

Patented Feb. 21, 1893.

Fig. 2. A perspective view of the apparatus. It shows a horizontal tube assembly supported by a frame. Air is drawn from the right by a blower (B') through a filter (A') and into a vertical tube (I). The air then flows through a series of horizontal tubes (A, A', A'') and is collected in a filter (A'') at the left end. The flow direction is indicated by an arrow labeled 'a'.

[illegible]

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# UNITED STATES PATENT OFFICE.

WILLIAM A. BEATY, OF PLANT CITY, FLORIDA.

## PHOSPHATE-WASHER.

SPECIFICATION forming part of Letters Patent No. 492,262, dated February 21, 1893.

Application filed October 4, 1892. Serial No. 447,830. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM A. BEATY, of Plant City, in the county of Hillsborough and State of Florida, have invented a new and Improved Phosphate-Washer, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved phosphate washer, which is simple and durable in construction, very effective in operation and arranged to effectively separate the sand, clay, marl or other substance from the phosphates, at the same time preventing balling of the clay or marl.

The invention consists of a trough provided on its sides with alternately arranged partitions forming pockets, and shafts carrying agitating arms passing through the said pockets on the revolving of the shafts.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement; Fig. 2 is a side elevation of the same with parts in section; and Fig. 3 is a transverse section of the same on the line 3—3 of Fig. 2.

The improved phosphate washer is provided with an inclined trough A, mounted at its ends on suitable legs B and B' to conveniently support the trough a suitable distance above the ground. The trough A is formed by two longitudinally-extending segmental sections A' and A<sup>2</sup> and connecting with each other in the middle, to form a longitudinal ridge, as plainly shown in the cross section in Fig. 3.

In the two sections A' and A<sup>2</sup> of the trough A are arranged transversely-extending partitions C and C' respectively, set alternately, as plainly shown in Fig. 1 to form alternating pockets D and D' respectively, in the said sections. Each of the partitions C or C' is perforated preferably by upwardly-extending slots C<sup>2</sup> as indicated in Fig. 3.

Through the pockets D and D' are adapted to pass the agitating arms E and E' respectively, set spirally and radially on the shafts

F and F' respectively, journaled in the legs B and B' of the trough A. The outer ends of the shafts F and F' are connected with each other by gear wheels G and G', and on the outer end of the shaft F is also secured a fast and loose pulley H connected by belt with suitable machinery to impart a rotary motion to the said shaft F, which by gear wheels G and G', imparts a like motion to the shaft F', which thus rotates toward the other shaft F.

The leg B at the inlet end of the trough A extends to the top of the latter, as plainly indicated in Fig. 3, so as to close this end of the trough. The other leg B' leaves the trough A open as shown in Fig. 2 to permit of discharging the separated phosphate to a chute leading to an elevator or other device, at this end. The sides of the sections A' and A<sup>2</sup> at the closed end of the trough near the leg B are formed at or near the top with openings as plainly shown in Fig. 2, the openings being closed by wire netting A<sup>3</sup> which allows the muddy water to readily discharge at this feed end of the machine. The sections A' and A<sup>2</sup> are also provided with perforations A<sup>4</sup> leading to the pockets D and D' respectively, to permit part of the water, fine sand, clay or other refuse to pass out of the pockets to the outside. The discharge ends of the sections A' and A<sup>2</sup> are provided with screens A<sup>5</sup> over which the phosphate passes while the remainder of the sand, clay, marl or other refuse passes through the screens to a chute or other device for carrying it off.

The operation is as follows: The material is placed into the closed end in the top of trough A from above and is moved forward in the direction of the arrow a' shown in Fig. 2 by the action of the agitating arms E and E' moving the material forward first from one pocket of one section to the alternating pocket of the other section, then back again to the next forwardly alternating pocket of the first section, and so on until the waste or refuse and the phosphates are completely separated, it being understood that a sufficient amount of water is continuously introduced into the trough to assist in the separation of the sand, clay, marl or other refuse and the phosphates. The phosphates and refuse finally pass over the screens

A<sup>s</sup> over which the phosphate passes to the open discharge end of the trough, while the sand and other refuse pass through the meshes of the screen to the outside of the machine.

- 5 It is understood that as the material is fed forward by the arms as above described, it is somewhat elevated owing to the inclined position of the trough, and comes constantly in contact with fresh water introduced at the  
10 open upper end of the trough through a suitable water supply pipe I or other means.

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

- 15 1. A phosphate washer, comprising a trough, partitions arranged on opposite sides of the said trough and forming alternately-arranged pockets, and agitating arms passing through the said pockets to move the material forward,  
20 substantially as shown and described.

2. A phosphate washer, comprising a trough made of two segmental sections, partitions arranged in the sections and forming alternating pockets, and revoluble shafts carrying spirally arranged agitating arms passing through  
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the said pockets, substantially as shown and described.

3. A phosphate washer, comprising a trough made of two segmental sections, partitions arranged in the sections and forming alternating pockets, and revoluble shafts carrying spirally arranged agitating arms passing through the said pockets, and means, substantially as described, for rotating the said shafts to move the agitating arms toward each other, as set forth. 35

4. A phosphate washer, comprising a trough formed of two longitudinally-extending perforated segmental sections, perforated partitions arranged in the sections and forming alternating pockets, revoluble shafts journaled in the ends of the said trough, and agitating arms set spirally on the said shafts and passing through the said pockets, substantially as shown and described. 40

WILLIAM A. BEATY.

Witnesses:

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J. L. HEAD.