to keep the mercury from becoming foul and inoperative through the absorption of foreign substances. The use of such silver lining may be unnecessary in the case of some ores and materials; but in most cases it is desired, together with the silver plates *i*, affixed to the float-arms I I, and which plate *i* assists in said beneficial action on the mercury, and in connection with the use of these silver plates I prefer the cylinder and paddles to be of wood, though any material suitable for such construction may be used. When said cylinder containing mercury, as above set forth, is charged through said feed-pipe with the materials to be treated, the paddles H H, carried by arms G G, are revolved through the material, and as each paddle reaches the lower swing of its revolution it passes through the mercury and by the longitudinal cups *h h* dips up a portion of the mercury and carries it along on its upward swing until the paddle reaches such position that the mercury discharges from said longitudinal cups by reason of gravity. As the mercury is discharged at the various positions through the material it by gravity

passes down through the material, coming in contact with the different particles of gold and silver, amalgamating with them, and carrying the gold and silver thus taken up down into the mass of mercury at the bottom, to again and again make its passage as described, carried up by the longitudinal cups in the paddles and descending by gravity through the material and coming in frequent contact with the silver plates *i i* and L. During the action described the floats K, with their opposite plates *i*, steady the material and prevent violent agitation, jar, and concussion, the stirring of the material and distribution through the same of the mercury being accomplished without flouring the mercury, while at the same time its distribution is thorough, and an unusually large percentage of the gold and silver, together with the finely-divided particles and flour-gold which so often escaped in previously-used amalgamators, is recovered. The operation of the amalgamator is made continuous by the pressure, regulated to suit the conditions, constantly forcing the material in at the feed-opening and causing it to overflow at the discharge-opening P, to reach which it has to pass the whole length and breadth of the amalgamator and is submitted to the action of the various paddles and the constantly-falling mercury.

What I claim is—

In an amalgamator, the combination of a stationary cylinder or shell having paddles arranged to revolve therein adapted to pass through mercury contained in the lower part of the cylinder or shell and carry it up to various points of discharge through the material being treated, with arms swinging loosely from a shaft through such cylinder or shell and carrying at the upper end of such arms a float and at the lower end thereof a silver plate adapted to prevent violent agitation, jar and concussion of the material and the mercury and for said silver plates to come in contact with the mercury, substantially as shown and described.

JOHN E. SUTPHEN.

Witnesses:

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