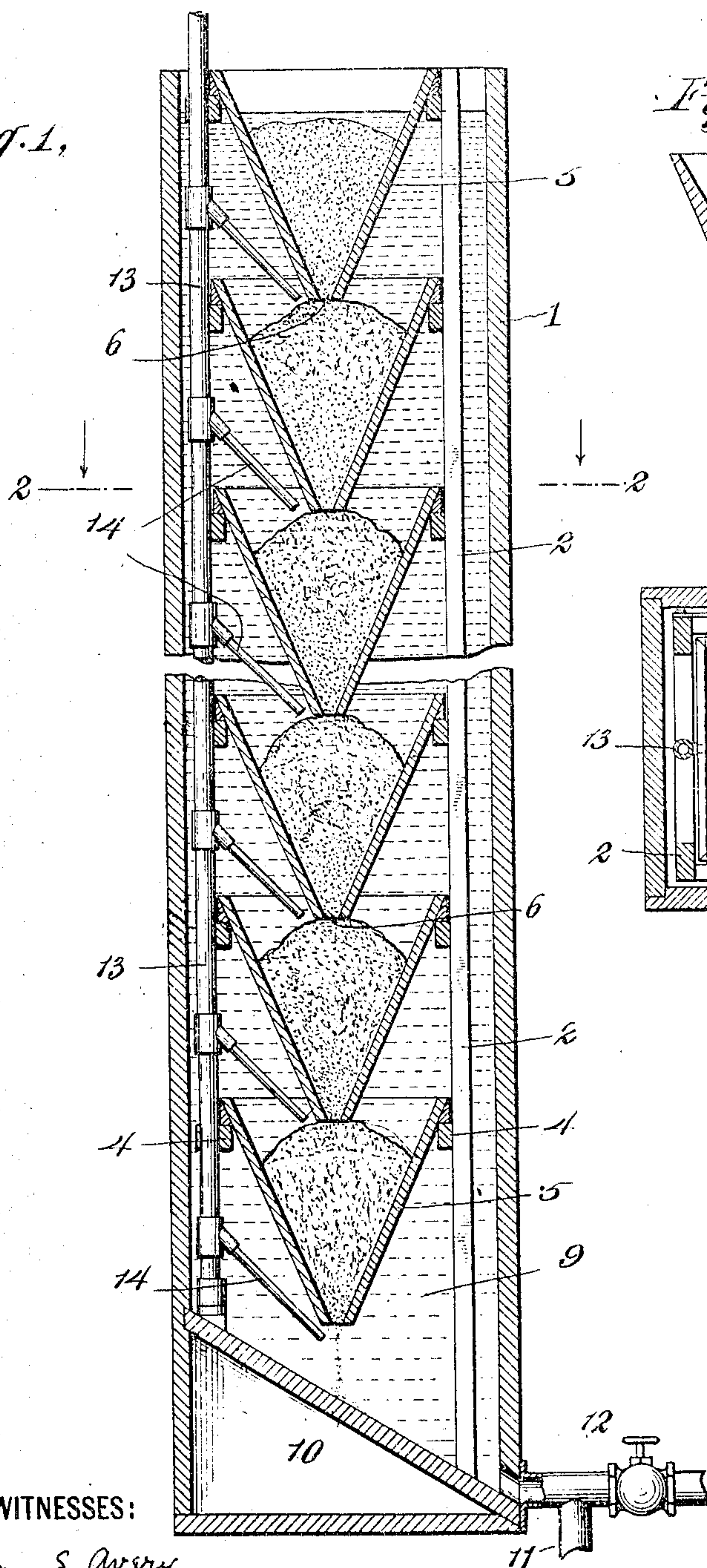


No. 871,300.

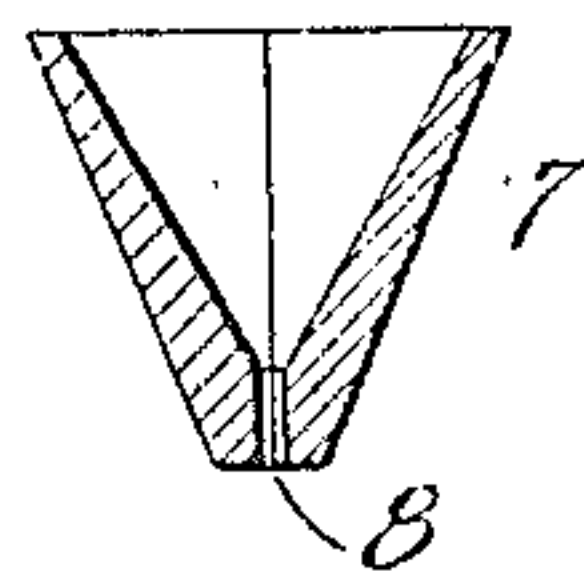
PATENTED NOV. 19, 1907.

A. SCHWARZ.  
PROCESS OF LEACHING ORES.  
APPLICATION FILED FEB. 1, 1906.

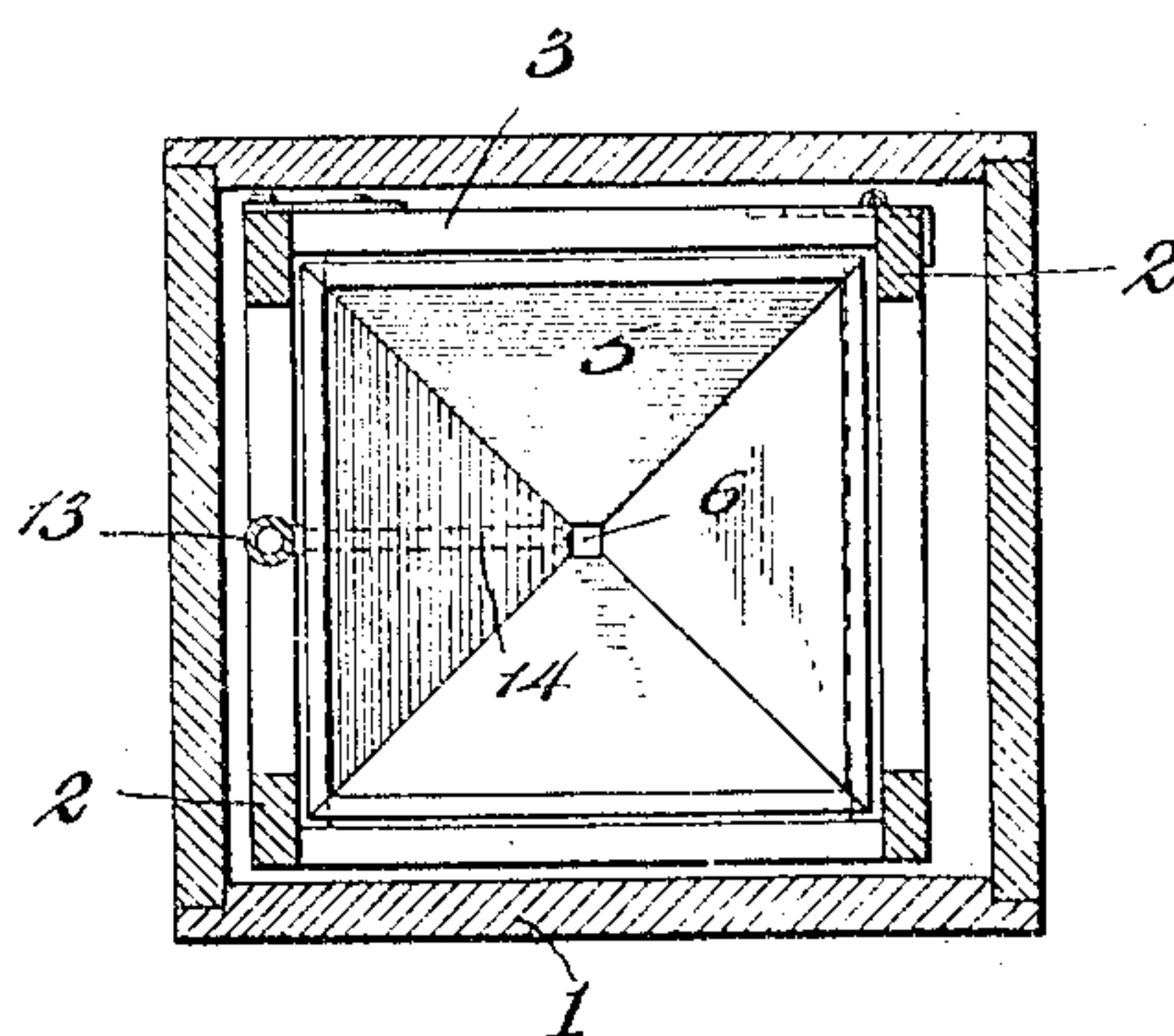
*Fig. 1,*



*Fig. 3,*



*Fig. 2,*



WITNESSES:

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INVENTOR

Alfred Schwarz  
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# UNITED STATES PATENT OFFICE.

ALFRED SCHWARZ, OF NEW YORK, N. Y., ASSIGNOR TO SCHWARZ ENGINEERING COMPANY,  
OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## PROCESS OF LEACHING ORES.

No. 871,300.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed February 1, 1906. Serial No. 298,982.

*To all whom it may concern:*

Be it known that I, ALFRED SCHWARZ, a subject of the Emperor of Germany, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Processes of Leaching Ores, of which the following is a specification.

The present invention relates to a method of leaching ores the primary object being to expose every particle of the ore to the leaching solution in order to effect a practically complete recovery of the values. This is accomplished by causing the ore to descend by gravity in a fine stream through the leaching solution.

The accompanying drawing illustrates one form of apparatus by which the invention may be practiced and in which

Figure 1 is a vertical section, the air supply pipe being shown in elevation; Fig. 2 is a horizontal section on the plane of the line 2-2 of Fig. 1; and Fig. 3 is a detail view.

Similar reference numerals indicate similar parts in the several views.

Referring to the drawing, the numeral 1 indicates a vat or tank the depth of which may be varied according to the particular ore treated or the quantity of ore undergoing treatment. Supported within said tank is a frame-work comprising uprights 2 held together by suitable tie rods 3. Fastened upon two opposite sides of the interior of the frame-work are blocks 4 which serve as supports for a series of hoppers 5 any number of which may be employed according to circumstances. These hoppers are pyramidal or conical in form and arranged one above the other and preferably so that the lower end of one is below the plane of the top of the one next below, as indicated in the drawing. The openings 6 at the apices of the hoppers are made of such diameter as to permit ore to descend therethrough in a very fine stream and at a comparative slow rate so as to secure the complete breaking up of the streams of ore and to afford an opportunity for the solvent to act upon the metallic constituents of the ore. In order to vary the size of the openings 6 to meet conditions presented by different ores and to regulate the rate of flow of the ore I may employ blocks 7 of the form shown in Fig. 3. These blocks are adapted to be seated in the lower part of the hoppers and are provided with a central longitudinal open-

ing 8 for the passage of the ore. Sets of blocks 8 may be utilized each set being made with the openings 8 of different diameters.

In leaching ores according to the present method the vat or tank 1 is filled to about the level indicated in Fig. 1 with a solvent 9 determined by the particular ore treated. The hoppers 5 except the top-most are completely submerged in the solution, the level of the latter however being above the outlet of the top-most hopper. The pulverized ore is then discharged into the top hopper the opening 6 of which permits it to descend by gravity in a constant and regulated stream. This fine stream of ore is immediately divided as it enters the quiescent solvent and spreads out from the opening in the hopper for a short distance in a cloud-like form. It then settles gradually and quietly in the hopper next immediately below from which it in turn passes through the solvent to the next hopper and so on throughout the series of hoppers from top to bottom of the tank. The ore will thus be arrested in its downward movement giving the solvent further opportunity to act upon it while it is held in the hoppers. The openings 6 in the hoppers or the openings 8 in the blocks 7 may be graduated so as to contract from one to the next lower thus retarding the escape of the ore from one to the other and permitting it to accumulate in the several hoppers, although as will be understood, after the operation is once fully started by an accumulation in the lower-most hopper the flow from one to the other will be continuous, there being at the same time a continuous discharge of tailings from the lower-most hopper. During these successive passages the ore is acted upon by the solvent, the values going into solution and the tailings received in the lower-most hopper from which they are discharged upon the inclined bottom 10 and thence carried by a discharge pipe 11 to any convenient vessel for further treatment if necessary, or to a valve of the character described in an application filed by me of even date herewith. The solution when saturated may be drawn off through a branch pipe 12 for the precipitation of the values therefrom.

It will be seen from the foregoing description that the leaching of the ore is effected without the aid of mechanical agitators and without disturbance of the ore except that naturally due to the falling of the ore by



gravity through the quiescent solution from  
hopper to hopper. This disturbance how-  
ever is amply sufficient to expose every par-  
ticle of the ore to the action of the solvent  
5 and results in an effective solution of the  
values. Under certain conditions it may  
be necessary to assist the solvent action by  
the presence of air. For that purpose I ar-  
range a pipe 13 along one side of the tank,  
10 said pipe being connected to a suitable source  
of air supply. Branches 14 lead from pipe  
13 and terminate in proximity to the open-  
ings 6 of the hoppers so as to distribute the  
air in the presence of the falling stream of ore  
15 care being taken, however, that the air pres-  
sure shall not be sufficient to interfere with  
the proper descent of the ore.

The present invention I have found par-  
ticularly adapted to the recovery of gold by  
20 the cyanid process. In that case the tank  
will be filled with any standard cyanid solu-  
tion, the gold and silver being dissolved out  
by the successive passages of the ore from  
the several hoppers through the solvent.

The final recovery of the metals from the so- 25  
lution may be effected in any well known  
manner.

What I claim and desire to secure by Let-  
ters Patent is:

1. The method herein described consisting 30  
in causing the ore to descend by gravity in a  
continuous stream through a series of verti-  
cally disposed hoppers having graduated dis-  
charge orifices, said hoppers being submerged  
in a quiescent leaching solution. 35

2. The method of leaching ores consisting  
in causing the ore to descend by gravity  
through a series of hoppers submerged in a  
quiescent solvent, and introducing air into  
said solvent in the presence of the falling 40  
stream of ore.

In witness whereof I have signed my name  
to this specification in the presence of two  
subscribing witnesses.

ALFRED SCHWARZ.

Witnesses:

OLIN A. FOSTER,  
M. E. McNinch.