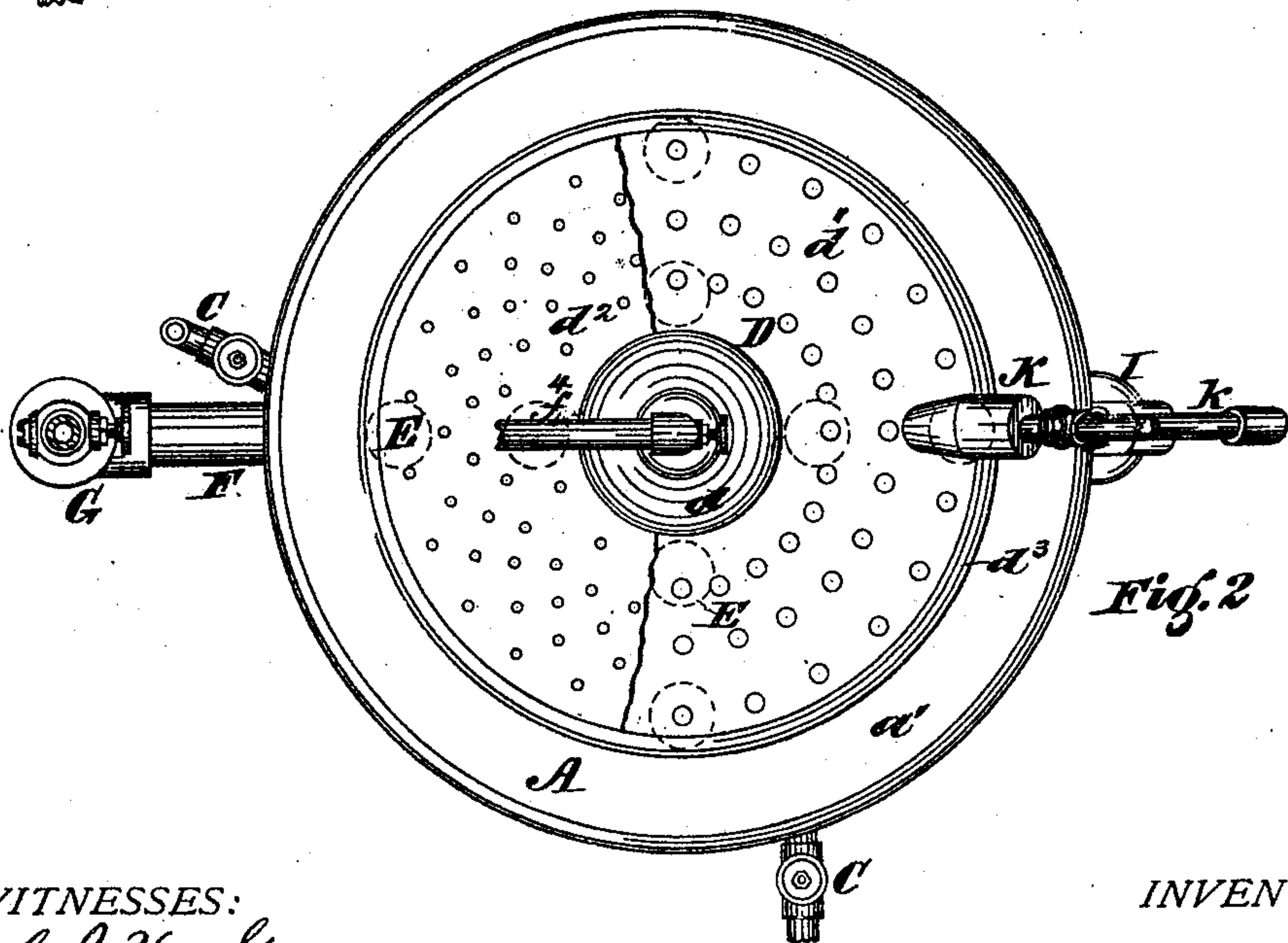
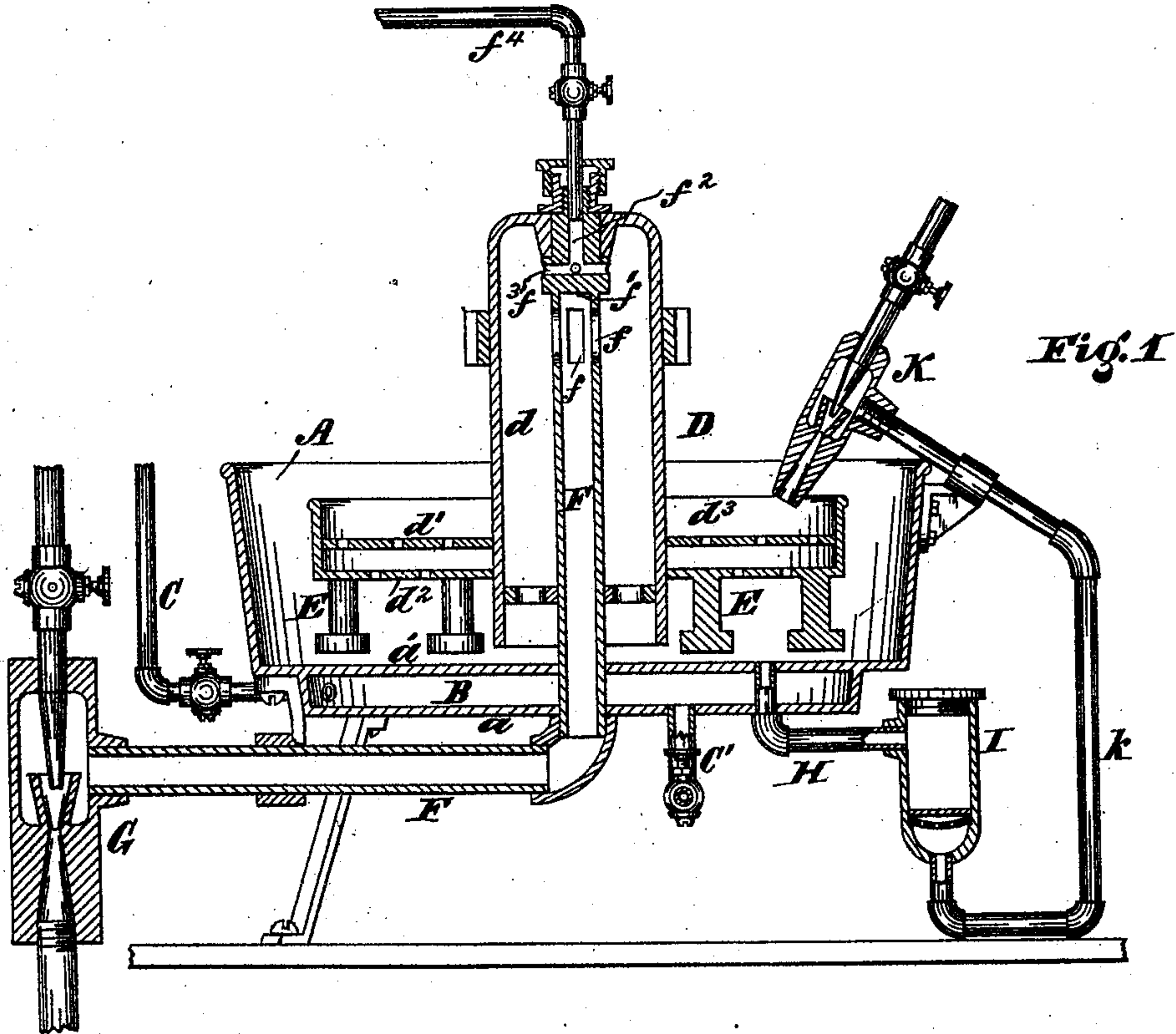


A. V. TRUST.  
Amalgamator.

No. 229,498.

Patented June 29, 1880.



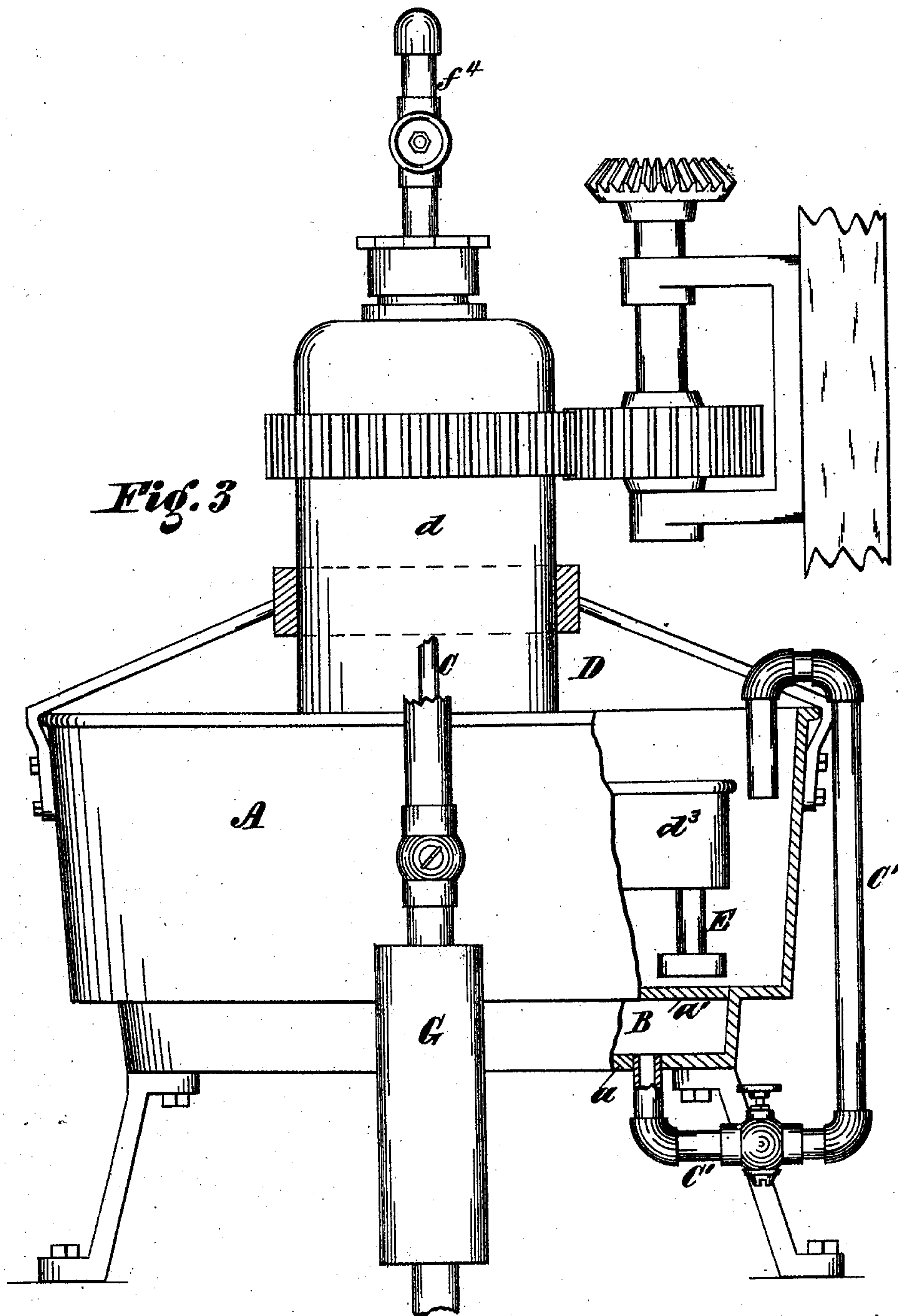
WITNESSES:  
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WITNESSES:

Saml. J. VanStavoren  
Chas. A. Connolly

INVENTOR,

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By Connolly Bros.,  
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# UNITED STATES PATENT OFFICE.

ALEXANDER V. TRUST, OF NEW YORK, N. Y.

## AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 229,498, dated June 29, 1880.

Application filed December 15, 1879.

*To all whom it may concern:*

Be it known that I, ALEXANDER V. TRUST, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Amalgamating; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a vertical transverse section. Fig. 2 is a plan, and Fig. 3 is an elevation, of an apparatus embodying my invention.

My invention has relation to that class of amalgamators in which amalgamation is effected by what is known as the "pan process;" and the primary object of my invention is to dispense with settlers and expedite the separation or recovery of the amalgam from the waste or earth.

A further object of my invention is to produce a more intimate contact of the mercury with the ore while undergoing treatment in the pan than has been heretofore achieved.

A further object of my invention is to provide means for obtaining and using pure water for the purpose of keeping the pulp in the required condition of fluidity while undergoing treatment.

My improvements consist in the following: First, in the process of separating the amalgam from the earth or waste, consisting in subjecting the gangue or ore, after treatment in the pan, to exhaust in a close vessel, as hereinafter more fully specified; second, in the process or method of withdrawing the amalgam or mercury from the pan and restoring it to the latter by pouring it in a stream or spray on the surface of the pulp or ore in the pan, the means of withdrawal being by suction or exhaust, and the amalgam, after withdrawal and before restoration to the pan, being strained, as hereinafter fully specified; third, in means whereby the water of condensation resulting from the steam employed for heating the amalgamating-pan is utilized for keeping the pulp in the pan in a sufficiently moist or saturated condition; fourth, in the peculiar construction and combination of parts, hereinafter fully set forth.

Referring to the annexed drawings, A indicates an amalgamating-pan having a false bottom, *a*, forming a steam-chamber, B. C is a steam-pipe leading to, and C' another pipe leading from, the chamber B, the latter pipe, C', extending over the side of the pan, so as to discharge the water of condensation from said chamber into the pan.

D represents a wheel composed of an elongated hollow hub or column, *d*, two perforated disks, *d'* *d''*, and a rim, *d'''*.

E E are feet, mixers, or grinders secured to the wheel D, and designed to operate in the usual manner upon the pulp in the pan A when said wheel is rotated.

F is a pipe which passes upwardly through the bottom of the pan A and forms the support and axle for the wheel D. Said pipe has openings *f f* at its upper end, and at its other extremity is connected with an ejector or equivalent exhaust device, G. Above the openings *f f* the pipe F is closed, as shown at *f'*, and has an opening, *f''*, with branches *f''' f'''*, for the admission of water through an inlet-pipe, *f''''*.

H represents a pipe passing through both bottoms of the pan and communicating with a straining-vessel, I, from which leads another pipe, *k*, having an ejector, K. The pipe *k* is arranged to discharge downwardly upon the wheel D, and I have shown the ejector K as constituting its discharge-nozzle; but said ejector may be located at any point between the strainer and the upper end of said pipe.

The operation is as follows: Mercury and ore are supplied in the usual manner and condition to the pan A, where the mass is subjected to the action of the mixers or grinders E until amalgamation is effected. While the mixing or grinding action is proceeding steam is admitted to the chamber B, the water of condensation therefrom being drawn through pipe C' and caused to flow in upon the pulp in the pan to keep such pulp duly saturated. The ejector K being also started, mercury or amalgam is drawn from the lower portion of pan through pipe H and strainer I and discharged upon the upper disk, *d'*, of wheel D. It passes thence through the perforations in said disk and the smaller perforations in the lower disk, *d''*, falling upon the pulp in the pan below in the form of fine streams or a spray. This affords a superior means of bringing the mercury in con-



tact with all the particles composing the mass of ore, as the mercury falling upon the top will, by reason of its superior gravity, find its way down through the earth.

5 After the treatment described has proceeded sufficiently long to effect amalgamation the rotation of the wheel and withdrawal of mercury from and its return and the supplying condensed water to the pan A, as already described, are stopped. The ejector G is now  
10 started and water supplied through pipe  $f^4$ . The effect is that the mass of pulp in pan A is lifted by suction or exhaust into the hub or column  $d$ . The mercury or amalgam can only  
15 be lifted a certain distance, which will be less than that of the openings  $f f$  from the bottom  $a'$  of the pan A. The waste (or earth and water) will, however, be lifted, or will raise itself above the surface of such mercury or amal-  
20 gam, and be drawn down through the pipe F, passing thereinto through the openings  $f f$ , and thence through ejector G to point of discharge, the water admitted through inlet  $f^2$  diluting the mass and assisting the flow. By  
25 this means I can in a few minutes accomplish what has heretofore required hours to effect in the ordinary settlers—namely, the separation of the earth or waste from the amalgam.

I do not wish to be understood as claiming  
30 to produce amalgamation by suspending mercury by means of suction or exhaust and causing ore to pass through the same; nor do I wish to claim as my invention the withdrawal of mercury or amalgam from an amalgamat-  
35 ing-vessel, straining the same, and restoring the mercury to such vessel. These I concede to be the invention of Charles E. Ball.

My improvements in those connections are limited to the separation of the waste from the  
40 amalgam which have been produced in the pan or like systems of amalgamation, and to the withdrawal and return of the mercury to the surface of the mass in such pans while undergoing treatment therein.

45 The advantage of using the water of condensation is this: In many cases the water available around mines is impregnated with sulphur or other mineral deleterious to mercury. The water of condensation is, however,  
50 relieved of such matter, and hence well fitted for keeping the pulp saturated. As the pan

requires to be heated anyway, I obtain such water without any increase of expense.

I have shown as an appendage to the apparatus embodying my improvements the strainer 55 I; but this I concede to be the invention of Chas. E. Ball, already referred to, and accordingly I base no claim thereon.

What I claim as my invention is—

1. The combination of the pan A, the hollow 60 column D, forming a vacuum suspension-chamber, and a hub for the mixers E, attached to and rotating therewith, the outlet-pipe F, and the ejector G, as and for the purpose set forth.

2. The grinding or mixing wheel D, having a perforated disk or disks, for the purpose of distributing the mercury in fine streams or spray over or upon the pulp in the amalgamating-pan, substantially as shown and described. 65 70

3. In combination with an amalgamating-pan, A, having a distributor, D, the pipes H  $k$ , and ejector or equivalent device K, for withdrawing mercury from and restoring it to said pan, substantially as shown and set forth. 75

4. In combination with pan A, having steam-chamber B, the steam-pipe C, leading thereto, and outlet-pipe  $C'$ , leading therefrom to the pan, whereby the water of condensation from said chamber is used for saturating the pulp 80 while undergoing treatment, substantially as set forth.

5. In combination with a suspension-chamber having the outlet-pipe F, provided with an ejector, G, the pipe  $f^4$ , for supplying water 85 for diluting the earth or waste elevated in said chamber and facilitating the action of the ejector, substantially as set forth.

6. The method or process of effecting the separation of waste from amalgam by a single op- 90 eration, consisting in elevating the pulpy mixture of waste and amalgam by suction or exhaust after amalgamation, substantially as set forth.

In testimony that I claim the foregoing I 95 have hereunto set my hand this 13th day of December, 1879.

ALEXANDER V. TRUST.

Witnesses:

F. L. WATERBURY,  
WM. H. FALCONER.