(No Model.) 2 Sheets—Sheet 1.

G. D. COLEMAN.

APPARATUS FOR CORRODING LEAD.

No. 481,004. Patented Aug. 16, 1892.

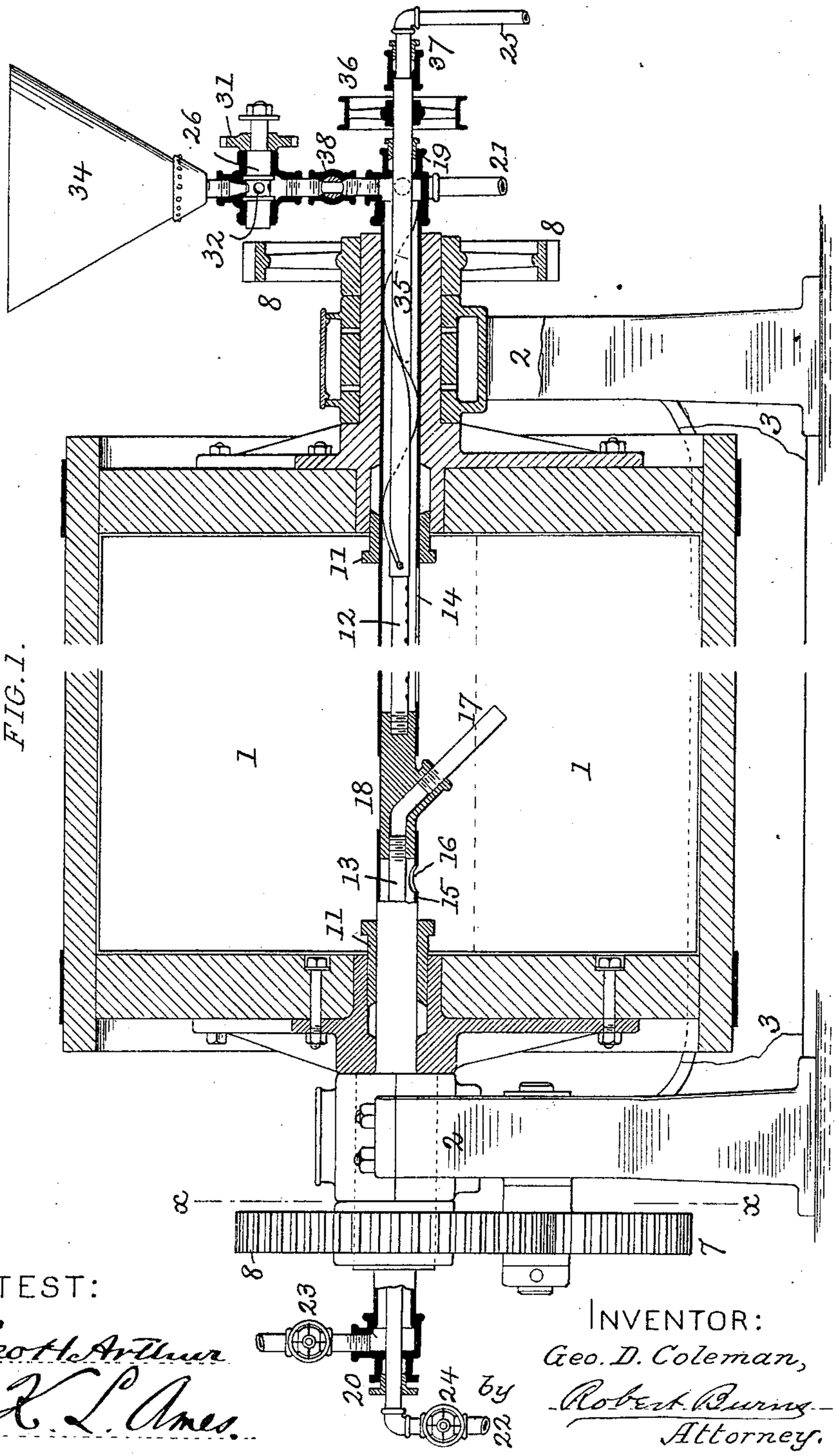

FIG. 1.

ATTEST:

Geo. H. Arthur

L. L. Ames.

INVENTOR:

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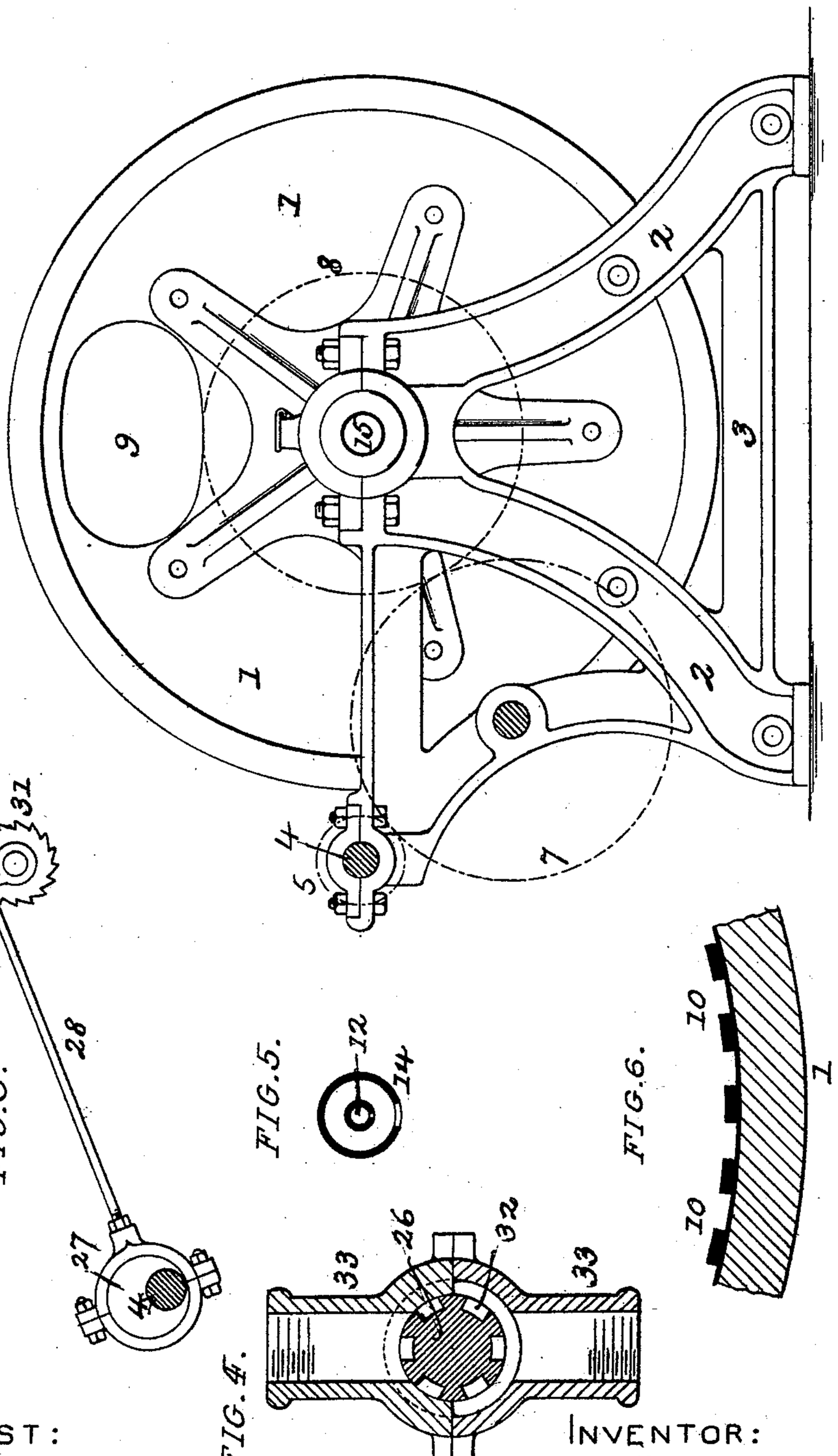

FIG. 2.

FIG. 3.

FIG. 5.

FIG. 6.

FIG. 4.

ATTEST:

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UNITED STATES PATENT OFFICE.

GEORGE D. COLEMAN, OF CHICAGO, ILLINOIS.

APPARATUS FOR CORRODING LEAD.

SPECIFICATION forming part of Letters Patent No. 481,004, dated August 16, 1892.

Application filed August 17, 1891. Serial No. 402,921. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. COLEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Corroding Lead; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to certain improvements in tumbling apparatus for corroding metallic lead in a comminuted state to form oxides or other salts of lead, more particularly for use in the manufacture of white lead, the objects of the present improvement being, first, to provide an improved construction and arrangement of the parts of a lead-corroding apparatus, whereby a convenient and perfect control is afforded of the water supply or flow by which the rise in temperature, due to chemical as well as frictional or mechanical action within the corroding-cylinder, is regulated and the particles of metallic lead kept clean and bright by the removal of corroded product as fast as formed, as well as the positive induction and eduction of the gases employed in the corroding operation; second, to provide an automatic feeding attachment for replenishing the supply of comminuted lead within the corroding cylinder to compensate for the amount carried away in the form of a corroded product in the continued operation of the apparatus; third, to afford an improved construction of the inner periphery of the revolving corroding cylinder or drum, whereby the frictional wear due to the rolling or shifting movement of the lead particles within the same is confined to the top surface of the series of longitudinal ribs on the inner periphery of the corroding cylinder or drum. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of a lead-corroding apparatus embodying my present improvements; Fig. 2, a transverse sectional elevation at line *x x*, Fig. 1; Fig. 3, a detached sectional elevation of the mechanism for imparting motion to the automatic feeding device for the comminuted lead; Fig. 4, an enlarged detail section of the automatic feeding device proper; Fig. 5, an enlarged detail transverse section of the gas and water pipes within the cylinder; Fig. 6, a detail section of a part of the wall of the cylinder, showing the relative arrangement of the longitudinal ribs on the inner periphery of the same.

Similar numerals of reference indicate like parts in the different views.

Referring to the drawings, 1 represents the horizontally-arranged corroding cylinder or drum, of wood or metal, as desired, and provided with axial trunnions by which it is journaled to rotate in the end standards 2 of a suitable frame 3, continuous rotary motion being imparted to the cylinder in any suitable and well-known manner, preferably by a counter-shaft 4, supported in bearings in the standards 2, pinions 6, and gears 7 and 8.

9 is a manhole at one or both ends of the cylinder for access to the interior of the same and through which the supply of comminuted lead can be introduced in the initial starting of the apparatus, the subsequent supply being effected automatically and continuously by automatic feeding mechanism, hereinafter more fully described. The inner periphery of the cylinder or drum 1 will be lined with any suitable uncorrodible material, preferably sheet-brass, and provided with a series of longitudinal ribs or bars 10, having an oblong square formation and arranged in close relation to each other, as illustrated in Fig. 6, so as to leave a space or cavity between adjacent ribs of a width about equal to the width of the top face of a rib or bar 10. This arrangement provides narrow longitudinal cavities around the inner periphery that fill with a body of the lead particles at their lower positions and holds the same to form a frictional surface, even with the top of the ribs. In this manner wear upon the ribs is restricted to the top surface of the ribs alone, and in consequence the lifetime of the ribs is extended to a great length. The trunnions of the corroding-cylinder are made hollow for the passage of the axial pipes, by which the flow of water and gases takes place through the corroding-chamber, leakage being prevented at each cylinder-head around said

pipes by means of the stuffing-boxes or glands 11. Said pipes, as illustrated in the drawings, consist of the induction and eduction non-rotary sections of water-pipe 12 and 13, and the similar induction and eduction non-rotary sections of gas or air pipe 14 and 15, that are arranged to surround the water-pipe sections, as shown, the induction-pipe sections 12 and 14 being, respectively, perforated and slotted along their length within the interior of the corroding-cylinder, so as to evenly distribute the water and gas along the whole length of such cylinder, while the eduction-sections of pipe 13 and 15 communicate with the interior of the corroding-cylinder in the following manner: The air-eduction pipe 13 by means of a lateral opening 16 and the water-eduction pipe by means of an open-ended downwardly-extending branch 17, that dips into the contained water in the corroding cylinder, said branch-pipe being preferably arranged in an oblique direction, so as to take water at a point removed from the end of the corroding-cylinder.

The different pipe-sections 12, 13, 14, 15, and 17 are connected together, so as to brace and support each other, by means of a hollow Y-shaped plug 18, which affords a very convenient support for the inner ends of the different pipe-sections, as clearly indicated in Fig. 1. The passage of the water induction and eduction pipes 12 and 13 through the ends of the respective air induction and eduction pipes 14 and 15 is effected in a tight manner by means of glands or stuffing-boxes 19 and 20 in the respective couplings of the pipe-sections 12 and 13 with their inlet and outlet branch pipes 21 and 22, through which the air or other gas is introduced under pressure from a suitable accumulator or other source and discharged into a succeeding corroding-chamber or other escape, as desired, such escape being controlled and regulated by a valve 23. The water eduction or outlet branch pipe is similarly provided with a valve 24, so as to regulate the flow of water through the corroding-cylinder, and in consequence the degree of temperature therein, caused by mechanical as well as chemical action, the water inlet or induction branch 25 being connected to a pump or other suitable source of water-pressure supply.

Suitable gages (not shown) may be employed to indicate the temperature as well as the pressure prevailing within the corroding-cylinder.

The gaseous body employed in the corroding-cylinder will usually consist of atmospheric air, as affording in a very cheap and convenient form the necessary oxygen required in the formation of the lead suboxide or protoxide. When, however, a lead hydrocarbonate alone or a mixture thereof with the sub or prot oxide is required, the gaseous supply to the corroding-cylinder will consist of a mixture of atmospheric air and carbonic-acid gas.

An automatic feeding mechanism, as follows, is provided for introducing a constant and limited supply of comminuted metallic lead to compensate for the amount abstracted in the form of corroded lead. In this 26 is a rotary cylinder receiving an intermittent rotary motion from the driving counter-shaft 4 of the apparatus or other suitable source of motion through the eccentric 27 on said shaft, eccentric-rod 28, rock-arm 29, carrying a pawl 30, that engages and actuates a ratchet-wheel 31, fixed on the hub of the cylinder 25, to effect the desired intermittent rotation of the same. The rock-arm 29 has pivotal movement on the hub of the cylinder 26, and the connection of the eccentric-rod 28 thereto is adjustable in a radial direction to or from the axis of the cylinder 26, so as to regulate the speed with which the same is rotated. The periphery of the cylinder 26 is formed with a number of pockets or recesses 32, that take a supply of comminuted lead from the upper chamber of the casing 33 of such cylinder to carry it to the lower chamber thereof.

In the construction shown the upper chamber is in connection with the supply funnel or hopper 34, while the lower chamber is in communication with the air-inlet or induction-pipe section 14, into which the lead drops to be conveyed by the spiral conveyer 35 forward into the corroding-cylinder. The spiral conveyer 35 is on a sleeve surrounding the water-induction pipe 12 and passes out through the gland or stuffing-box 19 and is provided with a belt-pulley 36, by which motion is imparted to the spiral conveyer from any suitable source.

37 is a gland or stuffing-box formation for preventing a leakage at the joint between the conveyer-sleeve and the water-induction pipe.

38 is a straightway-valve immediately beneath the feeding-cylinder 26, for the purpose of closing the communication between the same and the interior of the corroding-cylinder when it is desired to repair such mechanism, or for any other required uses.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of a water-induction pipe extending in through the trunnion or axis of the cylinder, and a water-eduction pipe extending out through the trunnion or axis of such cylinder and having its inner end extending downwardly from the center of the cylinder, such pipes being adapted to maintain a flow of water through the cylinder, for the purpose set forth.

2. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of water and gas induction pipes extending in through the trunnion or axis of the cylinder, and a water-eduction pipe extending out through the trunnion or

axis of such cylinder and having its inner end extending downwardly from the center of the cylinder, such pipes being adapted to maintain a flow of water through the cylinder, for the purpose set forth.

3. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of water and gas induction pipes extending in through the trunnion or axis of the cylinder and water and gas eduction pipes extending out through the trunnion or axis of the cylinder, the inner end of the water-eduction pipe being extended downwardly from the center of the cylinder, such pipes being adapted to maintain a flow of water and gas through the cylinder, for the purpose set forth.

4. In a lead-corroding apparatus, the horizontally-arranged revolving cylinder provided with ribs on its inner periphery of an oblong square form arranged a distance apart, so as to form spaces or cavities of a width nearly equal to that of the face of the ribs, as described, and for the purpose set forth.

5. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of water and gas induction pipes extending in through the trunnion or axis of the cylinder and water and gas eduction pipes extending out through the trunnion or axis of the cylinder, the downwardly-extending branch pipe 17, and a Y-shaped plug 18, connecting the inner ends of said pipes together, for the purpose set forth.

6. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of an induction pipe or passage extending in through the axis or trunnion of the cylinder, a rotatable cylinder 26, having peripheral pockets 32, and a casing inclosing said cylinder and having communication with the supply-hopper and the axial induction-pipe of the main cylinder, for the purpose set forth.

7. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of an induction pipe or passage extending in through the axis or trunnion of the cylinder, a rotatable cylinder 26, having peripheral feed-pockets 32, a casing inclosing said cylinder and having communication with the supply-hopper and the axial induction-pipe of the main cylinder, and a means for imparting intermittent rotation to the feeding-cylinder, consisting of the ratchet-wheel 31, pawl 30, arm 29, eccentric-rod 28, and eccentric 27, for the purpose set forth.

8. In a lead-corroding apparatus, the combination, with the horizontally-arranged revolving cylinder, of an induction pipe or passage extending in through the axis or trunnion of the cylinder, a spiral conveyer arranged to rotate in said induction pipe or passage, a rotatable cylinder 26, having peripheral pockets 32, and a casing inclosing said cylinder and having communication with the supply-hopper, and the axial induction-pipe of the main cylinder, for the purpose set forth.

In testimony whereof witness my hand this 5th day of August, 1891.

GEORGE D. COLEMAN.

In presence of—
ROBERT BURNS,
KNOWLTON L. AMES.