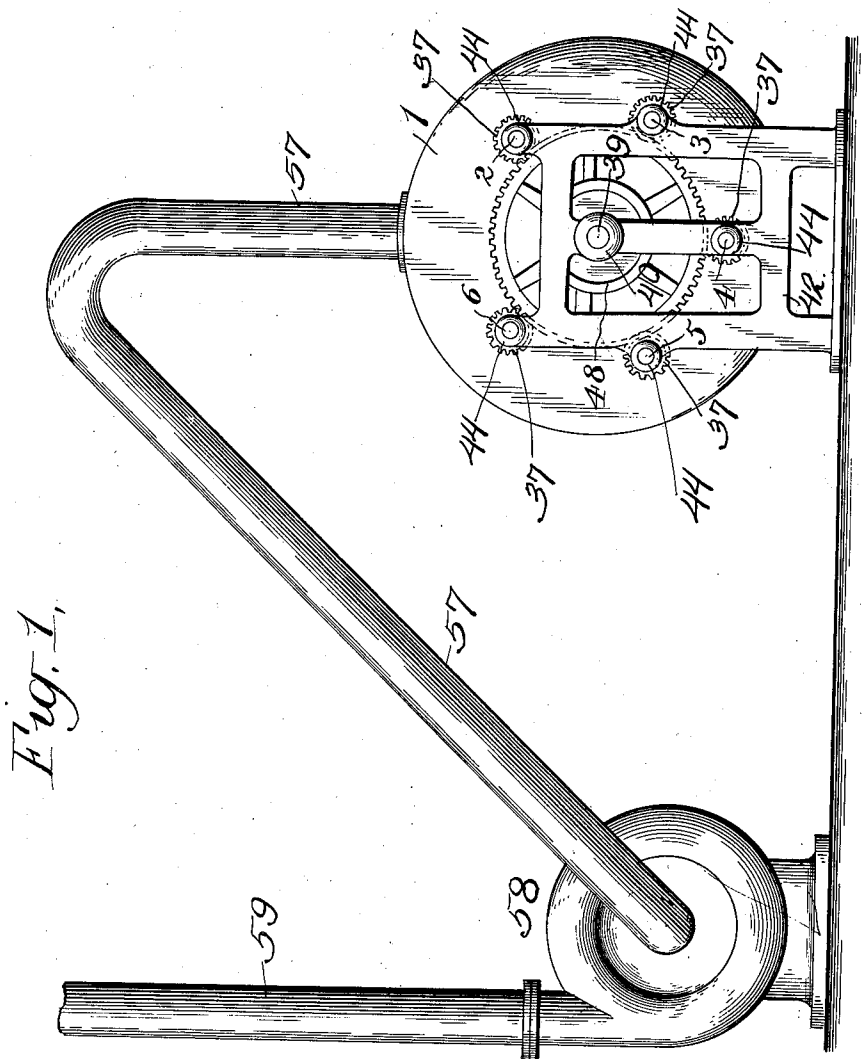


No. 846,384.

PATENTED MAR. 5, 1907.

J. W. BAILEY.
LEAD PRODUCT.
APPLICATION FILED JUNE 26, 1902.

2 SHEETS—SHEET 1.



WITNESSES:

John O. Kempler
Sidney Mann

John W. Bailey INVENTOR

BY *Kenyon & Kenyon*
ATTORNEYS

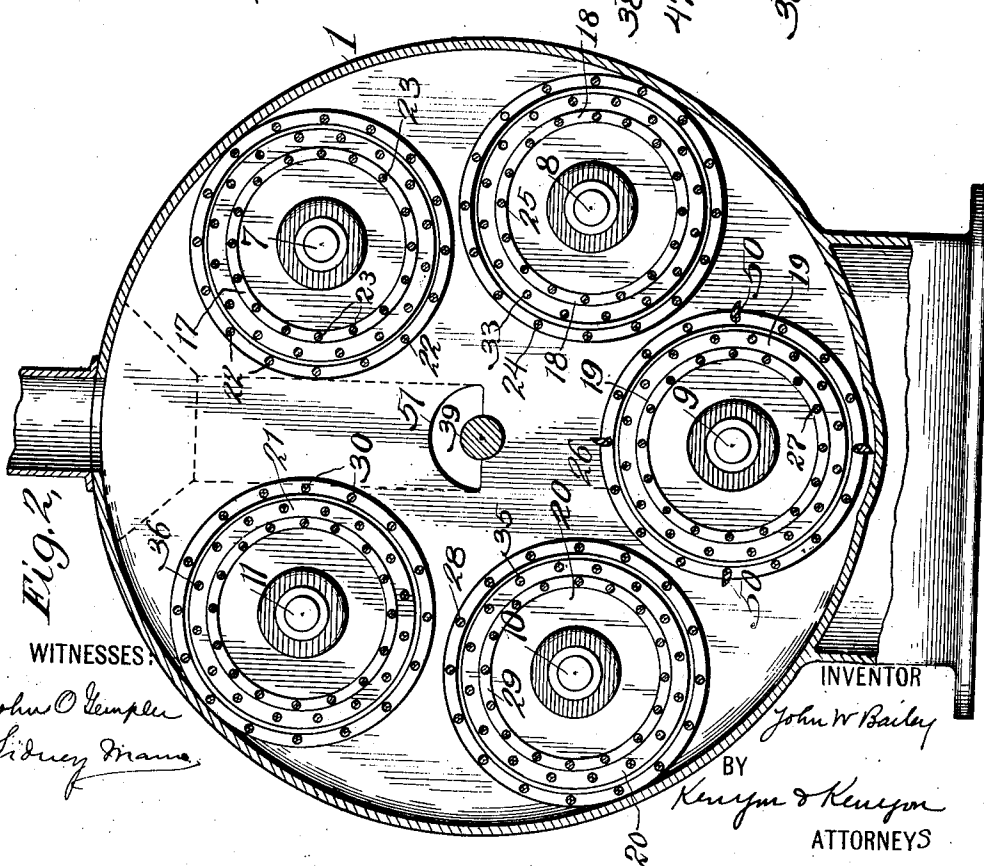
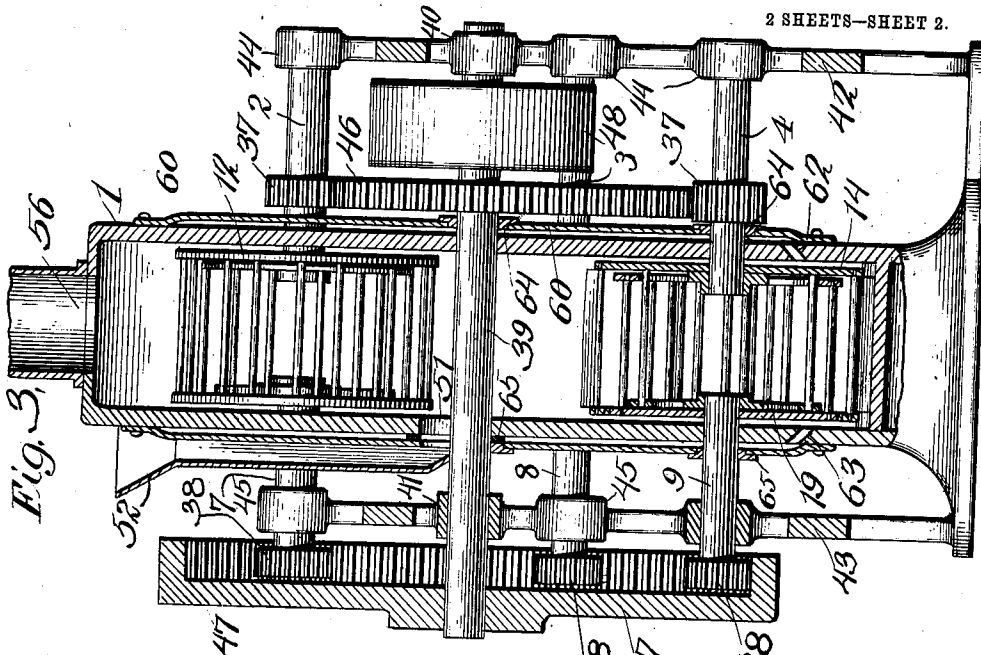
No. 846,384.

PATENTED MAR. 5, 1907.

J. W. BAILEY.
LEAD PRODUCT.

APPLICATION FILED JUNE 26, 1902.

2 SHEETS—SHEET 2.



WITNESSES:

John O. Kempler
Sidney D. Mann

INVENTOR

John W. Bailey

BY

Kennedy & Kennedy
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN W. BAILEY, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS,
TO UNITED LEAD COMPANY, A CORPORATION OF NEW JERSEY.

LEAD PRODUCT.

No. 846,384.

Specification of Letters Patent.

Patented March 5, 1907.

Application filed June 26, 1902. Serial No. 113,213.

To all whom it may concern:

Be it known that I, JOHN W. BAILEY, a citizen of the United States, and a resident of and whose post-office address is 555 West One Hundred and Eighty-third street, New York city, in the county and State of New York, have invented certain new and useful Improvements in Lead Products, of which the following is a specification.

My invention relates to a lead product; and it has for an object to provide metallic lead in a form which permits of its use in various compounds, chemical and mechanical.

A more especial object of the invention, however, is to produce the metal in a form which greatly facilitates its chemical union with other substances.

In prior processes where metallic lead has been treated for the production of substances or compounds of which lead is the base, as in processes for producing lead pigments, and particularly in the processes of making lead carbonate, or the white lead of commerce, the lead has been produced in a comminuted form, sometimes in the form of thin spangles, such as result from dropping the molten metal on suitable surfaces, sometimes in the form of a fiber produced by pouring the molten metal through small openings into a suitable cooling medium, and sometimes in the form of a coarse sand-like powder, such as that produced by directing a blast of compressed air or a jet of superheated steam through a stream of the molten metal. A chemical process in which the lead is treated in either of these forms is necessarily slow, the ordinary process of making lead carbonate by corrosion, for instance, requiring many weeks and even months for its completion. There is, moreover, in such a process always a large percentage of waste in the stock, owing, among other reasons, to the lack of uniformity in the sizes of the particles and to the irregularity in the subjecting of the same to the chemical action of the other substances. To remove this waste, expensive separating and cleansing operations are required.

I have discovered that the metallic lead may be reduced to the form of a dust or an impalpable and practically amorphous powder and that when it is subjected to chemical action in this condition it is rapidly and uniformly transformed into the ordi-

nary lead pigments and other compounds, such as white lead, litharge, or red lead, and this without any substantial waste and without rendering it necessary to resort to expensive and troublesome cleansing or other finishing operations in order to produce a pure and superior final product. This metallic powder may also be employed in its pure or uncombined state as a pigment or as a purely mechanical ingredient in various compounds. I have found that by subjecting the metallic lead to the action of rapidly-moving beaters the material may be reduced to the dust-like form above described and that by continuing the process the material may be reduced to any desired degree of fineness. This disintegrating or pulverizing process may be, and preferably is, carried to such a point that the material may be conveyed by currents of air or other gases and diffused throughout a body of air or gas and while in this condition uniformly subjected to the action of chemical agents, whereby a rapid and complete chemical union of every particle of the metal with other substances may be effected. The material may also be caused to unite with other substances in various other ways, as by agitating a body of the same, heated to a suitable temperature in the presence of the other substance or substances.

In accordance with the preferred method of producing the new lead product the material is first comminuted to a suitable degree of fineness, as by subjecting a stream of the molten metal to a jet of air or steam, as above described. The comminuted metal is then supplied, preferably in a substantially continuous manner, to a chamber in which one or more beaters are rotated at a high speed, and a current of air is maintained through the chamber, so as to separate and convey away the pulverized material as it reaches a suitable degree of fineness. The dust-laden current of air issuing from the pulverizing-chamber may be conveyed directly into a suitable chamber in which the material is subjected to a chemical process; or it may be conducted to a suitable settling-chamber, where the dust is collected and stored for future use. By regulating the speed of the current of air passing through the pulverizing-chamber the degree of fineness of the material may be easily and accu-

ately controlled. While this process of producing the new product is preferred, it is possible that the product may be produced in other ways, as by a grinding or abrading process, and it is to be understood, therefore, that my invention, as far as the product is concerned, is not limited to any particular process of producing the product.

The new product may be substantially pure metal or it may be a mixture of the metal and an oxid thereof. It has a dark-gray color, and it leaves a mark like that of a piece of pure lead. It is a very heavy powder, and it feels smooth to the touch, somewhat like powdered graphite.

In order that the method of producing my product may be more perfectly understood, I have illustrated in the accompanying drawings, which are referred to herein and form a part hereof, and will now describe an apparatus adapted to carry out the process, said apparatus forming the subject-matter of a copending application, Serial No. 113,214. It is to be understood, however, that the process may be carried out by other forms of apparatus, the form shown being selected only by way of example.

Of the drawings, Figure 1 is a side elevation of a complete machine constructed in accordance with my invention. Fig. 2 is a vertical section of the machine, and Fig. 3 is a central transverse section of the same.

Referring to the drawings in detail, 1 represents a suitable casing forming the pulverizing-chamber. This casing, as illustrated, is substantially cylindrical in form, and within it are arranged side by side a plurality of rotary beaters. In accordance with the construction shown the beaters are arranged in a circle near the circumference of the casing in a plurality of sets, each set comprising two or more concentric rows of beater-arms and means for rotating the adjacent rows of arms in opposite directions. This is accomplished by providing two series of short shafts, the shafts 2, 3, 4, 5, and 6 of one set being arranged to project through one side of the casing 1 and shafts 7, 8, 9, 10, and 11 of the other set being arranged to project through the opposite side of the casing in alinement with the corresponding shafts of the first set. On the adjacent ends of the two sets of shafts are mounted the beater-heads 12, 13, 14, 15, and 16 and 17, 18, 19, 20, and 21, respectively. Each of the beater-heads is provided with one or more rows of concentrically-arranged beater-arms, the heads 12, 13, 14, 15, and 16, as illustrated, being provided with two rows of arms 22 and 23, 24 and 25, 26 and 27, 28 and 29, 30 and 31, respectively. The heads 17, 18, 19, 20, and 21, as shown, are provided with a single row of beater-arms 32, 33, 34, 35, and 36, respectively.

The sets of short shafts 2, 3, 4, 5, and 6

and 7, 8, 9, 10, and 11 may be driven by any suitable driving mechanism. The shafts of each set, however, are preferably driven in the same direction, as in this way the adjacent portions of the side-by-side sets of beaters are caused to move in opposite directions, so that the material flying off from one set of beaters will come into contact with an oppositely-moving set of beaters or with the oppositely-moving material thrown off therefrom. The two sets of shafts, however, and the set of beaters carried thereby are preferably driven in opposite directions, so that the adjacent concentric rows of beater-arms will move in opposite directions. As shown, each of the shafts 2 to 11, inclusive, is provided with a driving-pinion, the pinions on one side of the machine being represented by the number 37 and those on the opposite side of the machine by the number 38. A driving-shaft 39 passes directly through the center of the machine, the same being supported in suitable bearings 40 and 41, which are formed in the standards 42 and 43. These standards are also provided with bearings for the outer ends of the two sets of beater-shafts, the bearings in the standard 42 for the shafts at one side of the machine being represented by the number 44 and those in the standard 43 for the other side of the machine by the number 45. Driving-shaft 39 is provided at one side of the machine with an external driving-gear 46, adapted to mesh with each of the pinions 37, and at the other side of the machine with an internal driving-gear 47, adapted to mesh with each of the pinions 38. A suitable driving-pulley 48 is provided on the shaft 39.

One set of beaters 14 and 19 is preferably arranged at the bottom of the casing, and the outermost row of beater-arms 26 is preferably provided with one or more scrapers 50, adapted to move close to the bottom of the chamber, so as to prevent the settling therein of any of the material being pulverized. The lead in the comminuted condition above described is supplied to the pulverizing-chamber through the opening 51, arranged at or near the center of the casing, a suitable feed chute or hopper being provided to facilitate this operation.

For the purpose of discharging the pulverized lead from the chamber when it has reached a suitable degree of fineness the casing is provided with a discharge-opening 56, which is preferably arranged at or near the top of the chamber, and said opening is connected by a pipe or passage 57 to the suction-port of an exhaust fan or blower 58. The delivery-passage 59 of the fan 58 may be connected to a suitable collecting-chamber in the ordinary manner. Any other suitable means may be provided for maintaining a current of air through the pulverizing-chamber.

It follows from this construction that all of

the lead introduced into the pulverizing-chamber will be kept in a state of rapid motion and will be continually coming in contact with oppositely-moving parts or particles, whereby it will be rapidly and efficiently reduced to a powder and will not be delivered from the casing until it has been reduced to a fine state, such that it may be conveyed in opposition to the force of gravity by the current of air produced by the fan. By regulating the speed of the fan, therefore, and the consequent velocity of the current of air the degree of fineness of the metal delivered from the pulverizing-chamber may be nicely controlled. The velocity of the current of air, however, will be made so moderate as not to convey the lead out of the pulverizing-chamber until it has been reduced to an impalpable powder. The speed of rotation of the beater-heads will depend upon their size. I have found that with beater-heads having a diameter of about sixteen inches the best results are produced by rotating the heads at a speed of about eight hundred revolutions per minute.

The herein-described processes of causing

the powdered lead to chemically unite with other substances are not claimed herein, as the same form the subject-matter of two co-pending applications, Serial No. 51,151, filed March 14, 1901, and Serial No. 97,848, filed March 12, 1902.

Having thus described my invention, what I desire to secure by Letters Patent is—

1. As a new article of manufacture, metallic lead in the form of an impalpable powder or dust.

2. As a new article of manufacture, a powder consisting of metallic lead reduced to such a fine state that it may be conveyed in opposition to the force of gravity by a moderate current of air.

3. As a new article of manufacture, an impalpable powder or dust produced by pulverizing metallic lead in a dry state.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN W. BAILEY.

Witnesses:

EDWIN SEGER,

J. H. FREEMAN.