

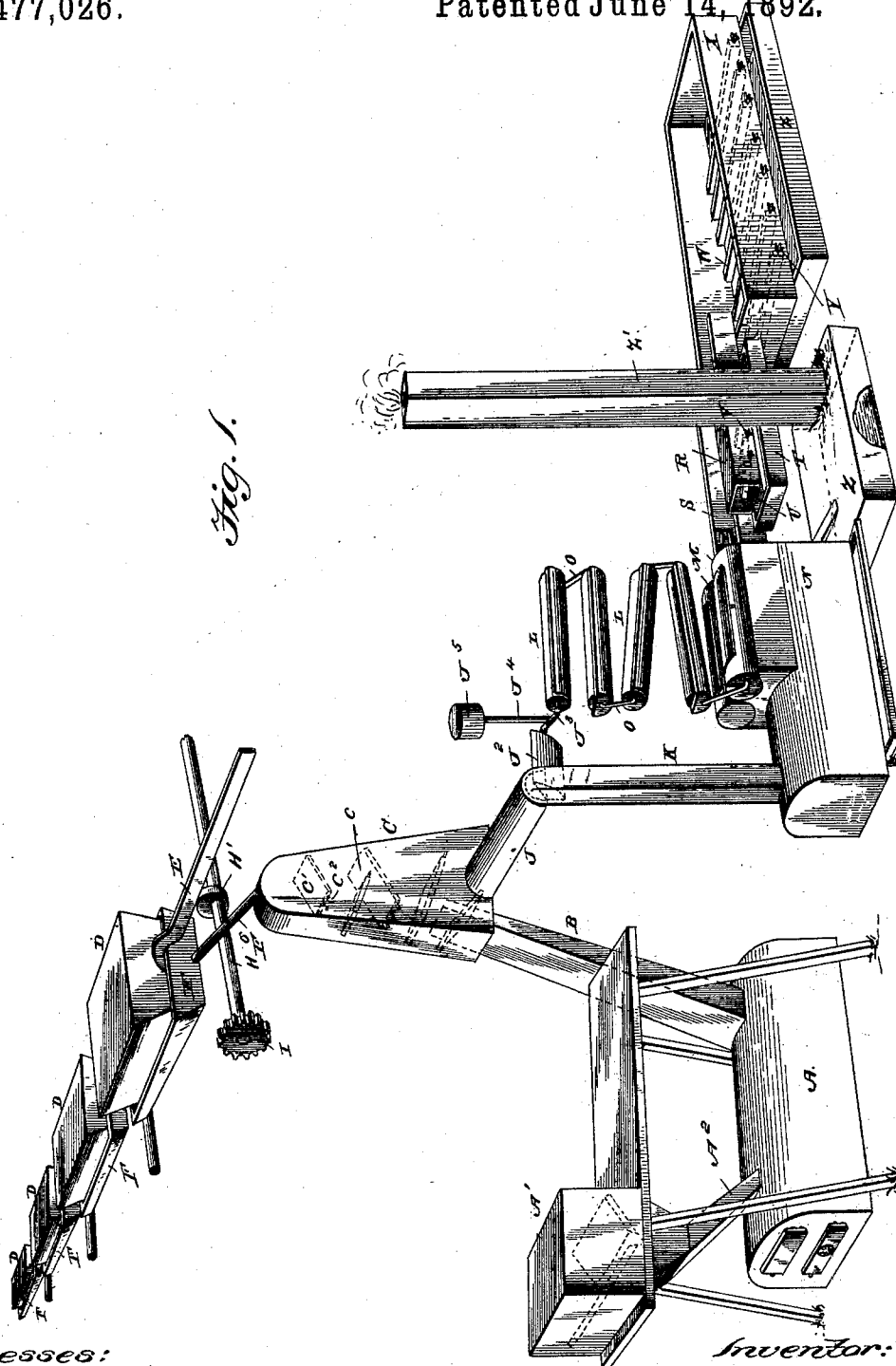
(No Model.)

2 Sheets—Sheet 1.

W. H. B. STOUT.
APPARATUS FOR TREATING ORES.

No. 477,026.

Patented June 14, 1892.



Witnesses:

W. Ashie
J. H. Burrows

Inventor:

William H. B. Stout
By, David H. Lee
Attorney.

(No Model.)

2 Sheets—Sheet 2.

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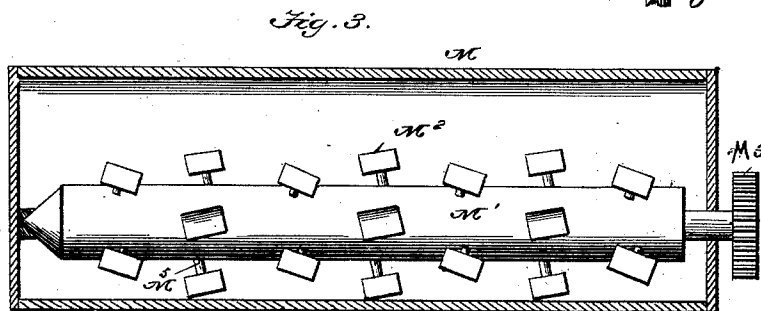
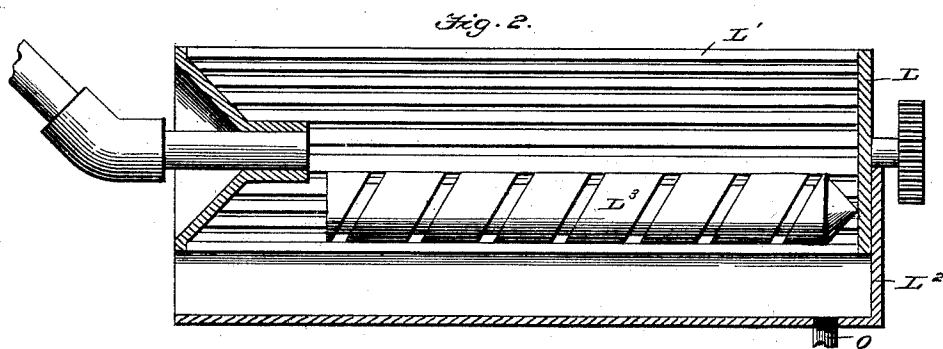


Fig. 4.

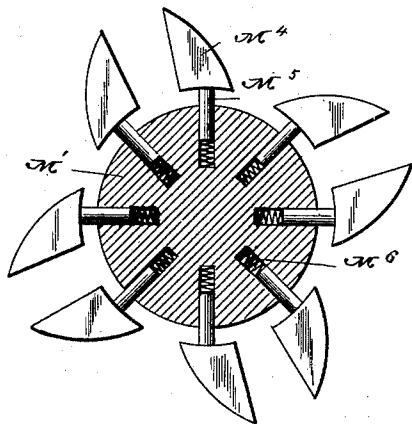


Fig. 5.

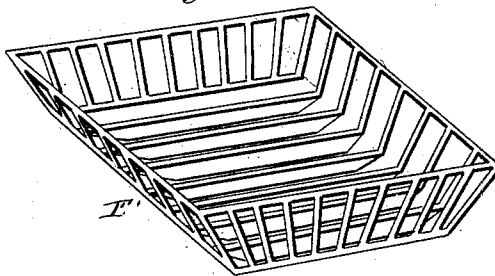
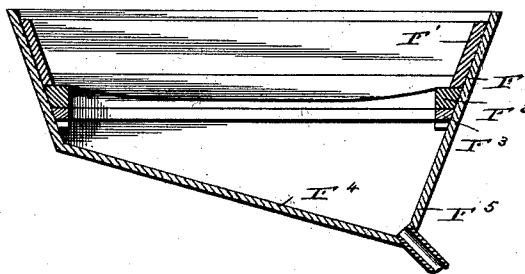


Fig. 6.



Witnesses:

Wm. A. Lapham
J. H. T. Burrows

Inventor:

William H. B. Stout
By, *David A. Lee*
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM H. B. STOUT, OF CHICAGO, ILLINOIS.

APPARATUS FOR TREATING ORES.

SPECIFICATION forming part of Letters Patent No. 477,026, dated June 14, 1892.

Application filed June 10, 1891. Serial No. 395,830. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. B. STOUT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new, useful, and valuable Improvement in Methods of Treating Ores, of which the following is a full, clear, and exact description.

My invention has for its object to provide an improved apparatus for crushing, roasting, and disintegrating ores and amalgamating the precious metals contained therein, and for collecting any volatilized metal escaping during the roasting operation.

In the accompanying drawings, Figure 1 is a perspective view of my complete apparatus. Fig. 2 is a sectional view of my cylindrical roaster ore-pulverizer, showing the construction and relative positions of its several internal parts. Fig. 3 is a sectional view of my improved stirring-cylinder complete. Fig. 4 is an end view of a modified form of stirring-shaft. Fig. 5 is a perspective view of the grate employed in my crusher. Fig. 6 is a sectional view of my crusher.

Similar letters of reference indicate like parts throughout the several views.

A represents a furnace having an automatic fuel-feed box A', connected therewith by means of a chute A². This chute is preferably provided with a damper or cut-off for preventing the heat from escaping upward through it. At the rear end of the furnace is provided a flue B, which conducts the hot air from the furnace upward into the chamber C, causing the inclined plates C' to become highly heated or red hot. At the downward edge of each of the plates C' is provided a series of teeth C², the purpose of which, together with that of the plates, will be hereinafter fully described.

I will now proceed to describe my crusher, which consists of a heavy iron weight D, which is raised vertically in any suitable manner and allowed to drop suddenly—such, for instance, as by having a suitable shaft E attached to opposite ends or sides of the weight D, and then by having these shafts work on cam-wheels H' on shaft H, turned by cog-wheel I. The weight D is caused to drop or be elevated. The weight drops into and closely

fits a receiver F, within which is arranged a grate F', the construction of which is clearly shown at Fig. 5. Directly under this grate at its outer edges is arranged a rubber cushion F², which is supported by a metal shoulder F³.

The operation of my improved crusher is as follows: First, ore, coal, rock, &c., is placed or automatically fed into the receiver of the crusher shown farthest away in Fig. 1, the ore being placed on top of the grate F, so that when the weight D falls it crushes the ore, and that part of it which has been crushed sufficiently small drops through the grate F upon the bottom F⁴ of the receiver, the incline of which causes the ore to pass by reason of its own gravity through the pipe F⁵, which carries it into the receiver of the next crusher, where it is broken up smaller, and so on until it is broken up as small as desired. Supposing that ore is the material which has been crushed in the manner described, then it is automatically transferred through the pipe F⁶ into the top of the ore-roasting chamber C, when it falls upon the top inclined plate C', which has been heated in the manner hereinbefore described, so as to suitably roast the said ore, which slides down the inclined plate C', and which is minutely separated by the teeth C² before it drops onto the next plate below, which latter plate treats it in the same manner as did the plate above. Upon the ore dropping from the lower inclined plate it is led into a tunnel J. Then it is conducted by the force of gravity to the receiver J², from which it is conducted by gravity into the pipe J³, where the hot ore is suddenly attacked by a heavy stream of water coming through the pipe J⁴, supplied by the reservoir J⁵. This impinging stream of water serves to completely disintegrate the crushed ore passing through said pipe J³ at the junction of the pipe K and the tunnel J. The ore falls into the receiver J², and the smoke and heat will take the more direct outlet and pass down its pipe K through the drum N, then through the compartment Z to the flue Z', through which it escapes. The ore now passes into the pulverizing-cylinder L, having longitudinal bars L', between each of which there is a slight space. Partially surrounding the cylinder L is a casing

L². Resting loosely in the bottom of said cylinder is a grooved roller L³, which serves to further pulverize the ore when said cylinder L is turned. As fast as the ore in the cylinder is pulverized it falls through the slats of the cylinder into the casing L² underneath, and from this the ore falls through the pipe O into another pulverizing-cylinder located below the top one, as shown at Fig. 1.

After leaving the last pulverizing-cylinder the ore, which has now been crushed very finely by the various processes through which it has passed, is led into one of the amalgamating-cylinders M, having the revolving stirring-bar M', provided with the series of paddles M² and operated by means of the cog-wheels M³. This cylinder M, together with a supply of water which rests within it, is kept warm by the heat and smoke which comes through the flue B down the passages J and K and into the compartment N, after which said heat and smoke pass into the compartment Z and passes out of chimney Z'. The floor of this compartment is covered with water, which is kept hot by the escaping heat and smoke, and the steam arising from this heated water arrests in its passage all volatile matter carried by said smoke and causes it to be deposited. After the amalgam has been drawn off from the cylinder M the gangue is then drawn off through a suitable pipe into the sluice-box R, within which riffles U are placed at suitable distances apart for the purpose of arresting and amalgamating any escaping ore. After this the ore is led into the large settling-tank X, within which riffles W are also placed.

At Fig. 4 is shown a modified form of stirring-roller, the blade M⁴ being of a plow-blade shape instead of oblong shape, as shown at Fig. 3. The shaft M⁵ work into bearing-holes made in cylinder M', and the blades M⁴ are kept pressed against the bottom of the cylinder by the spring M⁶.

What I claim is—

1. The mechanism for treating ores, consisting of a series of connected crushers D, roaster C, connected with said crushers by the pipe F and having the inclined plates C', receiver J², connected with said roaster by the tunnel J, the series of connected pulverizers L, connected with the receiver J² by the pipe J³ and by pipe J⁴ with the tank J⁵, the amalgamators M, connected with the pulverizers L and the sluice W and located in the top of the drum N, and drum N, connected with the compartments Z and by the pipe K with the tunnel

J, substantially as shown and described, and for the purposes set forth.

2. The mechanism for treating ores, consisting of a series of connected crushers D, each having an inclined bottom F⁴ and a grate F', provided with an elastic cushion F² and a cam-actuated hammer, roaster C, connected with said crushers by the pipe E, receiver J², connected with said roaster by the tunnel J, the series of connected pulverizers L, connected with the receiver J² by the pipe J³ and by pipe J⁴ with the tank J⁵, the amalgamators M, connected with the pulverizers L and sluice W and located in the top of the drum N, and drum N, connected with the compartments Z and by the pipe K with the tunnel J, substantially as shown and described, and for the purposes set forth.

3. The mechanism for treating ores, consisting of a series of connected crushers D, roaster C, connected with said crushers by the pipe F, receiver J², connected with said roaster by the tunnel J, the series of connected pulverizers L, each consisting of a casing L², and the revolving grated cylinder L', having the roller L³, resting loosely therein, said pulverizers connected by the pipe J³ with the said receiver, pipe J³, connected with the tank J⁵, the amalgamators M, connected with the pulverizers L and the sluice W and located in the top of the drum N, and drum N, connected with the compartments Z and by the pipe K with tunnel J, substantially as shown and described, and for the purposes set forth.

4. The mechanism for treating ores, consisting of a series of connected crushers D, roaster C, connected with said crusher by the pipe F, receiver J², connected with the said roaster by the tunnel J, the series of connected pulverizers L, connected with the receiver J² by the pipe J³ and by pipe J⁴ with the tank J⁵, the amalgamators M, each consisting of a cylinder and having the revolving cylinder M', provided with the spring-abutted paddles M², said amalgamators connected with the pulverizers L and sluice W and located in the top of the drum N, and drum N, connected with the compartment Z and by the pipe K with the tunnel J, substantially as shown and described, and for the purposes set forth.

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

WILLIAM H. B. STOUT.

Witnesses:

OCTAVIUS KNIGHT,
G. H. DAVIS.