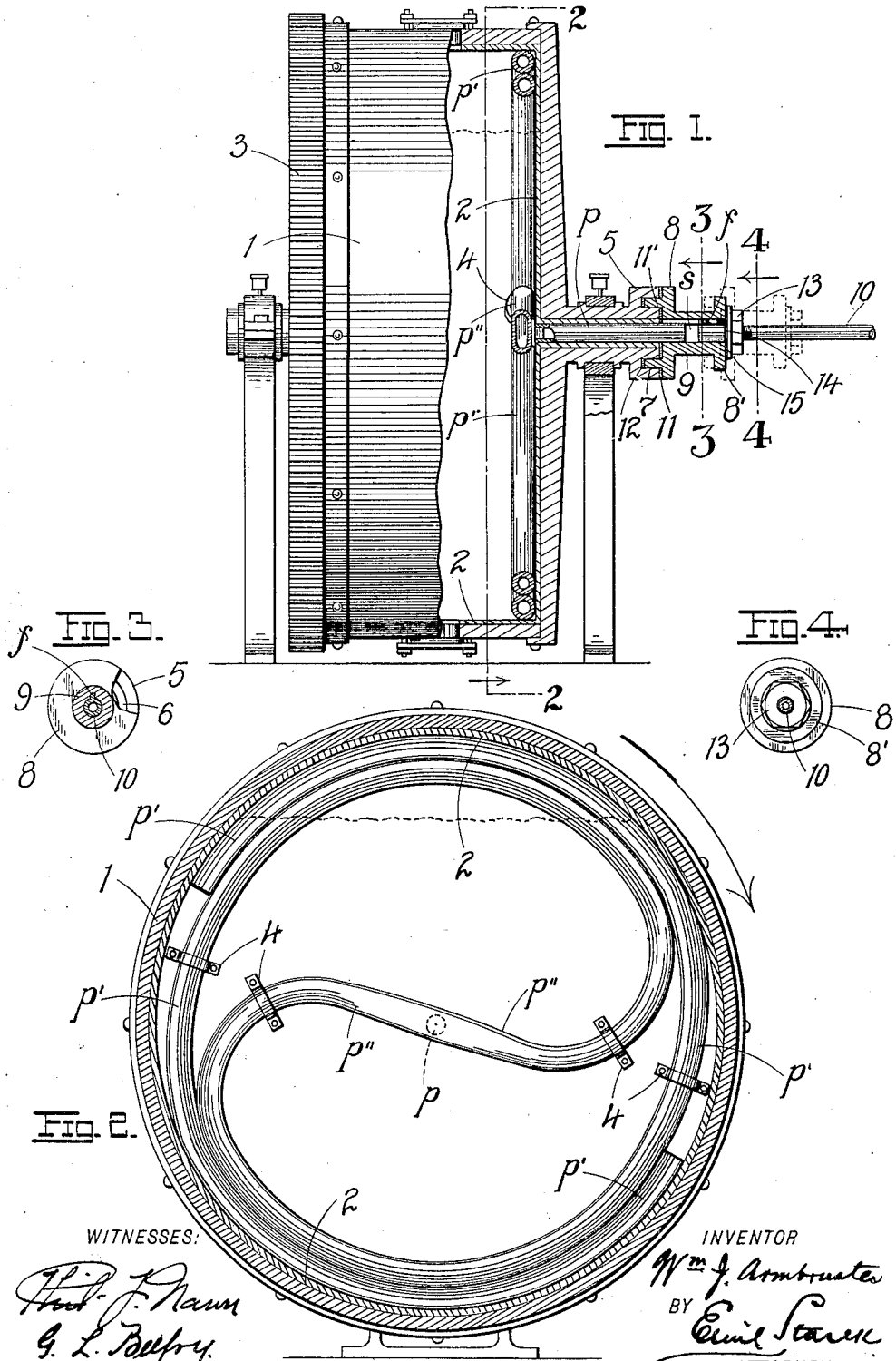


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CHLORINATION BARREL.

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CHLORINATION-BARREL.

No. 856,384.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM J. ARMBRUSTER, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Chlorination-Barrels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in chlorination barrels; and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a combined vertical middle section, and elevation of the barrel; Fig. 2 is a vertical cross section on line 2—2 of Fig. 1; Fig. 3 is a cross section on line 3—3 of Fig. 1, with parts of the sleeve broken away; and Fig. 4 is a cross section on line 4—4 of Fig. 1.

The present invention is a qualification of the construction of barrel shown and described in my pending application Serial Number 147,672, filed March 13, 1903, and while like it, it avoids the use of a stationary goose-neck for the delivery of the gas into the pulp chamber, the present device eliminates the chlorin compartment which in the pending application referred to is made a part of the barrel and revolves with it. The present device therefore is specially applicable for use where it is desirable and of advantage to supply gas to a number of barrels from a single generator. This would arise for example in some situations or localities where the necessary gas can be produced from cheaper raw materials than are well adapted for use in the generator individual to each barrel, or where a large number of barrels are used, one large generator of capacity sufficient to supply such number may be handled more felicitously and expeditiously. Certain localities too, may be advantageously situated for the production of chlorin gas by electrolysis cheaper than by other means. In general, it may be assumed that the barrels with individual gas generators are more particularly adapted for individual mills; and the barrels of the present design where a number of them can be supplied with gas from a single generator, are more especially adapted for use in large custom mills, although in localities where chlorin can be produced as cheaply from calcium hypochlorite and acid as by other means, the barrel

with the individual gas generator will be favored probably as often as otherwise.

The construction of barrels which contemplate the introduction of the chlorin gas through a stationary delivery pipe or goose-neck about which the hollow trunnion of the barrel revolves, is open to the objection that the chlorin (or other gas) under pressure in the barrel exerts its pressure toward forcing the gritty pulp between the base of such stationary pipe and the walls of the stuffing box or gland through which said base passes. The gritty and wet pulp and highly corrosive chlorin gas are continually forced between the stated parts of the apparatus, where the gritty pulp, generally containing a large proportion of quartz of a highly abrasive character, is ground between the parts by the revolving movement of the trunnion around the stationary inlet end of the delivery pipe, resulting in a loss of gas, leakage of the barrel, and of rapid cutting and wearing of the parts in consequence of the friction generated by these gritty substances. The goose-neck too, is under constant pressure of the tumbling ore as the barrel revolves, and soon breaks down.

With my present construction, the stationary goose-neck is displaced by a revolving pipe having an intake-end fixed within an opening disposed about the axis of rotation of the barrel, the joint interposed between the stationary feed-pipe and the hollow trunnion of the barrel (through which trunnion said fixed intake-end passes) being in the nature of a removable sleeve feathered to the feed-pipe, and having one end in forcible, yet movable engagement with the adjacent end of said trunnion, as will more fully appear from a detailed description of the invention which is as follows:

Referring to the drawings, 1 represents the barrel having the usual lead lining 2, and the driving-gear-wheel 3. One of the trunnions of the barrel is hollow, the passage therein receiving the fixed or intake-end of the chlorin conducting or delivery pipe *p*, the latter in the present instance being preferably extended in the form of two branches *p'* *p'* disposed along the inner surface of the barrel, and connecting along a reverse-curved section *p''* intersecting the axis of rotation of the barrel, the branches *p'* *p'* being secured to the adjacent head of the barrel by means of straps 4. In the present specification the term "conducting pipe" "delivery pipe" or

“gas delivery pipe” is to be applied to the pipe p, p', p'' as a unit, and it may be stated in passing, that I do not wish to be limited to any precise form of delivery pipe, since the same may assume any form which is fixed to the barrel and revolves with it, and which is provided with a delivery end discharging into the pulp chamber. This point of discharge should preferably be in a position removed a suitable distance radially from the axis of rotation of the barrel in order that the gas may be discharged both into, and above the pulp as the barrel rotates. In the present instance each branch p' is extended virtually 360 degrees along the inner wall of the barrel, the free open ends of the two branches being substantially diametrically opposite one another. This disposition of the branches $p' p'$ prevents the pulp at any time from backing into the intake end p since, whatever may be the position of the free end of the branch below the surface of the pulp, the latter can never rise in said branch above its own level; and, as there is always a section (or arc) of the pipe above the surface of the pulp, this section will always be drained of its contents by the time it has emerged above the pulp surface in its rotation with the barrel. It must not be inferred, however, that the specific configuration for the delivery pipe p, p', p'' here shown is the only one contemplated by the present invention, as any one skilled in the art may be able to improvise other forms which will be a full equivalent for that here shown. In fact, any form which discharges into the barrel and which at the same time preferably maintains a section (or arc) of the pipe above the level of the pulp within the barrel (to prevent the pulp from backing into the intake end of the pipe) comes within the spirit of my invention. Of such forms any number and variety might be improvised as is obvious. Under my invention too, the discharge from the inner end of the delivery pipe is free and unobstructed. The direction of rotation of the barrel is indicated by arrow in Fig. 2, and the level of the pulp surface by the dotted wave line in the same figure.

The outer end of the hollow trunnion in the present construction terminates in an enlarged (preferably) circular head 5, whose outer face is provided with an annular groove 6, for the reception of a correspondingly shaped wall or ring 7 formed on the adjacent face of one of the terminal flanges 8 of a rotatable sleeve 9 feathered to move longitudinally along the adjacent end of the stationary supply or feed-pipe 10. The latter leads to any suitable source of gas supply (not shown) and has its discharge end within the sleeve, the latter embracing the adjacent ends of the pipes p , and 10, the pipe p projecting a suitable distance beyond the head 5 and being separated by a suitable space s

from the discharge end of the pipe 10 (Fig. 1.) Interposed between the flange 8 and the adjacent abutting end of the hollow trunnion (the term “trunnion” in this connection having reference to the trunnion proper and its head 5) on either side of the ring 7, are packing rings 11, 11'; and interposed between the bottom of the groove 6 and the end of the ring 7 is a packing ring 12. Adapted to force the sleeve forcibly against the several packing rings is a nut 13 which is passed over a screw-threaded portion of the stationary feed-pipe 10, said nut being limited by an annular shoulder 14 on the pipe, a suitable packing ring 15 being interposed between said nut and the adjacent terminal flange 8' of the sleeve 9.

To renew any of the packing rings 11, 11', 12, the nut 13 is first unscrewed and slipped along the pipe 10, the sleeve is then drawn along the feather f until the space s is cleared (see dotted position of the parts in Fig. 1), when the several rings may be removed through said space and new rings introduced and placed in proper position, the parts being subsequently restored to their first position. Of course there will be little occasion to renew the packing ring 15, since the sleeve being feathered to the pipe 10 is stationary, the only rings subjected to wear during the rotation of the barrel being the rings 11, 11' and 12. The present construction therefore has merely to contend against the escape of the gases led into the barrel through the pipe 10 and hollow trunnion communicating therewith, the danger of any solid matter or grit finding its way between the intake-end of the delivery pipe and the inner wall of the trunnion being wholly eliminated, since the pipe is fixed to the barrel and revolves with it. Moreover, there will be very little leakage, if any, of the gas, since before the gas can escape it is obliged to take a circuitous path past the several packing rings as clearly obvious from Fig. 1. The life of the rings will be materially prolonged as they have nothing to resist but the attack and pressure of the dry chlorine gas free from grit, pulp, and moisture. The matter of the renewal of the rings is a simple one, being quickly accomplished at a negligible cost even if renewed for every few charges of the barrel. Packing of a character resistant to the action of chlorine should evidently be adopted, also keeping in view that the same should be as frictionless as possible (such as graphite, lead, and the like).

The coupling or joint made a feature of the present invention is simple, allowing of ready withdrawal of worn packing and replacement of new, at the same time making a connection between the feed and delivery pipes sufficiently tight to prevent the escape of gas at the juncture, yet permitting the revolving motion of the delivery pipe at that point.

And while the description of the apparatus has so far related only to its use for the chlorination of ores or other substances, it is as well adapted for the treatment of ores and other substances by other gases, such as carbon dioxid, sulfur dioxid, etc. As an instance of such applicability can be cited the manufacture of white lead. Suitable pastes or solutions or preparations of lead or its compounds are placed in the barrel or cylinder which is revolved and simultaneously charged with acetic acid vapors and carbon dioxid gas, or either alone, or with other gases according to the process adopted.

The device will be found to be applicable in many instances when it is required to subject a substance to the action of gas or vapors or injections of liquid with simultaneous agitation or tumbling of the contents of the barrel; or, when it is required to feed a charge of matter under agitation in a revolving cylinder or drum with air, gas, vapors, liquids or other substance or substances from an external source of supply. As another instance of the applicability of the device can be cited the agitation of a charge of gold ore and cyanid solution or other solvent of gold while air or other gas or substance is fed into the drum from an external source.

For the cyanidation of slimy gold ores or tailings, or gold ores or tailings, which, owing to a clayey or slimy or other non-percolating or slow percolating character cannot well be treated by percolation, and should therefore be subjected to agitation in the gold solvent solution, this device is readily applicable. So that the term "chlorination barrel" must be understood as contemplating any barrel or drum to which the present coupling is applicable, and as contemplating any revolving barrel or drum adapted to agitate a charge of matter while being fed with air, gas, vapors, liquids, or other substances from an external source of supply.

I do not wish of course to be limited to the precise details here shown as they may in a measure be departed from without in any wise affecting the nature or spirit of my invention. For example, the delivery pipe herein specifically referred to as being "within" the barrel, might actually be on the outside thereof, so long as it discharged into the pulp-chamber, and was otherwise disposed in the relation here indicated.

Having described my invention, what I claim is:

1. A chlorination barrel having a pulp chamber, a delivery pipe carried by, and rotatable with the barrel, and discharging thereinto, a section of the pipe being above the level of the pulp in the pulp chamber during the rotation of the barrel, and a feed-pipe discharging into the outer end of the delivery pipe, substantially as set forth.

2. A chlorination barrel having a pulp

chamber, a delivery pipe located within and rotatable with the barrel and having an intake or fixed end in the head of the barrel disposed about the axis of rotation of the latter, and a series of branches disposed along the inner walls of the barrel and continued each virtually 360 degrees along said walls, the delivery ends of the respective branches, being substantially diametrically opposite one another, and means for supplying gas to said delivery pipe, substantially as set forth.

3. A chlorination barrel having a pulp chamber and a hollow trunnion, a stationary feed-pipe having a discharge end opposite said trunnion, a delivery pipe located within and rotatable with the barrel, and having a fixed or intake end secured in said trunnion and projecting a suitable distance beyond it, a stationary sleeve mounted slidingly on the feed-pipe and adapted to simultaneously envelop the adjacent ends of the respective pipes, substantially as set forth.

4. A chlorination barrel having a pulp chamber and a hollow trunnion, a stationary feed-pipe having a discharge end opposite said trunnion, a delivery pipe located within and rotatable with the barrel, and having a fixed or intake end secured in said trunnion and projecting a suitable distance beyond it, and separated by a space from the discharge end of the feed-pipe, a stationary sleeve mounted slidingly on the feed pipe and adapted to simultaneously envelop the adjacent ends of the respective pipes, and bear against the outer end of the hollow trunnion, and suitable packing rings interposed between the abutting surfaces of the trunnion and sleeve respectively, substantially as set forth.

5. A chlorination barrel having a pulp chamber, and a hollow trunnion, a stationary feed-pipe having a discharge end opposite said trunnion, a delivery pipe located within and rotatable with the barrel and having a fixed or intake end secured in said trunnion and projecting a suitable distance beyond it, and separated by a space from the discharge end of the feed-pipe, a terminal head formed in the trunnion having an annular groove, a flanged sleeve capable only of longitudinal movement on the feed-pipe, having an annular wall or ring adapted to enter said groove, the sleeve simultaneously enveloping the adjacent ends of the feed and delivery pipes, a nut on the feed-pipe for forcing the sleeve against the trunnion, and suitable packing rings interposed between the sleeve and trunnion, and between the sleeve and nut, substantially as set forth.

6. A chlorination barrel having a pulp chamber, a delivery pipe carried by and rotatable with the barrel, and freely discharging thereinto, a section of the pipe being constantly above the level of the pulp in the pulp-chamber during the rotation of the bar-

rel, and a feed-pipe discharging into the outer end of the delivery-pipe, substantially as set forth.

7. A chlorination barrel having a pulp
5 chamber, a hollow trunnion opening there-
into, a stationary feed-pipe having a dis-
charge end opposite the trunnion, a sleeve
fixed to and enveloping the feed-pipe and
10 bearing with one end against the adjacent
end of the trunnion, and suitable packing

rings interposed between the adjacent ends of the trunnion and sleeve respectively, substantially as set forth.

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

WILLIAM J. ARMBRUSTER.

Witnesses:

EMIL STAREK,
G. L. BELFRY.