H. R. CONKLIN.

AGITATOR.

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1,160,848. Patented Nov. 16, 1915.

Fig 1

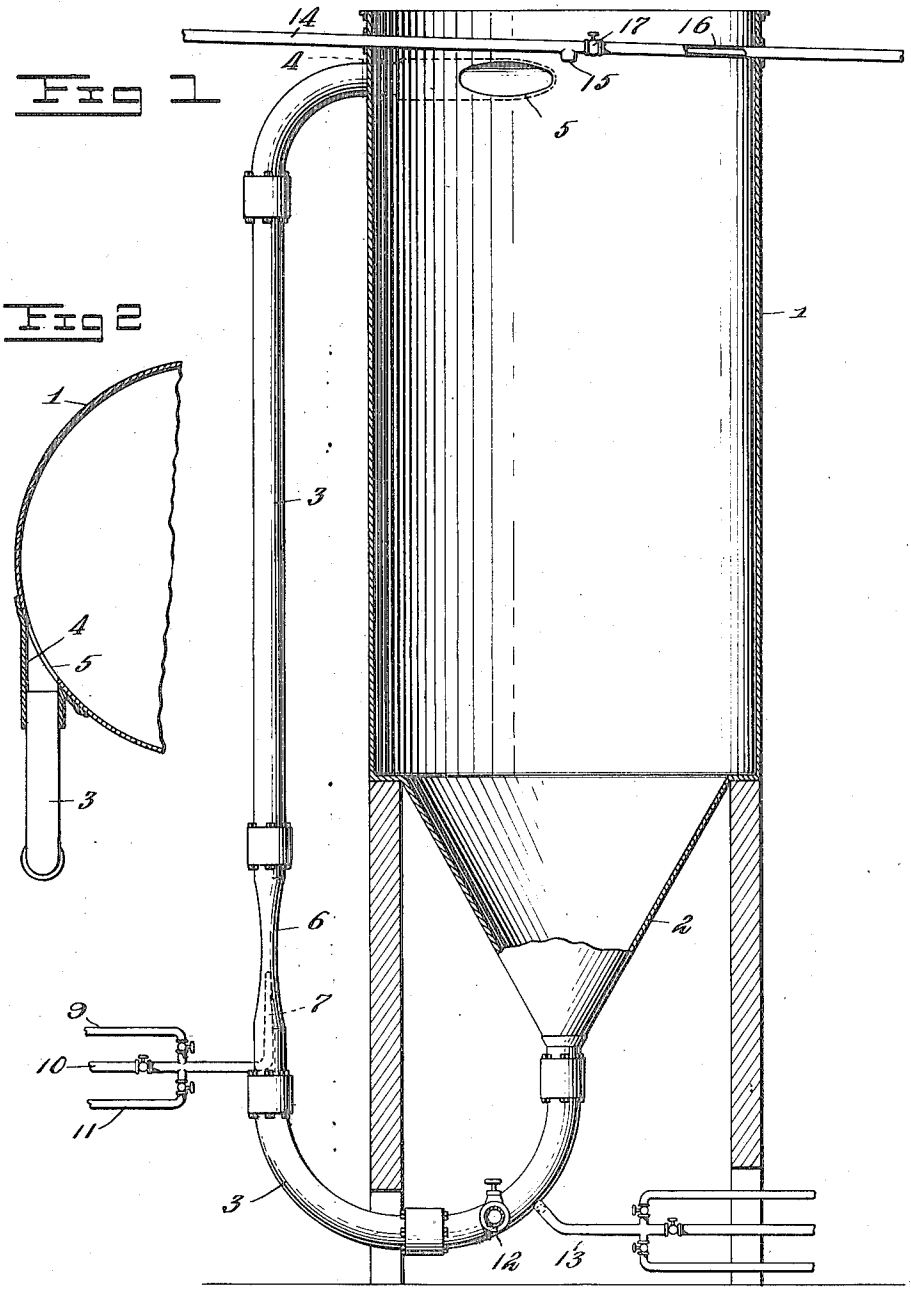


Fig 2

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AGITATOR.

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To all whom it may concern:

Be it known that I, HARRY R. CONKLIN, a citizen of the United States of America, residing at Joplin, in the county of Jasper and State of Missouri, have invented certain new and useful Improvements in Agitators; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to agitating devices for stirring purposes, more especially for stirring large volumes of solution and ground ore, such for example as is customary in the cyanid process for the extraction of gold and silver.

Referring to the drawings in which like parts are similarly designated. Figure 1 is a vertical section through an apparatus embodying my invention, parts thereof being shown in elevation; and Fig. 2 is a detail view, partly in section, showing the tangential connection for the circulating pipe.

The apparatus shown comprises a cylindrical tank or vat 1, having a conical bottom 2, preferably a steep conical bottom connected at its smallest end to an exterior circulating pipe 3 whose upper end discharges tangentially into the upper portion of the tank 1. The tangential discharge may be effected in any manner, but I prefer to connect the upper end of the circulating pipe 3 to a casting 4, as shown, having a discharge opening 5.

In the circulating pipe I provide a liquid impeller or ejector section 6, which is simply a contracted portion provided with a propelling nozzle or jet 7 having three pressure media valved connections, 9, 10 and 11, for air, liquid and steam, respectively. I also provide a drain valve 12 and a connection 13 in the circulating pipe near the drain valve and bottom of the tank for supplying pressure media, either air, liquid or steam, to loosen the contents of the tank should the material become settled therein during temporary stoppage. An inclined supply pipe 14 passes through the upper portion of the tank, preferably above the inlet 5, having a downwardly directed inlet opening 15 over the center of the tank 1, and an overflow outlet opening 16 preferably in the top of the pipe at a lower part of the pipe 14 than the inlet opening and preferably near the side of the tank 1. A single valve 17 is placed in the pipe 14 between the inlet 15 and outlet 16.

The operation is as follows: The cyanid solution and ore pulp mixture flows through the pipe 14, valve 17 being closed, enters the tank at 15 at the center and fills the tank. When about full circulation is started by means of the ejector 6—7 and the contents given a whirling movement throughout the whole depth of the tank. This causes the pulp to remain in suspension while being subjected to the action of the cyanid solution, the supply flow to the tank being continuous, and the discharge also being continuous through the discharge opening 16 and pipe 14 to the next tank in series. It will be noted that the apparatus operates continuously and that it is not designed for the treatment of separate charges. In case the tank has to be emptied to repair it, or for other causes, the inlet 15 may be stopped by means of a pipe plug and the outlet 16 closed by a wooden plug and valve 17 opened to by-pass the mixture to the next tank of the series, whereupon valve 12 is opened to discharge the contents. If the pipe 3 becomes clogged near the bottom, where clogging will occur by reason of a stoppage of the operation from any cause, this may be loosened by means of pressure medium through the supply at 13.

I am aware that liquid has been agitated in a tank by means of an outside circulating pipe such as 3, but such agitation has not been effective in keeping the material in suspension, and stoppages were occasioned by accumulation of the pulp at the bottom of the tank. I have discovered that by combining this circulation with a whirling of the entire body of the mixture in the tank deposition in the tank has been avoided. It is also necessary that the circulating pipe be large relatively to the diameter of the tank, and I have found that such pipe should be not less than one-twelfth the diameter of the tank. With such dimensions the rapid withdrawal of the mixture through the bottom of the pipe will alone produce rotation, which is strongly reinforced by the tangential action at the top of the tank due to the discharge at 5. In case the solution requires heating, it may be impelled by a steam jet through pipe 11 and

jet device 7, and if thinning be required, water or solution under pressure may be used as the impelling medium from pipe 10.

I claim—

1. The combination with an agitating tank having a central outlet at its bottom, a circulating pipe extending from said outlet exterior of the tank and discharging tangentially into the top of said tank, said outlet and tangential discharge being sufficiently large to cause the rotation of the entire contents of the tank, an injector in said pipe having a plurality of impelling fluid supplies, an inclined supply pipe passing across said tank having a liquid discharge orifice over the center of said tank and a liquid overflow orifice near the side of the tank below the normal liquid level, and a valve in said pipe between the two orifices.

2. The combination with an agitating tank having a circulating pipe and an ejector in said pipe; of separate steam, air, and liquid supply pipes, and means to admit the media in said supply pipes severally or combined to said ejector as impelling media for the material to be circulated in said tank and circulating pipe.

3. The combination with an agitating tank having a conical bottom, of an inclined supply pipe extending across the tank near its top having a supply opening over the center of the tank, a discharge opening near the edge of the tank below the liquid level and a valve between said openings, a circulating pipe connecting the apex of the conical bottom with the top of the tank and a tangential inlet casting on the outside of the tank connected to said pipe, an impeller nozzle in said pipe, means to supply independently or combined one or more of the impelling fluids to said nozzle, a drain valve in said pipe and means to supply pressure fluid to said pipe between said valve and tank bottom.

In testimony that I claim the foregoing as my invention, I have signed my name.

HARRY R. CONKLIN.