

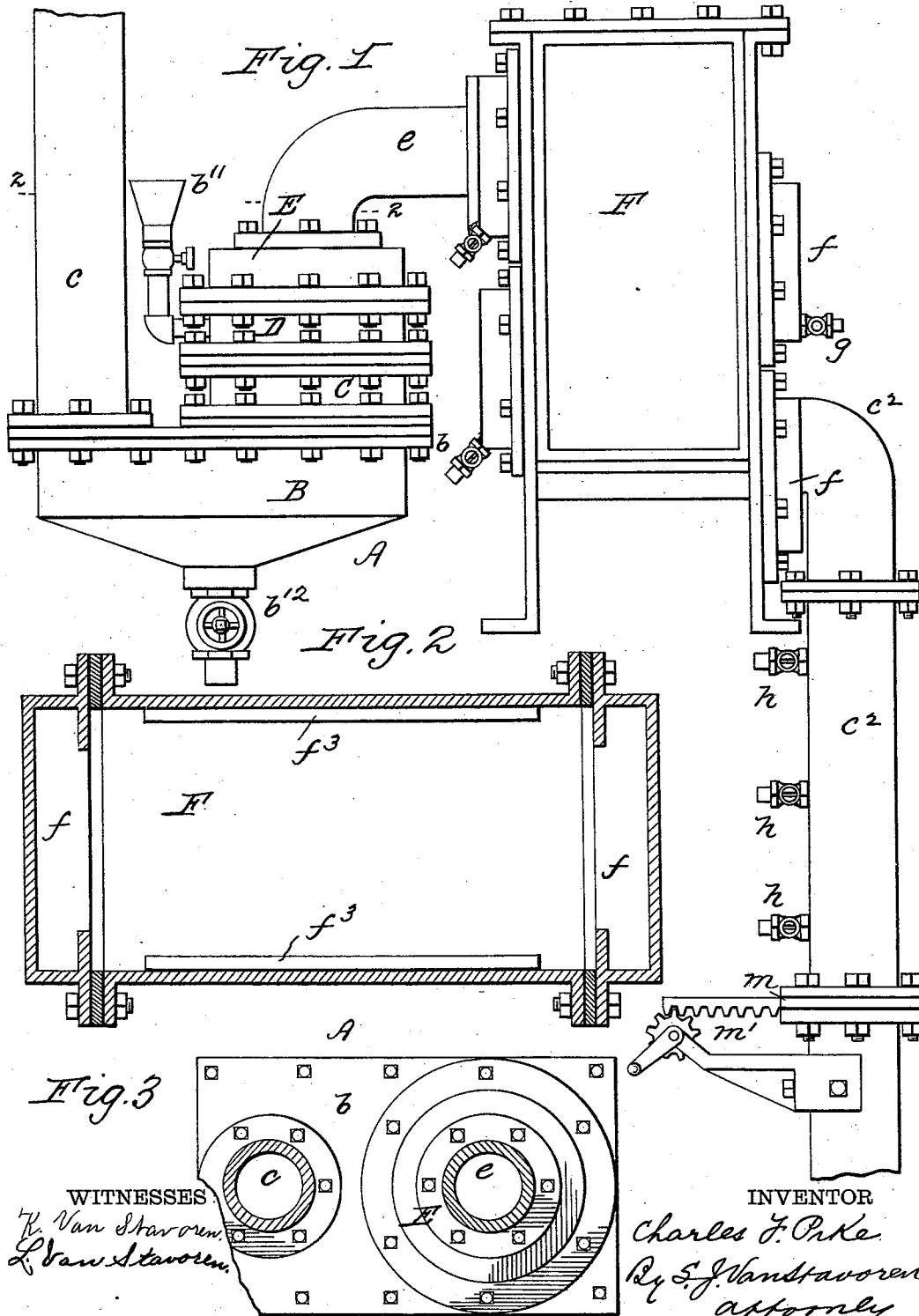
(No Model.)

3 Sheets—Sheet 1.

C. F. PIKE.
AMALGAMATOR.

No. 528,976.

Patented Nov. 13, 1894.



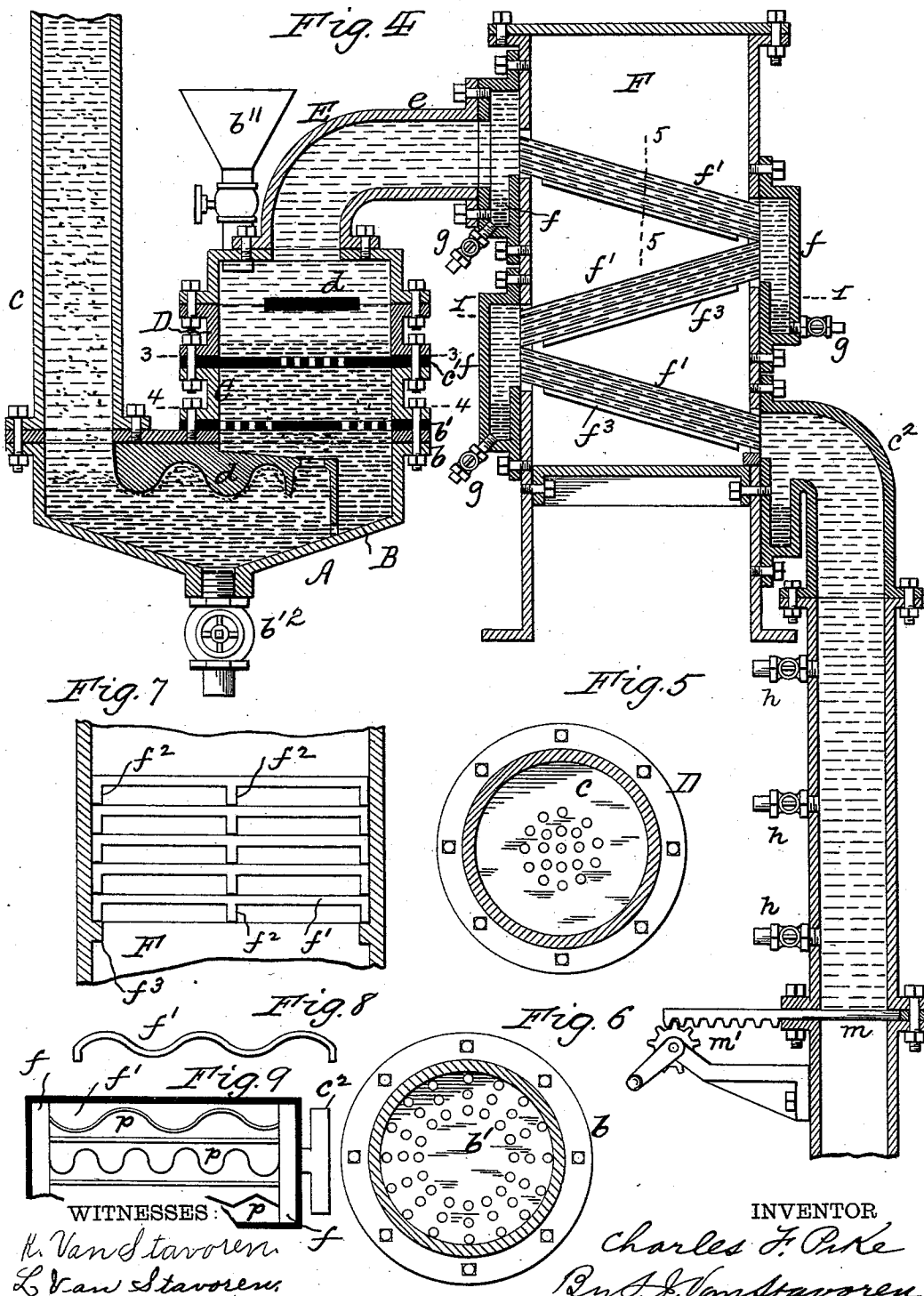
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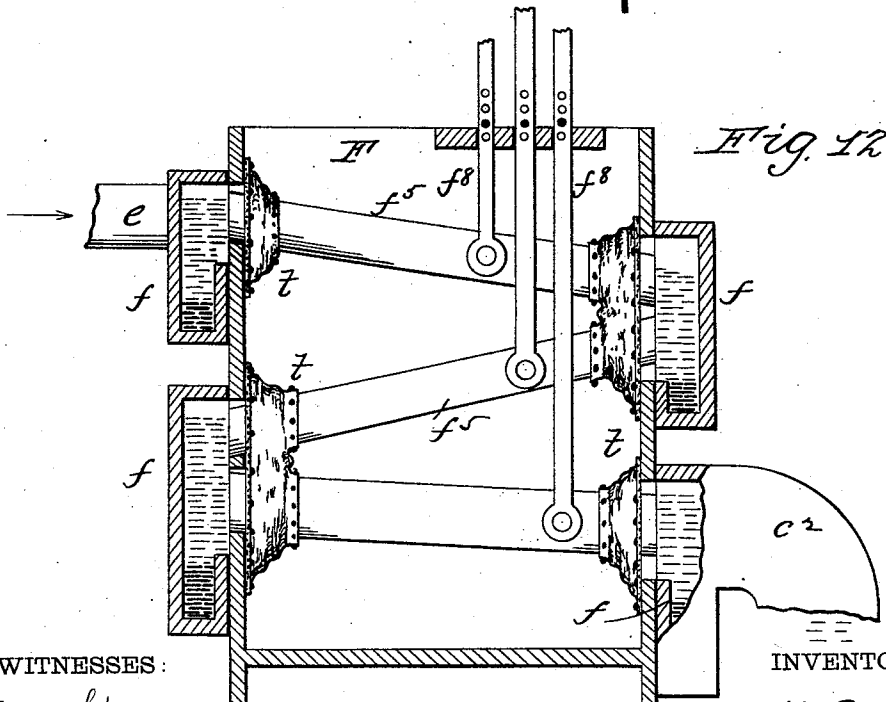
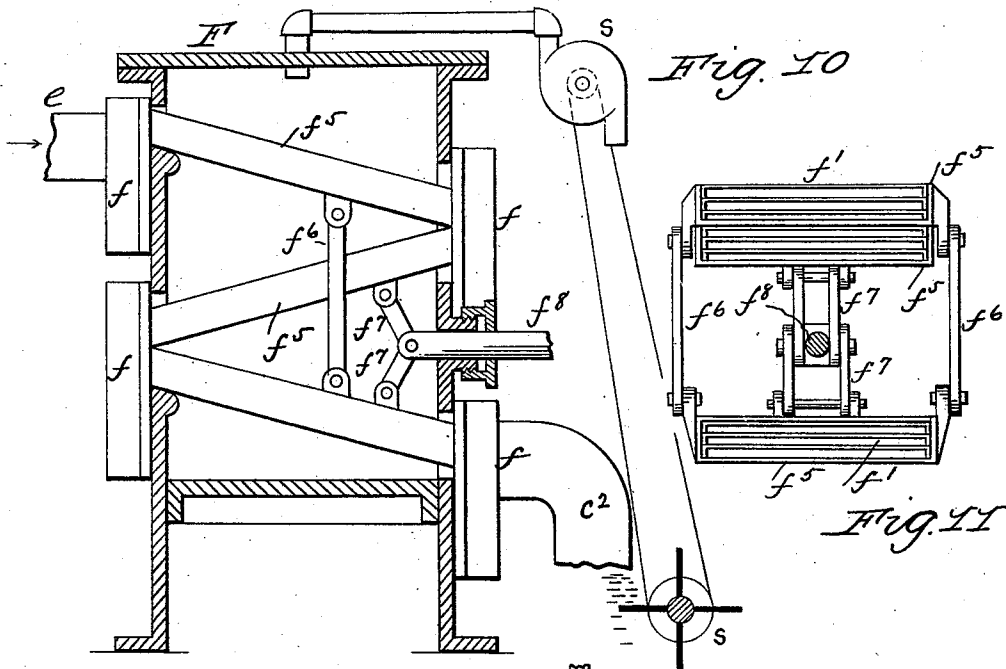
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WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES F. PIKE, OF PHILADELPHIA, PENNSYLVANIA.

AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 528,976, dated November 13, 1894.

Application filed June 10, 1893. Renewed April 17, 1894. Serial No. 507,941. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. PIKE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Amalgamators; 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 has relation to amalgamators of the form wherein suction force is used to propel the ore or gangue through the mercury or the amalgamator, and a series of separate ways or chutes is employed for dividing the ore or gangue into different streams or flows in its passage through the amalgamators.

My invention has for its object an improved form of such device for obtaining a rapid and thorough extraction or amalgamation of all the metal from the ore or gangue without waste of mercury.

My invention accordingly consists of the combinations, constructions and arrangements of parts as hereinafter more fully described in the specification and pointed out in the claims.

Reference is had to the accompanying drawings, wherein—

Figure 1 is an elevation of a form of amalgamator embodying my improvements. Fig. 2 is a section on the line 1—1 Fig. 4 with division plates removed. Fig. 3 is a section on line 2—2, Fig. 1. Fig. 4 is a vertical section of Fig. 1. Fig. 5 is a section on line 3—3, Fig. 1. Fig. 6 is a section on line 4—4, Fig. 1. Fig. 7 is a broken section on line 5—5, Fig. 1. Fig. 8 is an end view of a modified form of division plate for the amalgamator. Fig. 9 is a horizontal section of modified form of division plate chamber for the amalgamator. Fig. 10 is an elevation, partly sectional of such chamber with means for simultaneously varying the inclination of all the division plates alike. Fig. 11 is an end elevation of the same, partly sectional, detached from the frame or casing of the amalgamator, and Fig. 12 is a view similar to Fig. 10 showing sepa-

rate adjusting means for each cluster or set of division plates.

A represents the inlet or initial chamber of the amalgamator, which may be of any suitable form, but which is shown composed of a lower receiving chamber B, having to one side thereof an inlet pipe *c*, of a siphon or suction appliance, which propels the ore or gangue through the amalgamator, and to the other side thereof an open flange top *b* upon which rests a perforated plate *b'* and to which is bolted a tubular section C.

The chamber B from its inlet *c* to the center of the perforated plate formed between the corrugations on the under side of a plate *d* forming a part of or secured to the top plate *b* of chamber B, and the surface of the mercury in chamber B adjacent to said corrugation is provided with a sinuous or tortuous path *d* for the travel of the ore or gangue through the mercury in said chamber before arrival at plate *b'* which path may be provided for as shown or as desired and is employed to obtain greater degree of contact of metal in the ore with the mercury in chamber B, or in other words to repeatedly turn over or agitate the ore or gangue in its passage through said chamber in order that the maximum amount of amalgamation may take place therein as possible before passing to the remaining parts of the amalgamator.

The perforated plate *b'* is blank in the center or middle so as to cause the ore or gangue to spread itself after leaving the path *d* on its way to plate *b'*. Upon the flanged top of section C is a centrally perforated plate *c* above which is a succeeding section D with an imperforate plate *d* in alignment with the perforations in plate *c'*. The section D with plate *c* is bolted to the top of chamber B, as shown, and to section D is bolted the outlet section E which has a pipe connection *e* with a mercury catch pocket *f* communicating with chamber F.

As many sections C and D and with interposed perforated plates *c'* may be used as desired. In all cases the perforations in one plate are opposite the blank or imperforate sections of the succeeding plate; the last plate of the series being preferably an imperforate one.

Such arrangement provides for the repeated distribution or spreading of the ore or gangue in its passage through the mercury in the sections C D for obtaining greater contact with the metal in the ore or gangue and corresponding amalgamation in the initial device A.

The chamber F contains the division chutes or amalgamating plates f' for separating the flow of gangue or ore into separate thin streams to obtain the maximum exposure of the same to the amalgamating division plates f' . As shown they are composed of series or gangs arranged successively in opposite directions as shown or otherwise as desired. These plates have side and middle strengthening ribs f^2 on their under surfaces and are superposed upon one another; the bottom one being supported upon ledges f^3 formed on or secured to the sides of chamber F.

At the end of each gang of plates f' are mercury catching pockets f which are common to all the plates of the series or gangs leading thereto. These pockets f may be of any suitable form and secured to the chamber F in any desired manner and have drain cocks g . The provision of these pockets f at each end of the gangs of plates f' provides for the comingling of all the streams of water coming from one gang before the same pass into a succeeding cluster. Hence the ore or gangue in the passage through chamber F is repeatedly successively divided into different streams or flows and then merged into a common stream or flow for successive division into separate streams. This successive division and merging of the flow more thoroughly agitates, divides or separates the bulky material of the ore or gangue for obtaining the greatest possible degree of exposure of metal to the amalgam plates and corresponding degree of amalgamation. The successively located pockets f also serve to catch all the mercury that may be carried with the gangue or ore so that none is wasted. The last pocket f of the series has a connection with the outlet pipe c^2 of the suction device which is provided with differently located outlet-cocks h for varying the degree of suction and hence the velocity of the flow through the amalgamator, and at its termination has a drain valve m with actuating mechanism m' for removing any accumulations of metal or mercury or other material therein, said pipe c^2 when valve m is closed forming a settling pocket or chamber. If desired the discharge of the flow may be through valve m .

The plates f may be straight in cross-section as shown in Fig. 7 or curved or corrugated as illustrated in Fig. 8.

If desired the ways or paths between superposed plates may be equal in width or unevenly divided by the introduction of corrugated or otherwise formed metal strips p as illustrated in Fig. 9.

If desired any suitable actuating devices may be used for exhausting the air from the chamber F or the bend of the siphon formed

by chambers A and F and the inlet and outlet pipes. In the drawings, see more plainly Fig. 10, such devices are shown composed of a suction pump or fan s driven by a water motor s' actuated by the flow from pipe c^2 .

The gang of division amalgam plates F may be located to be non-adjustable as to their inclination as shown in Fig. 4, or their inclination may be all varied alike and at once or separately and differently as desired.

In Figs. 10 and 11 the gangs are shown located in boxes or troughs f^5 which are connected to and supported upon a suitable arrangement of links $f^6 f^7 f^7$ having a suitable actuating bar f^8 for simultaneously adjusting all the gangs for varying their inclination alike for all if all have the same inclination. If not such inclination will be varied accordingly.

In Fig. 12 each gang is provided with its own adjusting device f^3 so that each may be separately adjusted and its inclination varied as desired without interfering with that of any of the others.

The pockets f may communicate with chamber F as shown in Fig. 4, or such communication may be cut off by means of flexible or yielding coupling t between the ends of the gangs and the walls of chamber F as shown in Fig. 12. The chamber B has a suitably located mercury supply pipe b^{11} and a drain outlet cock b^{12} .

As the construction and arrangement of the novel features of my invention may be variously changed without departing from the spirit of the same I do not confine myself to them as shown and described.

What I claim is—

1. An amalgamator having an initial chamber containing mercury, a sinuous or tortuous path therein for the flow of ore or gangue there-through, and a chamber containing gangs of division amalgam plates communicating with separate common pockets for alternately and repeatedly dividing the flow into separate streams and reuniting them into a single flow, substantially as set forth.

2. In an amalgamating device having a flow for passing the ore or gangue through the amalgamator, gangs of chutes in the path of said flow for dividing the flow into a number of thin streams, and pockets at the ends of said gangs for reuniting said streams in a single flow, substantially as set forth.

3. In an amalgamator, the chamber B containing a column of mercury, a series of superposed casing sections with plates between said sections, to one side of and above chamber B, said plates each having perforated and imperforated sections, and the perforations in one plate being opposite to the blank or imperforate section in the other plate, and a tortuous path between the inlet of chamber B and inlet to said casing sections, substantially as set forth.

4. In an ore washer or concentrator, a re-

ceiving and treating chamber having a siphon discharge pipe, an air exhaust device, a pipe connection from the highest point or bend of said siphon discharge to the exhaust device and actuating mechanism in gear with the exhaust device operated by the flow from the discharge pipe, substantially as set forth.

5 5. In an amalgamator, the combination of gangs or sets of chute amalgam plates, with pockets at each end of successive gangs common to all the chutes of said gangs, substantially as set forth.

10 6. In an amalgamator, the combination of gangs of alternately directed or inclined amalgam plates f' , and pockets f joining the adjacent ends of the gangs, substantially as set forth.

15 7. The combination with chamber F, the gangs of alternately directed amalgam plates f' and actuating devices for varying the degree of their inclination, substantially as set forth.

20 8. In an amalgamator, the combination with chamber F, the gangs of alternately directed or inclined amalgam plates f' and separate means for each gang for independently adjusting the inclination of said gangs, substantially as set forth.

9. The combination with an amalgamator,

gangs of alternately inclined amalgam plates, the suction outlet pipe c^3 having differently located valved outlets for varying the degree of suction from said amalgamator, substantially as set forth.

10. In an amalgamator, the combination with the suction discharge pipe therefor, differently located side valved outlets on said pipe for regulating the degree of flow through the amalgamator, and a bottom discharge outlet with valve m , substantially as set forth.

11. The combination of chamber F, the gangs of alternately directed chutes or plates f' , and flexible couplings between the ends of said gangs, and the walls of chamber F, substantially as set forth.

12. In an amalgamating device having a suction flow for passing the ore or gangue through the amalgamator, a number of alternately directed gangs of chutes in the path of said flow, and pockets at the ends of and joining said gangs, substantially as set forth.

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

CHARLES F. PIKE.

Witnesses:

THOS. S. RODGERS,
JAMES T. DAILY.