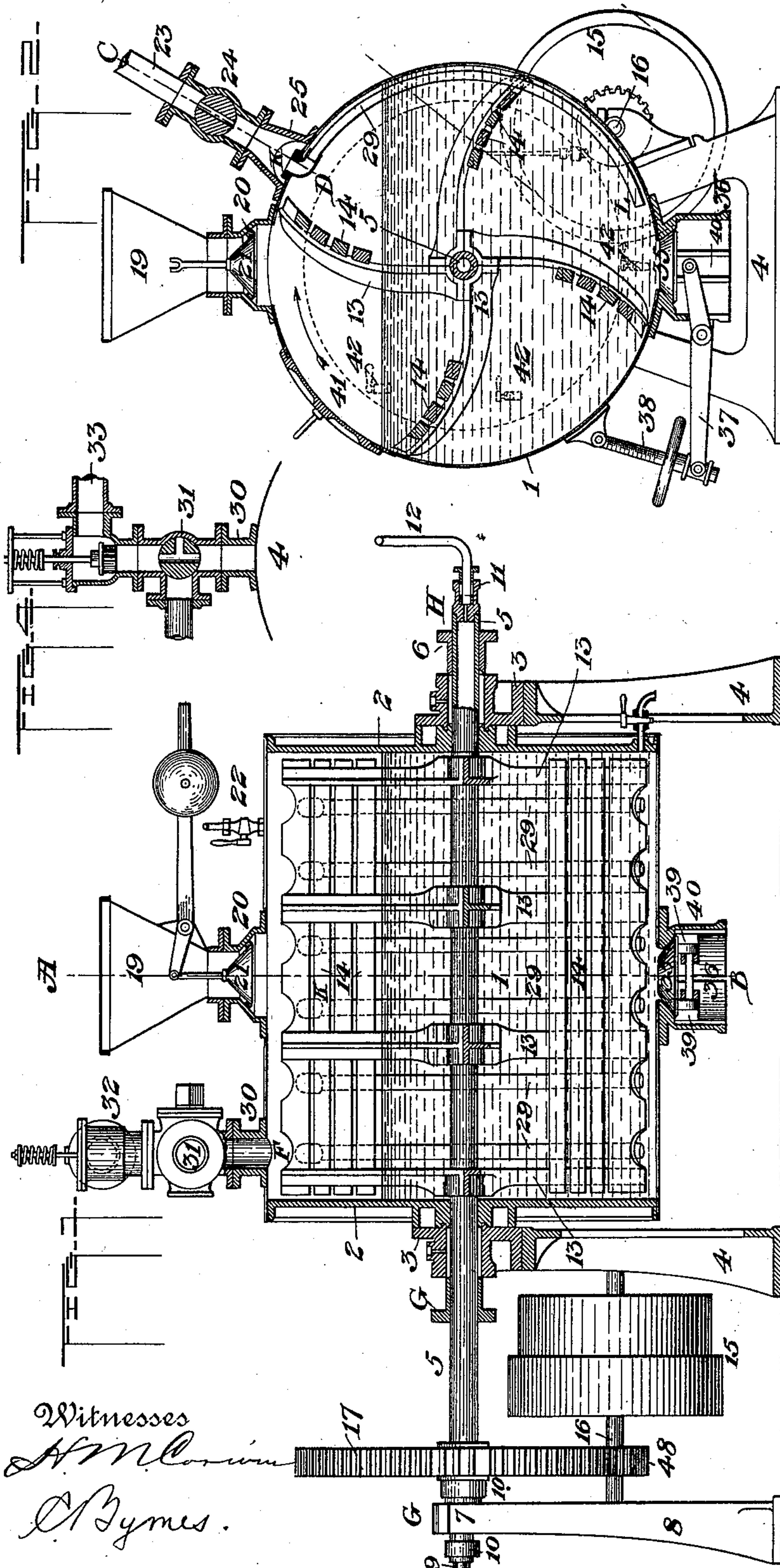


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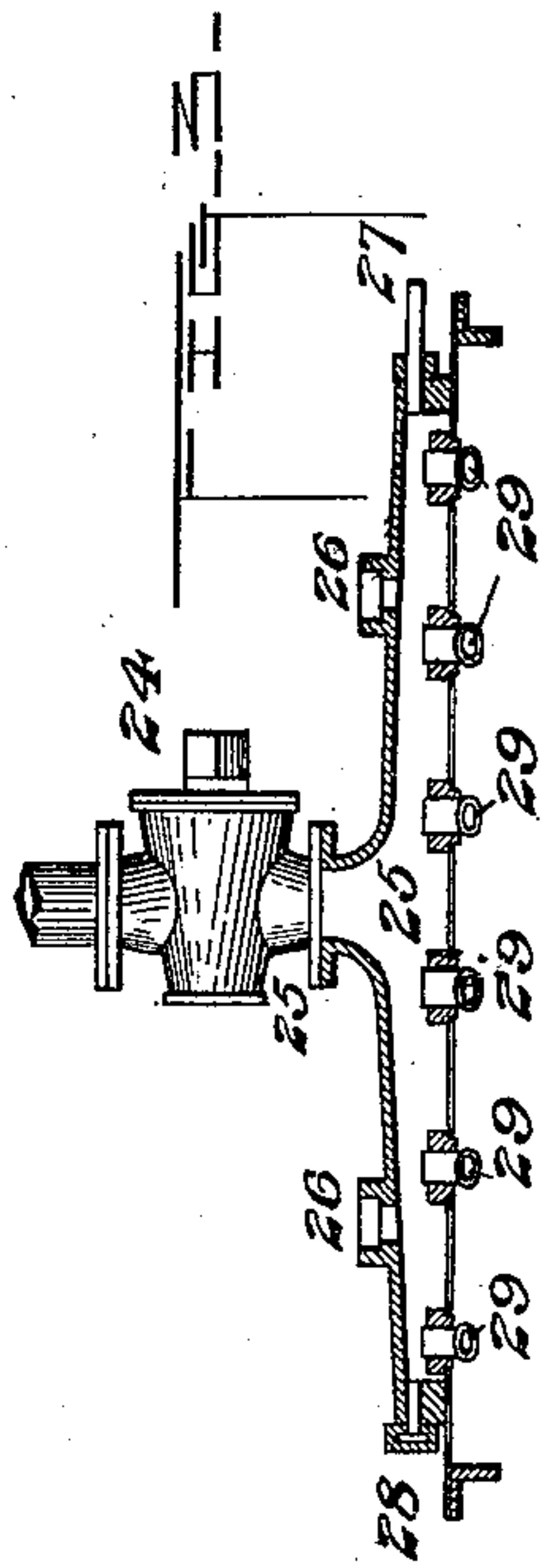
J. W. H. JAMES.  
MANUFACTURE OF WHITE LEAD.

No. 583,751.

Patented June 1, 1897.



Witnesses  
A. M. Corbin  
D. G. Gyles.



Inventor  
John William Henry James  
by W. Baxendale & Sons  
Attorneys



# UNITED STATES PATENT OFFICE.

JOHN WILLIAM HENRY JAMES, OF LONDON, ENGLAND.

## MANUFACTURE OF WHITE LEAD.

SPECIFICATION forming part of Letters Patent No. 583,751, dated June 1, 1897.

Application filed November 10, 1893. Serial No. 490,597. (No specimens.) Patented in England October 1, 1891, No. 5,287; in France October 1, 1891, No. 216,474; in Belgium October 1, 1891, No. 96,644, and in Italy January 5, 1892, No. 31,078.

*To all whom it may concern:*

Be it known that I, JOHN WILLIAM HENRY JAMES, of the city of Westminster, London, England, have invented a new and useful Improvement in the Manufacture of White Lead, (for which I have obtained Letters Patent in Great Britain, No. 5,287, dated October 1, 1891; in France, No. 216,474, dated October 1, 1891; in Belgium, No. 96,644, dated October 1, 1891, and in Italy, No. 31,078, dated January 5, 1892;) and I do hereby declare the following to be a full, clear, and exact description thereof.

The invention has for its object to produce white lead of superior quality to that at present produced; and the invention consists of an improved process of manufacture. Such manufacture is conducted in improved apparatus especially designed to obtain the desired results.

The process is conducted as follows: I mix one part of pure finely-ground yellow litharge or oxid of lead with from one and a half to two parts, by weight, of water (more may be used, but without advantage) and with from one-tenth of one per cent. to one per cent., by weight, of acetic acid, estimated as glacial. I agitate from the bottom upward the magma so produced and during the agitation I inject carbonic-acid gas among it. The injection and agitation are effected under pressure or not, at a temperature of from 170° to 210° Fahrenheit, and are continued for from one to three hours, according to quantity dealt with, until white lead containing from sixty-five to seventy per cent. of carbonate of lead and from thirty to thirty-five per cent. of hydrate of lead is obtained.

The white-lead mixture obtained as above set forth, together with the mother liquor, is neutralized and with the addition of water is slowly agitated in a horizontal gyratory direction. It is then filtered and is afterward dried at a temperature of about 190° to 210° Fahrenheit.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of the carbonating apparatus. Fig. 2 is a cross-sectional elevation of same on line A B of Fig. 1. Fig. 3 is a longitudinal sectional elevation on line C D of Fig. 2, showing arrange-

ments for gas and water supply to the carbonating apparatus. Fig. 4 is a vertical section on line E F of Fig. 1, showing arrangement for controlling the exit of waste or inert gases.

1 is a metal cylinder with ends 2, carried on standards 4, and rigidly fixed thereto by brackets 3, which are bolted to the cylinder ends 2 and to the tops of the standards 4. 5 is a hollow metal spindle perforated with holes between the ends 2 of the cylinder and revolving in stuffing-boxes formed in brackets 3. These stuffing-boxes are provided with glands 6. The end G of the hollow spindle 5 is carried in a bearing 7 on the top of the standard 8 and is closed by means of the screwed metal plug 9. Set-collars 10 are fixed to the spindle 5 on each side of bearing 7. The end H of the spindle 5 is provided with a gland and stuffing-box 11 to take the end of the fixed steam-pipe 12, which is provided with a cock. (Not shown on the drawings.) Beater-arms 13 are bolted together in sets of four on the spindle 5 and are fixed thereto by means of keys. Timber slats 14 are attached to the beater-arms by means of bolts.

A belt-driven speed cone-pulley 15 is fixed on a small counter-shaft 16, which transmits motion to the spindle 5 by means of the gear-wheels 17 and 18.

A charging-hopper 19 is fixed to a casting 20, which is in turn attached to the top of the cylinder 1 by means of bolts, and is provided with a charging-bell 21, by means of which litharge or lead oxid is introduced into the cylinder.

22 is a cock for supplying acetic acid.

23 is the gas-supply pipe to cylinder 1, and 24 is a plug-cock for regulating the supply of gas.

25 is a gas-distributing trough provided with bosses 26, which are screwed for the reception of cocks of hot and cold water supply pipes. (Not shown on drawings.) A small steam-pipe 27 is attached to end J of the gas-trough and is provided with a cock, (not shown on drawings,) while the end I of the gas-trough is closed by means of a small screwed cap 28. Metal pipes 29 are secured to the inside of the cylinder, their ends K passing through the shell of the cyl-



inder and communicating with the gas-distributing trough, while their lower ends *L* are open to the inside of the cylinder.

30 is a seating bolted to the top of the cylinder and carrying the two-way cock 31, which controls the distribution of the waste gases passing out of cylinder. The spring-valve 32, fixed on the top of the cock 31, allows the waste gases to escape at any desired pressure into the atmosphere through the pipe 33.

35 is a discharge-valve fitting tightly into its seat in the casing 36, which is bolted to the cylinder 1. The valve 35 is worked by means of the lever 37, which is actuated by the hand-wheel and screw 38. The vertical movement of the valve is secured by means of the projecting lugs 39, which are guided by means of the vertical grooves 40.

41 is a manhole and cover for obtaining admission into the cylinder 1 when desired. Try-cocks 42 for sampling or testing the liquor and thermometer 43 for indicating temperature of same are fixed in one of the cylinder ends 2.

All metal parts of cylinder 1 in any way exposed to the action of the liquid contents are of either copper or gun-metal.

In actual practice with a carbonator about four feet six inches long and four feet in diameter I proceed as follows: The requisite quantity (from one hundred and sixty-eight to two hundred and twenty-four gallons) of water at a temperature of 170° to 210° Fahrenheit is introduced into the cylinder by means of one or both of the cocks 26 and the pipes 29. The revolving beaters or agitators are then set in motion and the charge of about half a ton of lead oxid in either the wet or dry condition is fed through the charging-hopper 19 and bell 21 and simultaneously a small quantity—say one-half per cent. by weight—of acetic acid (estimated as glacial) is passed into cylinder through cock 22. The cock 24 is then opened to admit washed gases from a limekiln, which are pumped into and distributed throughout the charge by a gas-pumping engine through the trough 25 and distributing-pipes 29. The inert or waste gases pass into the atmosphere through the two-way cock 31 and escape-valve 32, or, if sufficiently rich in CO<sub>2</sub>, may be passed through pipe 34 to another carbonator or series of carbonators before being allowed to escape into the atmosphere. The usual working pressure is from one-half to one atmosphere; but any desired pressure can be maintained in the cylinder by adjusting the spring on the valve 32. Should the temperature of the mass at any time fall below that desired—namely, from 170° to 210° Fahrenheit—steam is passed through pipe 12 and perforated spindle 5 until the proper temperature is attained. Samples are taken at intervals during the operation by means of the small try-cocks 42, and as soon as the sample shows uniformly

white and contains no unconverted oxid, which for the above-mentioned charge will occur in from two to three hours from the commencement of the operation, the gases are shut off by means of cock 24 and the contents of cylinder are discharged through the valve 35 into a suitable receiving-tank. Another charge is then introduced and the operation proceeded with as before.

In the receiving-tank the small proportion of acetate of lead remaining in the charge from carbonator is neutralized by means of carbonate of soda or potassa, and the contents of the tank are then allowed to flow into a suitable agitating-vat. The charge being thus agitated is thoroughly washed by the addition of fresh water to any desired extent and is then pumped into high-pressure filter-presses, from which the white lead is obtained in the form of cakes containing a relatively small percentage of moisture. The white lead thus produced is finally dried in hot-air stoves of a suitable character.

The air-supply for the stoves is passed by means of a fan through a steam-pipe heating apparatus, by which its temperature is raised to about 210° Fahrenheit, and the hot air is then forced by the fan at a slight pressure from end to end of the stoves, passing on its way above and between the frames containing the white lead to be dried. The operation of drying takes from one to two days, according to circumstances, and the dried white lead is then ground in edge-runners and finally passed through horizontal millstones or other suitable grinding apparatus, suitable means being adopted to prevent any dust passing into the atmosphere during this stage of the operation.

I claim—

1. A carbonator comprising a cylinder, a shaft extending through the cylinder having affixed thereto beater-arms adapted to be rotated when the shaft is rotated, a trough formed in the cylinder-casing, a supply pipe or pipes opening into said trough, and tubes or pipes extending from said trough and opening into the lower portion of the cylinder; substantially as described.

2. A carbonator comprising a fixed cylinder, a horizontal shaft extending through the cylinder having affixed thereto beater or agitator arms adapted to be rotated vertically when the shaft is rotated, gas-supply pipes or pipe opening into a trough formed in the cylinder-casing, and tubes extending from said trough and opening into the lower portion of the cylinder for supplying carbonating-gas; substantially as described.

In testimony whereof I have hereunto set my hand this 31st day of October, A. D. 1893.

JOHN WILLIAM HENRY JAMES.

Witnesses:

LESTER M. CLARK,  
L. EDWARDS.