

J. COX.
SEPARATOR AND PURIFIER.
APPLICATION FILED DEC. 7, 1910.

1,010,239.

Patented Nov. 28, 1911

2 SHEETS—SHEET 1.

Fig. 1.

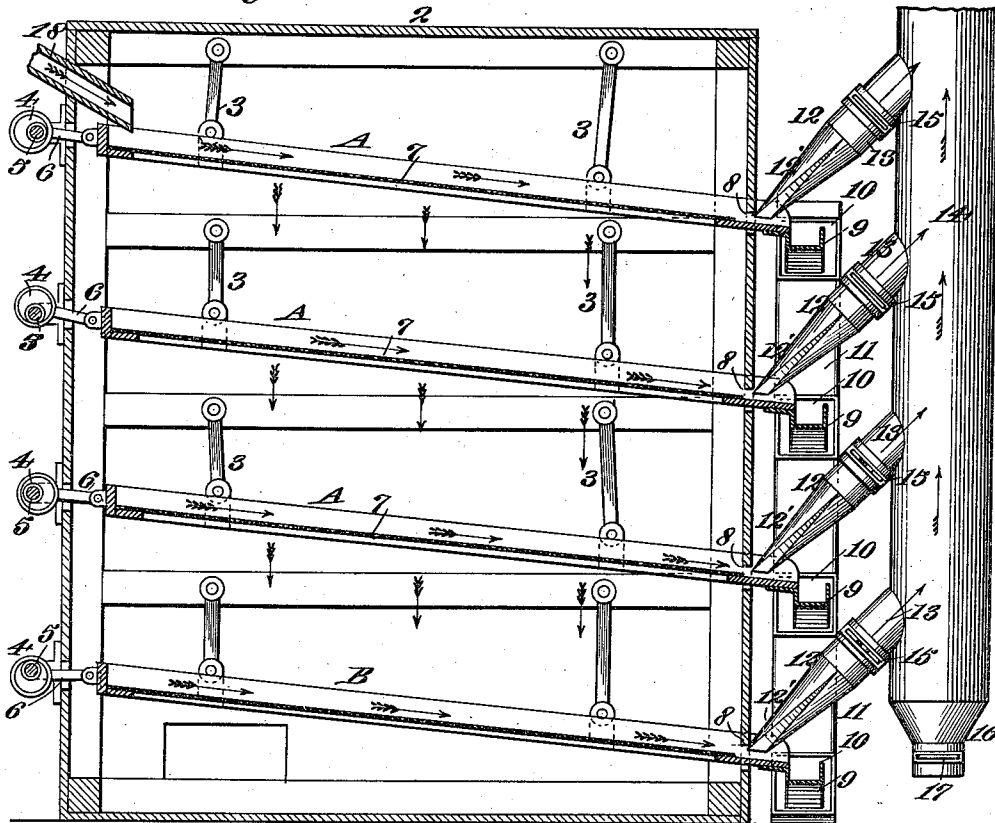


Fig. 2.

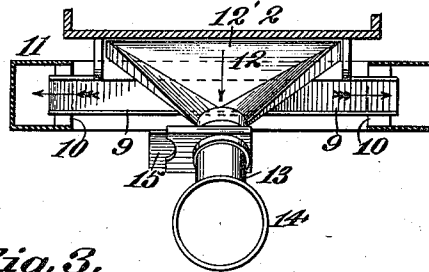
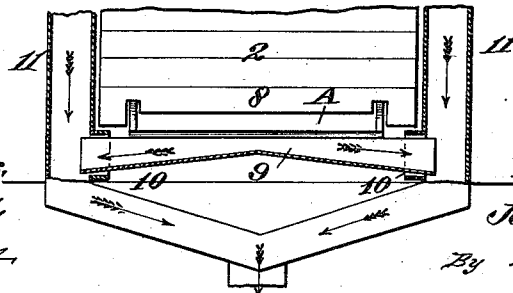


Fig. 3.



Witnesses,
Charles Pickles
R. S. Berry

Inventor:
John Cox.
By Geo. H. Strong
att'y

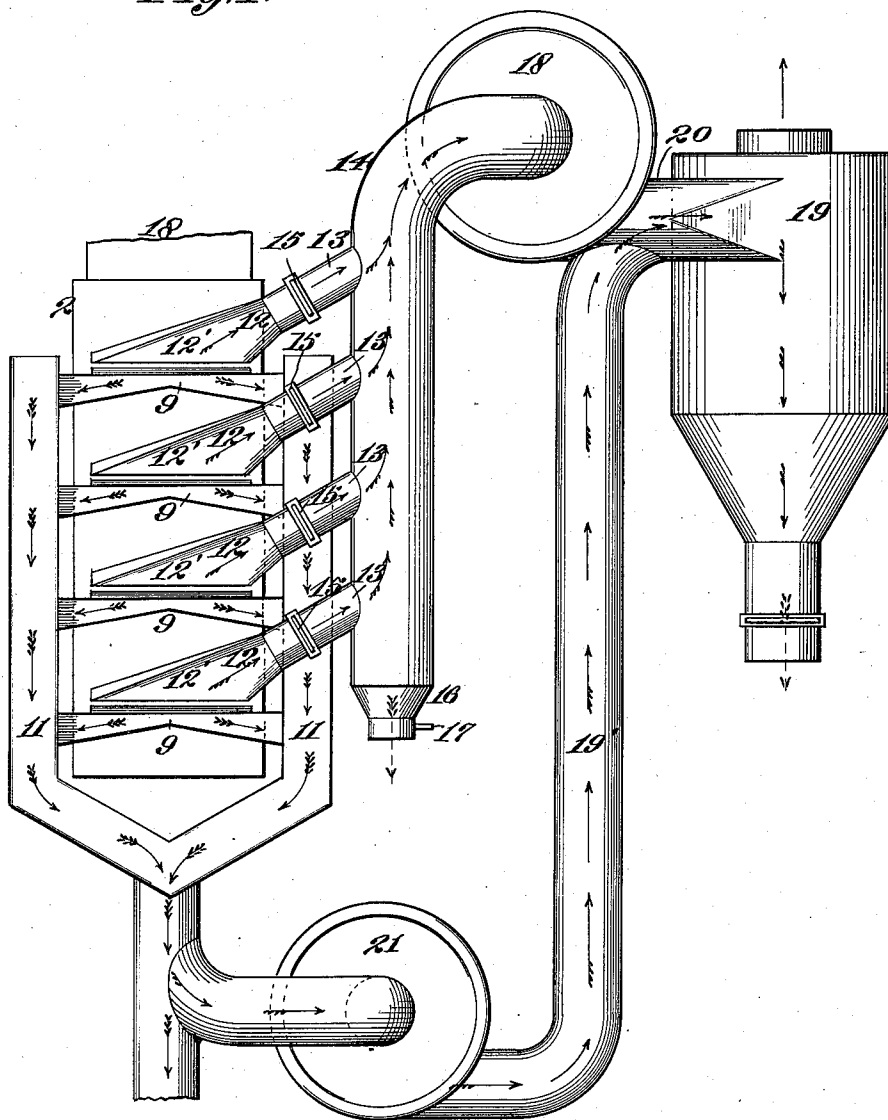
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2 SHEETS-SHEET 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN COX, OF SAN FRANCISCO, CALIFORNIA.

SEPARATOR AND PURIFIER.

1,010,239.

Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed December 7, 1910. Serial No. 596,059.

To all whom it may concern:

Be it known that I, JOHN COX, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Separators and Purifiers, of which the following is a specification.

This invention relates to an apparatus for cleaning and purifying white carbonate of lead and particularly pertains to a machine for removing tan-bark and other foreign matter from carbonates, preparatory to grinding.

It is the object of this invention to provide a simple and effective means for separating and removing tan-bark and other materials of lighter specific gravity than carbonate of lead from the carbonates prior to grinding.

In the process of corroding lead buckles in corroding bins and removing them therefrom prior to separating the carbonates, considerable tan-bark, dirt and other foreign substances become mixed therewith, which it is necessary to remove before crushing and grinding the carbonates, in order to prevent discoloration of the product. Heretofore, this separating process has been done largely by hand which requires considerable time and labor, and is not efficient because fine and dust-like particles of tan-bark are not removed, and by reason of its coloring character this dust causes a discoloration of the finished product when ground therewith. The difficulty of entirely removing the tan-bark and other foreign matter necessitated considerable care in removing the corroded lead buckles, but by the use of this invention such care is not required as all dirt is completely removed thereby.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the invention. Fig. 2 is a partial plan view. Fig. 3 is a partial end elevation. Fig. 4 is a diagram illustrating the process.

In the embodiment of this invention I employ a series of slightly inclined shaking screens A disposed one above another within a suitable housing or casing 2. These screens A are suspended on links 3 which are pivoted at one end to the frame of the

screens and at the other to the frame of the housing 2 in such manner that the screens A may be oscillated or vibrated in the direction of their length.

The vibrating of the screens A may be accomplished in any suitable manner but they are here shown as actuated by eccentric disks 4 mounted on drive shafts 5 driven by any desired power. The eccentric disks 4 operate straps 6 which are pivotally connected to the upper ends of the screens A. The wire mesh 7 of the screens A is graduated in fineness from the uppermost to the lowermost screens A, the coarsest screen disposed at the top and the finest at the bottom, as is common in grading machines employing vibrating screens.

A shaking table B may be disposed beneath the lower screen A upon which the fine particles delivered from the latter will be received and carried forward to be discharged from the lower end of the table, as later described.

The housing 2 is designed to completely inclose the shaking screens A and table B; one end of the housing being slotted at 8, however, through which slots the lower ends of the screens A and table B project.

Receiving troughs 9 are rigidly mounted on the outer or lower ends of the screens A and table B, outside of the housing 2. These troughs slope downwardly toward their ends from their centers and terminate in orifices 10 formed in vertically disposed conveyer tubes 11, which are arranged on each side of the end of the housing 2 and converge at their lower end in a common point of discharge. These conveyer tubes 11 are connected at a point near their lower end with a suction fan or other suitable means for creating a downward current of air in the tubes which is drawn in through the orifices 10, the purpose of which will become apparent hereinafter.

Disposed above the outer projecting end of each screen A and table B, adjacent each slot 8, is a suction nozzle 12, having a long and narrow mouth or intake 12' which is situated in close proximity to the screen or table surfaces, and extending the full width thereof.

The nozzle 12 is connected to a throat 13 leading to a vertically arranged general or main suction pipe 14 disposed in front of the housing 2. The suction pipe 14 is connected near its upper end to a suitable fan

or other means for creating a strong upward current of air through the nozzle 12 and throat 13. The lower end of the pipe 14 terminates in a hopper 16 the bottom of which is normally closed by a slide plate 17.

A slide damper 15 is disposed in each throat 13 between the nozzle 12 and the suction pipe 14, for the purpose of regulating the suction at the intake 12' of the nozzle 12.

The operation of this invention is as follows: The white carbonates after being separated from the lead buckles, are delivered to the uppermost screen A through a feed chute 18. The finest particles of the carbonate and other substances mingled therewith, pass through the uppermost screen A upon the screen there-beneath and so on throughout the series; each screen A retaining such particles of carbonate and other materials as are too coarse to pass between their respective meshes. The materials supported upon the screen surface are caused to move downward toward the lower end of the screens by means of the sloping incline of the latter and the vibration motion transmitted thereto by the eccentric disks 4. These particles of carbonates and other materials on passing through the slots 8 are subjected to the action of the suction nozzle 12 which action is to draw or separate such material or particles of lesser specific gravity than the carbonates, and draw them into the main or general suction pipe 14. The suctional area of the suction pipe 14 being greater than the intake of the nozzle 12, or the opening in the throat 13 and as governed by the damper 15, causes the volume of air drawn in through the nozzle 12 to expand, thereby permitting or causing the heavier or larger particles of the materials therein to fall downward into the hopper 16 from whence they can be removed as desired, by opening the slide bottom 17.

The purpose of the graduating screens A is to grade the dust particles of tan-bark and other impurities that the suction of each nozzle 12 may be so regulated by means of a damper 15 that the suction will not affect the particles of white carbonates delivered or passed under the intake 12' of the nozzle.

For example; if but one nozzle and a single shaking table were employed a draft at the nozzle 12 sufficiently strong to lift the large and coarser particles of tan-bark and the like, would also carry away the fine and dust-like particles of the carbonates; but by subjecting the carbonates and dust-like particles to a preliminary grading process and subjecting each separate grade to a suction draft, which is regulated in proportion to the size and weight of the dirt particles in that grade, it will be readily seen that nothing but the dirt particles will be drawn into the general suction pipe 14 other than

the minutest particles of carbonates such as will be caused to rise and float in the air by the agitation of the screens A. The lowermost screen A is provided with a screen mesh of approximately 100 meshes to the square inch, so that the particles delivered upon the table B will be extremely fine. The lowermost nozzle 12 will be so adjusted by means of the damper 15 that the fine dust and dirt particles of this grade will be separated from the finest particles of carbonates. These graded carbonates are delivered continuously over the outer ends of the vibrating screens A and the table B into the troughs 9 from which they are delivered through the orifices 10 into the conveying tube 11 to be carried off to a common point of discharge for further treatment. The downward draft or suction in the conveyer tubes 11 causes the floating dust particles of the carbonates which rise from the troughs 9, to be drawn into the conveyer tubes through the orifice 10 and also prevents the dust from rising in the conveyer tubes 11 and passing out the orifices 10. The poisonous nature of the carbonates makes it desirable that the dust be prevented from floating in the air about the machine.

The dust particles drawn into the pipe 14 by the fan 18, Fig. 4, are delivered to a separator 19 through a pipe 20, and the dust drawn from the conveyer tubes 11 by the auxiliary fan 21 is likewise delivered to the separator 19 through the pipe 19'.

It is obvious that as many shaking screens A and nozzles 12 may be employed as may be found necessary in order to effect a thorough cleaning of the carbonates.

In this description I have referred to "lead buckles" and in order that this may be fully understood I will state that in the method known as casting the buckles the pig lead is melted in a large iron kettle and allowed to flow continuously on to an endless double belt of molds, which form the lead into perforated disks of about one pound each, these disks being commonly known as buckles, due to the fanciful resemblance to the large metallic buckles used as ornaments on shoes in the earlier times. It is absolutely necessary that these buckles be cast, as a rolling process would harden or change the crystalline nature of the lead to such an extent that it would be impossible to corrode it.

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

1. In an apparatus for removing light foreign substances from heavier substances, the combination with a series of vibrating superposed screens of successively diminishing mesh, means for vibrating the screens, means for delivering the mixed heavy and light substances to the uppermost screen, a

receiving trough mounted on the discharge end of each of said screens, a vertically disposed conveyer tube into which all of said troughs discharge, and means for creating
5 a downward suction in said conveyer tube.

2. An apparatus for removing tan bark and like substances from dry carbonate of lead, said apparatus including a series of superposed inclined screens of successively
10 diminishing fineness, upwardly inclined nozzles with intakes disposed in close proximity above the lower ends of the screens, a suction apparatus and a vertical tank extending therefrom into which all the nozzles
15 discharge, transversely disposed inclined troughs below the outer ends of the screens, conveyer tubes into which said troughs discharge, and a suction device of less power than the first named one, with which said
20 conveyer tubes connect.

3. An apparatus for removing tan bark and like substances from dry carbonate of

lead, said apparatus including a series of superposed inclined screens of successively diminishing fineness, upwardly inclined nozzles with intakes disposed in close proximity
25 above the lower ends of the screens, a suction apparatus and a vertical tank extending therefrom into which all the nozzles discharge, transversely disposed inclined
30 troughs below the outer ends of the screens, conveyer tubes into which said troughs discharge, a suction device of less power than the first named one, with which said conveyer tubes connect, and a receiver into
35 which both suction devices discharge.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN COX.

Witnesses:

CHARLES EDELMAN,
C. C. COOK.