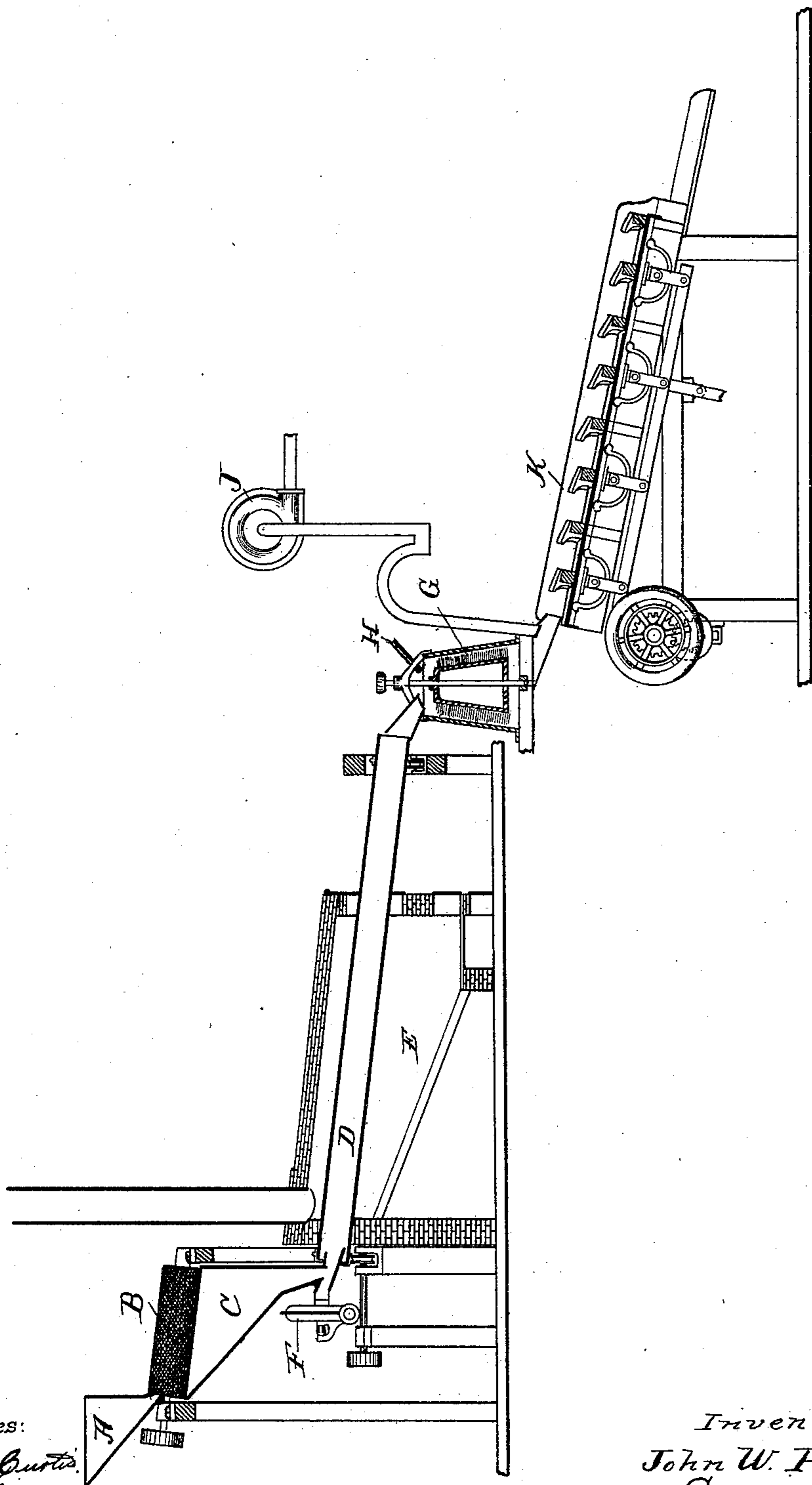


(No Model.)

J. W. PARMELEE.  
METHOD OF CONCENTRATING GOLD.

No. 359,627.

Patented Mar. 22, 1887.



Witnesses:

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# UNITED STATES PATENT OFFICE.

JOHN W. PARMELEE, OF ENGLEWOOD, ILLINOIS.

## METHOD OF CONCENTRATING GOLD.

SPECIFICATION forming part of Letters Patent No. 359,627, dated March 22, 1887.

Application filed June 10, 1886. Serial No. 204,730. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. PARMELEE, a citizen of the United States, residing in Englewood, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Methods of Concentrating Gold, of which the following is a specification.

This invention relates to an improved method of extracting gold from the alluvial deposits of placer gold mines by the dry method of concentration.

I have discovered that by drying the dirt artificially and then disintegrating it preparatory to passing it through the concentrating operation, the yield of gold is very largely increased. I have also found that even if the clay or dirt be apparently dry, as in dry weather, there is still a modicum of moisture in it, not perceptible to the touch, which interferes with the extraction of a large portion of the contained gold, and such dirt can only be brought to the proper condition for effective work by the application of artificial heat. I have also found that in order to insure the best results from the concentration the placer dirt must be reduced to a fine condition and the gravel deprived of adhering matter, in order to free all the particles of gold; and hence, before subjecting the material to the concentrating operation, I pass it through a disintegrator capable of effecting a reduction thereof to the required degree and a cleaning of the gravel without crushing or grinding.

My improvement consists in first subjecting the material to artificial heat to dry the same, then disintegrating the dirt and cleaning the gravel without crushing or grinding it, and then separating the gold from the mass. This will be fully understood from the subjoined description and the accompanying drawing, in the latter of which I have shown a sectional elevation of a machine adapted to the working of my improved method of concentration.

In said drawing, A represents the hopper into which the dirt, clay, &c., from the mine is first dumped. This hopper feeds it into the interior of a revolving screen, B, where a separation of the large gravel is effected. The portion passing through the meshes of the screen is then conducted by the chute C into

a suitable drier—such, for instance, as the inclined rotary cylinder D, heated by the furnace E. A fan, F, is preferably employed to draw the moist air from this drier, and thereby quicken the drying process. From the drier D the dirt passes into the disintegrator G, which may be supplied with warm air by a pipe, H; and in order to insure a downward current of air in this disintegrator, as well as to draw off the dust therefrom, a fan, J, is preferably connected to the under side thereof. This fan should not produce a draft sufficient to carry off the gold particles. The dirt next passes from this disintegrator into a suitable dry concentrator or separator, such as is shown at K, where the gold is extracted.

My method is in no wise dependent upon the character of the drier or concentrator; but driers known as the "Worrell driers," made at Hannibal, Missouri, and the concentrating machine shown in the patent to De Guinon, No. 293,852, of February 19, 1884, answer very well. For the disintegrator I prefer to use the form patented to me in Patent No. 335,615, of February 9, 1886; but any other disintegrator capable of reducing the dirt to an equally fine condition and of cleaning the gravel without grinding or crushing may be used.

The operation involved in the practice of my method is substantially as follows: After screening the dirt and gravel it is first dried. This drying operation may be carried to any extent required, depending upon the condition of the material. If the material is comparatively dry, it will of course require less heat than when wet; but I find it advisable, even in comparatively dry weather, to subject the dirt to artificial heat, because there usually is a slight degree of lingering moisture in the earth at such times, and by extracting this small amount the subsequent operations of disintegrating and concentrating are not only facilitated, but the results obtained are very much better. The next operation is that of disintegration or reduction. This should be carried to the extent of producing a fine, atomic condition of all the dirt and of thoroughly cleaning the stones contained therein of all adhering dirt and particles. When performed

with proper thoroughness, the disintegration ought to reduce the clayey portions of the dirt, if perfectly dried, to a flour-like fineness. In this manner the gold is freed from the dirt and  
5 gravel to which it may be attached, so that it may be readily separated from the accompanying earth when passed into the concentrator.

My said disintegrator, wherein the material, instead of being crushed or ground, is subjected  
10 to the whipping action of numerous flexible blades secured to the rapidly-revolving cone, by which operation the earth is speedily reduced and the gravel cleaned, is admirably adapted to do this work thoroughly and  
15 quickly. The reduction is perhaps most advantageously done when performed in the presence of heat, because many of the larger lumps of placer dirt may pass through the drier without being perfectly dried, and hence  
20 when broken up in a warm disintegrator the small portions thereof are readily deprived of the small amount of moisture they contain. To obtain this warmth in the disintegrator, the clay, &c., may be conducted to it directly  
25 from the drier and before it has parted with the heat received therein; or a blast of heated air may be supplied through the pipe H for the purpose, or both the heat carried in the material (the outer shell of the lumps will  
30 naturally be overheated) and the warm blast be used. The final drying thus received, while the earth is being reduced to a fine condition, will also be expedited by the current of air passing through the disintegrator, and in ex-

ceptional cases, in dry climates, such current 35 will be sufficient to obtain some of the benefits of my invention. After being thus pulverized and dried the material is ready to be acted upon by the concentrator, and is fed thereinto. In this concentration the material may be agi- 40 tated and the gold allowed to fall, by its superior gravity, into collecting-pockets; or the separation of the gold from the dirt may be effected in any other known way of concentration by dry methods. A further separation of the 45 finer gravel and the earth may take place at the disintegrator.

In some cases, when the dry season is protracted, the artificial drying may be dispensed with; but I do not advise such course even in 50 dry seasons, if fuel to operate the drier is to be had. Where the drying is coupled with the other parts of the operation, the mining can be carried on the year round without difficulty. 55

I claim—

The improvement in the method of dry concentration of gold from alluvial deposits, consisting in first subjecting the deposits to artificial heat, then disintegrating the dirt and 60 cleaning the gravel without crushing or grinding it, and then separating the gold, substantially as specified.

JOHN W. PARMELEE.

Witnesses:

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