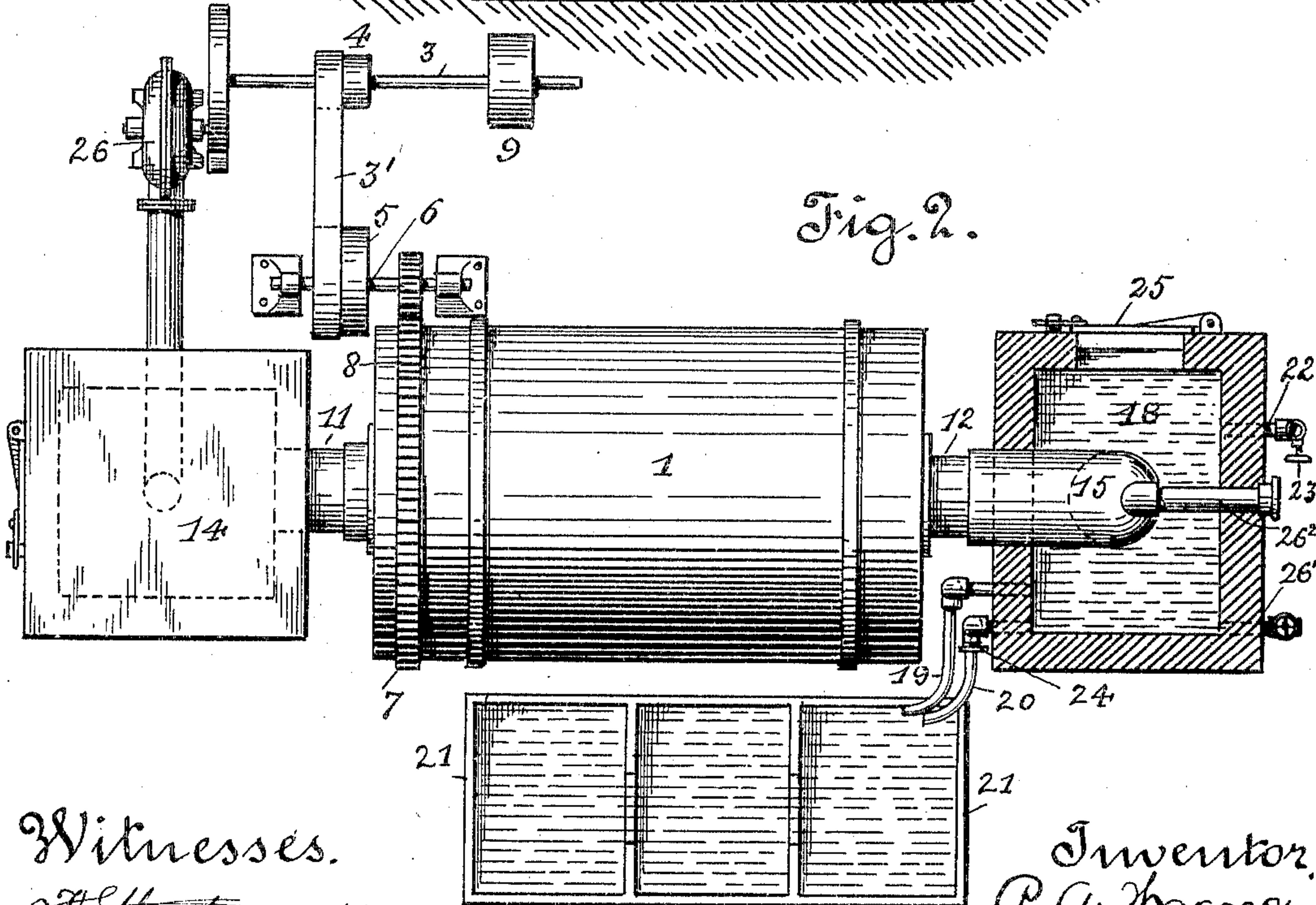
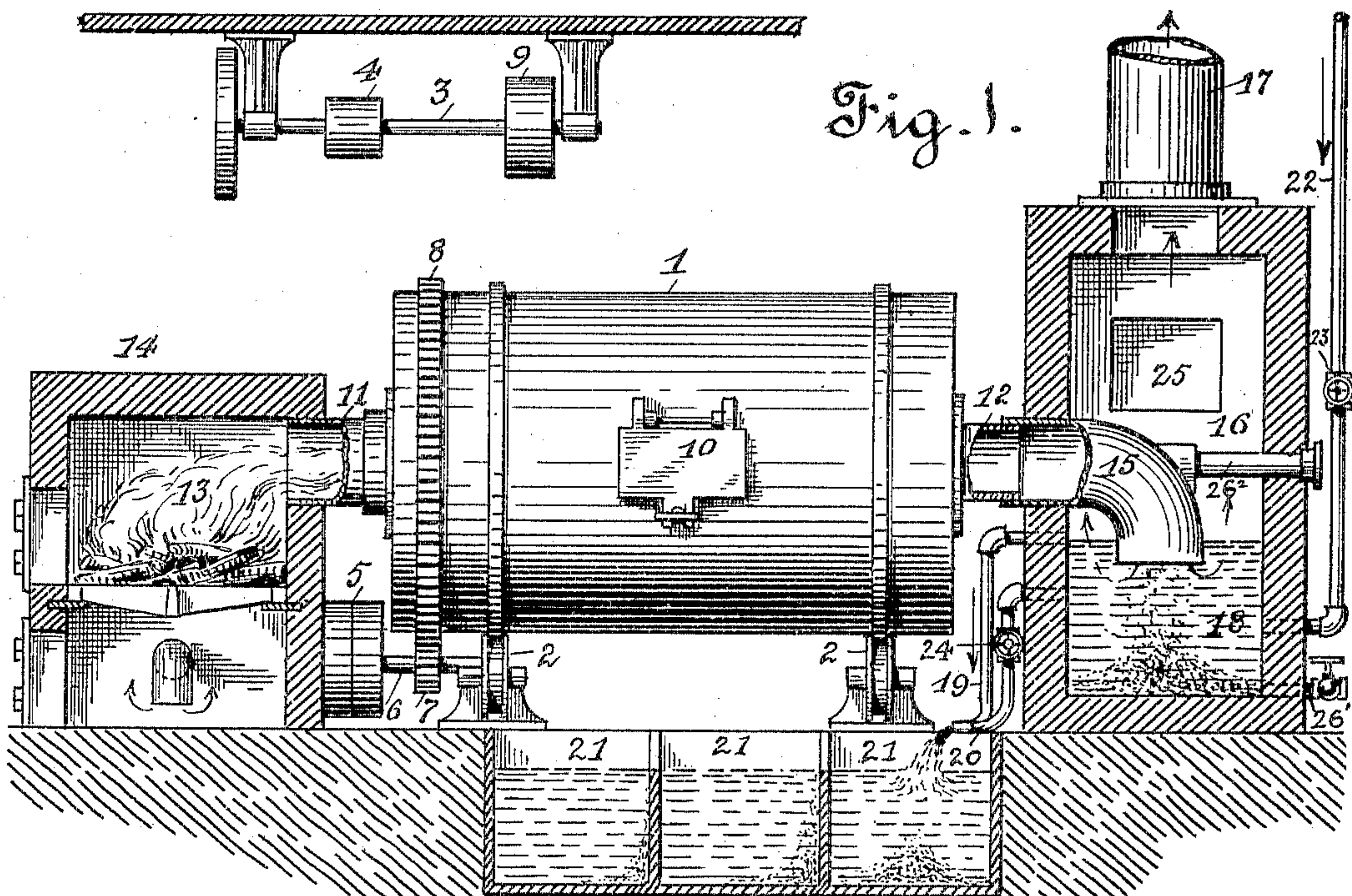


No. 789,303.

PATENTED MAY 9, 1905.

P. A. WAGNER.  
ORE ROASTING FURNACE.  
APPLICATION FILED NOV. 16, 1904.



Witnesses.

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# UNITED STATES PATENT OFFICE.

PETER A. WAGNER, OF CARRVILLE, CALIFORNIA.

## ORE-ROASTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 789,303, dated May 9, 1905.

Application filed November 16, 1904. Serial No. 232,927.

*To all whom it may concern:*

Be it known that I, PETER A. WAGNER, a citizen of the United States, residing at Carrville, in the county of Trinity, State of California, have invented certain new and useful Improvements in Ore-Roasting Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

The invention relates to furnaces generally for the reduction or separation of the valuable metal from the ore within which the same is contained or embodied, the same comprising means within or connected with the furnace-stack for causing the precipitation of the metal-vapor, which otherwise would escape with and be carried off by the products of combustion passing out of the furnace-stack.

To comprehend the invention, reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a side view in elevation of the ore-roaster, the furnace, collecting-chamber of the stack, and the collecting-tanks for receiving the water flowing from the collecting-chamber being sectioned vertically, the conduit leading from the rotating ore-cylinder to the collecting-chamber of the stack being partly broken away; and Fig. 2 is a top plan view of the parts disclosed in Fig. 1 of the drawings.

In the drawings the numeral 1 designates an ordinary rotary ore-roasting cylinder, which is mounted on roller-bearings 2. This cylinder in the present case is driven from the drive-shaft 3 by means of a belt 3', working over the belt-pulleys 4 5. Belt-pulley 4 is secured on the drive-shaft 3, while the belt-pulley 5 is secured on the shaft 6, which shaft 6 has secured thereon the cog-pinion 7. This pinion meshes with the cog-ring 8 on the rotary cylinder or drum 1. The shaft 3 is driven by a belt (not shown) working over the belt-pulley 9.

The rotary drum or cylinder 1, into which the ore to be roasted is delivered through the door 10, is mounted on hollow trunnions 11 12, one of which, 11, leads from the combustion-chamber 13 of the furnace 14, while the opposite trunnion, 12, connects with the con-

duit 15. This conduit extends well into the collecting-chamber 16 of the stack 17, its inner end being downwardly curved in order that the same may be submerged within the body of water 18 in said chamber when the level thereof is even with that of the overflow-pipe 19, which pipe conveys the overflow-water into one of the series of settling-tanks 21.

Water is delivered into the collecting-chamber 16 by means of a supply-pipe 22. This pipe may lead from any suitable source of water-supply, the flow thereof through the said pipe and into the collecting-chamber being controlled by a regulating-valve 23. From the collecting-chamber also extends a draw-off pipe 20, which pipe is arranged a slight distance below the overflow-pipe 19 and like the said pipe 19 leads to one of the series of settling tanks or vats 21. The flow of water through this pipe is regulated or controlled by the valve 24.

Entrance is obtained to the interior of the collecting-chamber 16 for repair or cleaning purposes through the manhole-door 25.

A blower 26 connects with the furnace 14, below the grate-bars thereof, the purpose of said blower being to create a draft sufficient to force the flame and heat from the combustion-chamber 13 into the rotating drum or cylinder 1 for the roasting of the ore contained therein.

Owing to the excessive heat required to reduce the ore within the rotating cylinder considerable of the valuable material passes off into the stack with the products of combustion in the form of metallic vapor, which loss it is the purpose of the described invention to provide against.

After the cylinder 1 has been filled with the ore to be roasted, the furnace fired, and the force-draft started the collecting-chamber 16 is filled with water until the lower end of the conduit 15 is submerged. This causes the escaping products of combustion to pass through the liquid-body 18 before escaping into the stack 17, the direct flow into the stack commonly employed being thus interrupted by the body of water so interposed. The result of forcing the escaping products of combus-



tion through the liquid-bath contained in the collecting-chamber is to cause the condensation, so to speak, of the volatile metal or metallic vapor carried off with the products of combustion flowing from the roasting-cylinder and the precipitation thereof within the said collecting-chamber. The metallic vapor thus separated or recovered from the escaping products of combustion will settle at the bottom of the collecting-chamber, Fig. 1 of the drawings. A continuous flow of water is maintained through the collecting-chamber during the working or treatment of the ore. To provide against the possibility of any of the lighter particles of the valuable metal or material being lost by the overflow required to maintain such continuous circulation, the overflow is conveyed by the pipe 19 to one of the connected series of tanks 21, such valuable particles as may be contained in or carried by the overflow settling within said tanks, from which the same may be readily and easily recovered. The body of water is withdrawn from the collecting-chamber 16 when a "clean up" is desired through the medium of the valved controlled outlet-pipe 26', the waste water running to any suitable place. After the roasting of the ore within the cylinder 1 the water within the collecting-chamber 16 is drawn off by opening the valve 24 for the pipe 20 until the level of the body of water is below the inner end of the conduit 15. This is done prior to the roasting of a new charge of ore, the purpose thereof being to permit of a free and unobstructed draft to the stack 17 during the initial firing of the ore. However, the moment a proper draft has been established for the drawing of the flame into the roasting-cylinder 1 the valve 24 is closed and the body of water within the collecting-chamber raised

above the lower end of the conduit 15 or to a level with the overflow-pipe 19.

In order that an inspection of the interior of the roasting-cylinder may be had during the operation of roasting the ore therein, a pipe 26<sup>2</sup> leads from the conduit 15 to the outside of the collecting-chamber 16. This pipe is in line with the axis of the cylinder, and the outer end thereof is closed by an isinglass or mica covering, through which the interior of the cylinder may be viewed by the operator for any purpose whatsoever.

It will be understood that the various parts and connections of the collecting or settling chamber will be constructed of fire-clay or such material as will not be readily affected by the heat or fumes passing from the roasting-cylinder.

Having thus described the invention, what is claimed as new, and desired to be protected by Letters Patent, is—

The combination with an ore-roasting apparatus, of a collecting-chamber interposed between the roasting-chamber and the furnace-stack, a conduit for conveying the hot products of combustion into the collecting-chamber, of means for maintaining a water-level within said chamber above the discharge end of the conduit during the working of the ore, and a pipe extending from the outside of the collecting-chamber into the discharge-conduit of the roasting-chamber, through which pipe an inspection of the interior of the roasting-chamber may be had.

In testimony whereof I have hereunto set my signature in the presence of witnesses.

PETER A. WAGNER.

Witnesses:

ERNEST A. WAGNER,  
C. E. CUNNINGHAM.