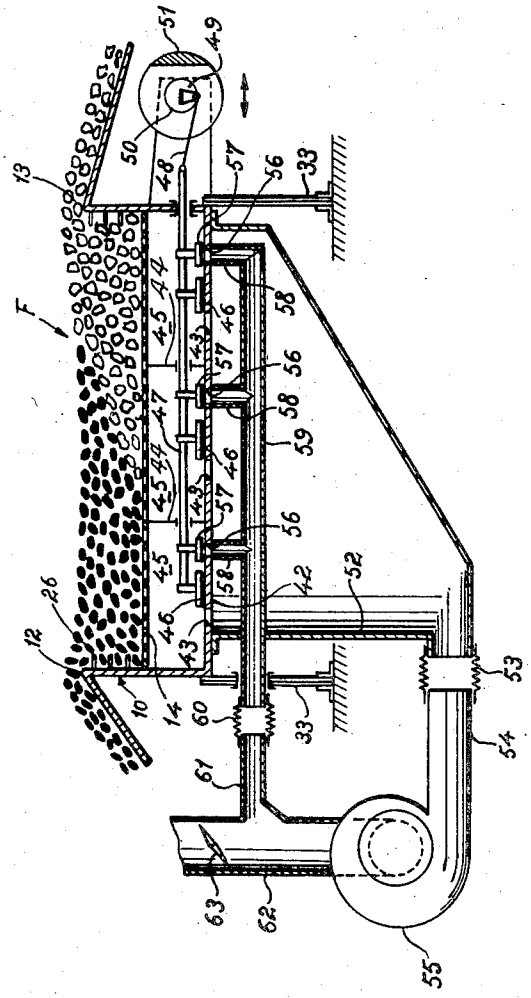
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APPARATUS FOR SORTING SOLID PRODUCTS BY DENSITY

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APPARATUS FOR SORTING SOLID PRODUCTS BY DENSITY

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The present invention relates to an apparatus for sorting solid products by density, of the kind in which the products to be sorted are unloaded into a container, the base of which is perforated and through which a flow of gas passes from the bottom to the top, whilst means of progression are provided to lead the sorted products towards one or a number of separate extremities of the apparatus. By perforated base, it is convenient to mean in the present description any base arranged in such a way as to permit a suitable passage for the gases and, at the same time, to prevent the product from passing through. A perforated base of this kind may consist, for example, of a plate provided with holes, of a grid, of a sieve, of a highly porous ceramic wall, or of any other convenient arrangement.

An object of the invention is to improve the operation of apparatus of this type and to enable more precise and more effective sorting to be made.

In accordance with one of the features of the invention, in an apparatus of the kind referred to, the gaseous flow has a pulsatory or intermittent character.

The means of progression may consist of an alternating movement applied to the whole or part of the container and synchronise with the pulsation of the flow of gas and/or of an inclined perforated base.

The objects, features and advantages of the invention will furthermore become apparent from the description which follows below with reference to the form of construction chosen by way of example and with reference to the attached drawings in which the sole figure is a diagrammatic view in vertical longitudinal cross-section of a form of construction of the apparatus in accordance with the invention.

In the figure, there is seen at **10** a container or caisson having two opposite discharging-sills **12** and **13**. The container **10** is provided with a perforated horizontal base **14**. The base **14** is perforated under the whole container. The walls of the container are provided with internal horizontal fins **26** intended to suppress the undesirable effects known as wall-effects. Container **10** is supported by flexible plates **33**. Underneath the base **14**, the container is extended by an approximately air-tight chamber defined by the lateral walls of the container and by a horizontal lower plate **42**. Ports such as **43** are arranged in the plate **42** whilst vertical partitions **44** extend between the plate **42** and the base **14** in order to divide up the space situated beneath the base into separate compartments **45**, each of which is provided with at least one port-hole **43**. Each port-hole **43** is associated with a shutter-member **46** forming a slide-valve and slidably mounted against the upper part of the plate **42** between an open position in which the member **46** frees the port **43** and a closed position in which the member **46** closes the port **43**.

The various members **46** are mounted on an actuating rod **47** which passes through the partitions **44** and the wall of the container and is connected by a crank-arm **48** to the handle **49** of a driving shaft **50**. The latter

is rotatably mounted on the container **10** and is provided with an out-of-balance weight **51** so as to uncover and shut off alternately by means of the members **46**, the ports **43**, and to impress horizontal oscillations on the container by means of the out-of-balance weight **51**.

The member **46** arranged on the left is locked in position on the rod **47** in such a manner as to be in phase-opposition with respect to the other members **46**, so that the pulsations applied to the left-hand part of the container are out-of-phase with respect to the pulsations applied to the right-hand part, the pulsations as a whole being in synchronism with the horizontal oscillations of the container. Under the plate **42** is fixed a hood **52** which is connected through a flexible joint **53** to the delivery conduit **54** of a fan **55**. The plate **42** also comprises port-holes **56** in addition to the port-holes **43**. Each port-hole **56** is arranged in the vicinity of a port-hole **43** in a same compartment **45** and is associated with a shutter member **57** forming a slide-valve and slidably mounted on the upper surface of the plate **42**. The various members **57** are rigidly coupled to the alternating shaft **47** which carries the members **46**, and the members **57** and **46** are locked in position on the rod **47** in such a way that the port-holes **56** are closed or freed by the members **57** when the port-holes **43** are respectively freed or closed by the members **46**.

The port-holes **56** communicate with conduits **58** extending under the plate **42** and being connected to a collector **59** mounted inside the hood **52**. The collector **59** is connected by a flexible joint **60** to a conduit **61**, which is under partial pressure, for example, and which communicates with the upstream pipe **62** on the intake side of the fan **55**, the downstream delivery pipe of which supplies the hood **52** as in the previous case. The pipe **62** is provided with a regulating damper **63**.

In operation, the rotating shaft **50** impresses horizontal oscillations on the container **10** by means of the out-of-balance weight **51**, as previously. In synchronism with these oscillations, the port-holes **43** are alternately opened and closed whilst the port-holes **56** are closed when the port-holes **43** are open and vice-versa.

The fan **55** causes an increase in pressure within the gaseous space inside the hood **52** and a depression, adjustable at **63**, in the collector **59**. In consequence, when the port-holes **43** are open and the port-holes **56** are closed, a rising flow of gas under pressure passes through the layer of products in the container **10**, and this assists the decantation of the products without causing these products to progress horizontally since the latter are lifted away by the flow of gas.

In the following half-period of the oscillations, the port-holes **43** are closed and the port-holes **56** are open. The compartments **45** are then put under depression, which strongly forces the products against the perforated base **14** and assists their progression under the effect of the corresponding oscillation. The unsorted products unloaded at F are sorted into light products collected at **12** and into heavy products collected at **13**.

What I claim is:

1. Apparatus for sorting and classifying solid products by density, comprising a container for the products to be sorted, a perforated base for said container, a plurality of discharge-chutes associated with said container for selectively discharging the sorted products, means for impressing a lateral oscillating motion on said container and said products, an extension formed beneath said container and adapted to form an air-chamber, at least one gas-tight partition mounted between the baseplate of said chamber and said perforated container-base, thus forming a plurality of gas-tight compartments, a plurality of blowing-passages formed in said baseplate, one to each said compartment, a slide-valve associated with each said

blowing-passage, a plurality of suction-passages formed in said baseplate, one to each said compartment, a slide-valve associated with each said suction-passage, means for conjointly actuating all said slide-valves to open and close at a given frequency, in such manner that said blowing-passages are opened when said suction-passages are closed and conversely, a source of air under pressure, an air-hood mounted beneath said baseplate, conduit means connecting said air-pressure source to said hood, a collector-conduit passing inside said hood, conduit means connecting said suction-passages to said collector, a source of air under partial-pressure, and conduit means connecting said collector to said source of depression, whereby the opening of said blowing passages causes a pulse of compressed air to pass through said products, the subsequent opening of said suction-passages causing a suction pulse which reverses the air flow through said products, the cycle being repeated at a desired frequency throughout the sorting period.

2. Apparatus as claimed in claim 1, in which the said source of air under pressure is the delivery conduit of

an air-blower, the said source of air under partial-pressure being the intake conduit of the said blower.

3. Apparatus as claimed in claim 1, in which said means for applying lateral oscillations to said products, includes a rotating out-of-balance weight coupled to said container.

4. Apparatus as claimed in claim 1, in which the said conjoint actuating means is a rod coupled to said slide-valves and given a reciprocating movement by a power-driven shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

235,851	Bourne	Dec. 28, 1880
1,811,026	Raw	June 23, 1931
1,848,151	Bennett	Mar. 8, 1932
2,148,068	Fuller	Feb. 21, 1939

FOREIGN PATENTS

374,423	Great Britain	June 6, 1932
798,731	France	Mar. 11, 1936