

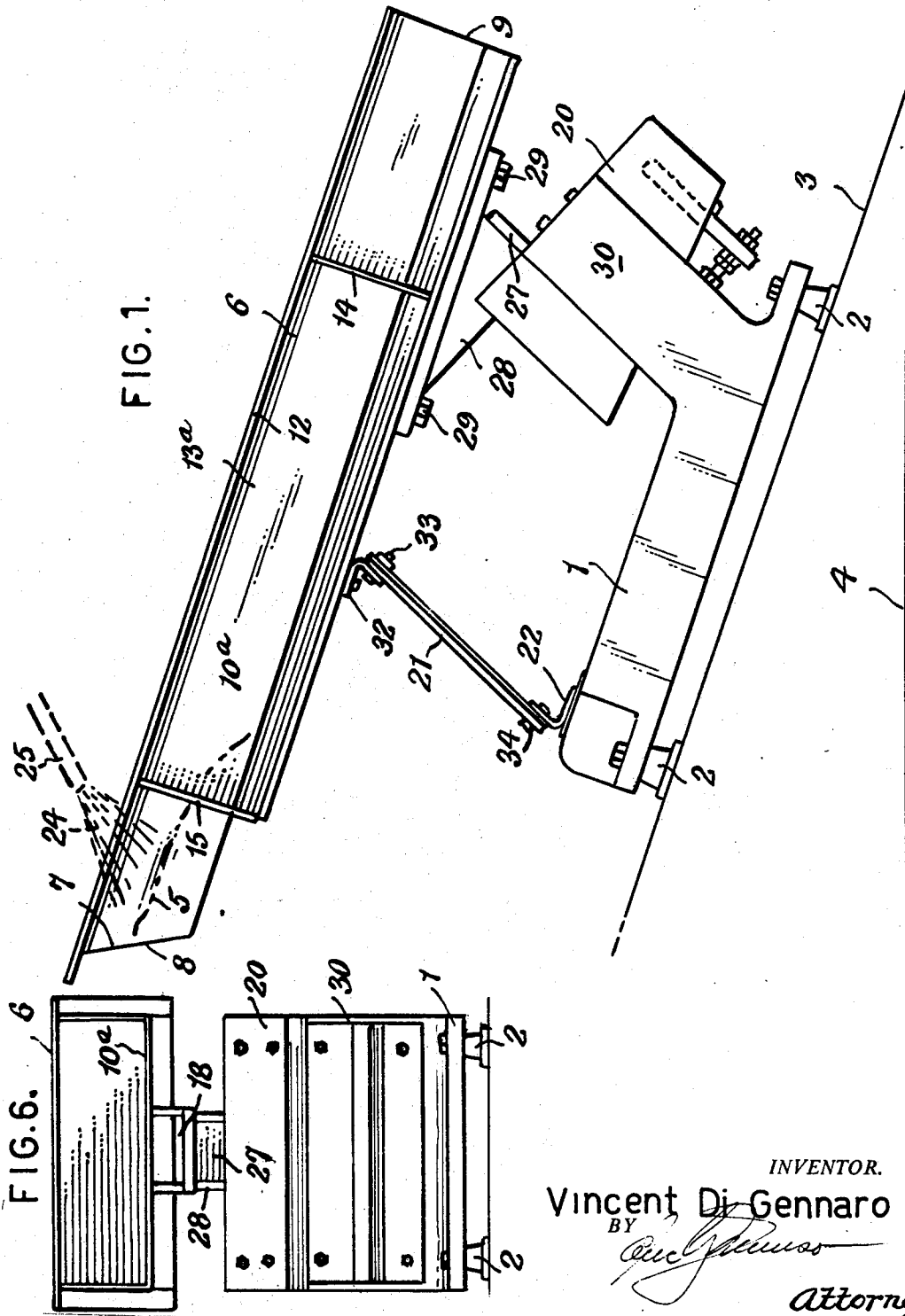
Sept. 10, 1968

V. DI GENNARO  
VIBRATING APPARATUS

3,400,728

Filed April 28, 1966

2 Sheets-Sheet 1



INVENTOR.  
Vincent Di Gennaro  
BY *Vincent Di Gennaro*  
Attorney

Sept. 10, 1968

V. DI GENNARO

3,400,728

VIBRATING APPARATUS

Filed April 28, 1966

2 Sheets-Sheet 2

FIG. 2.

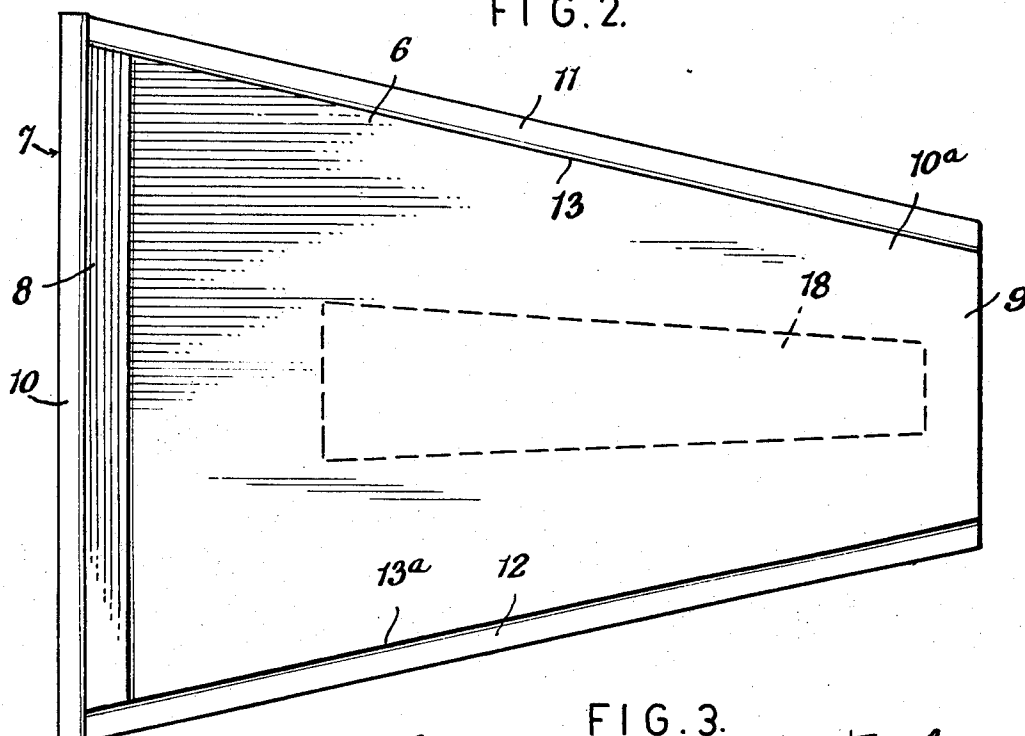


FIG. 3.

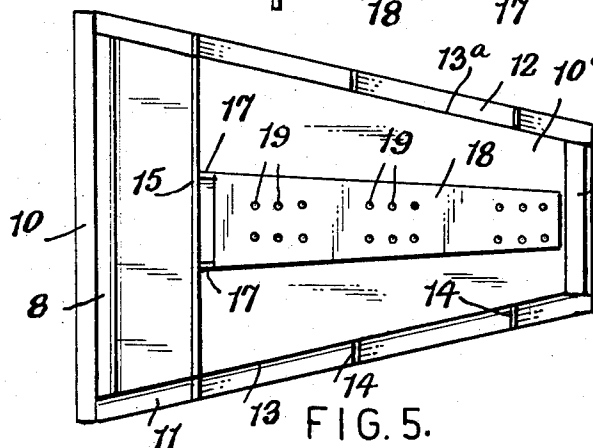
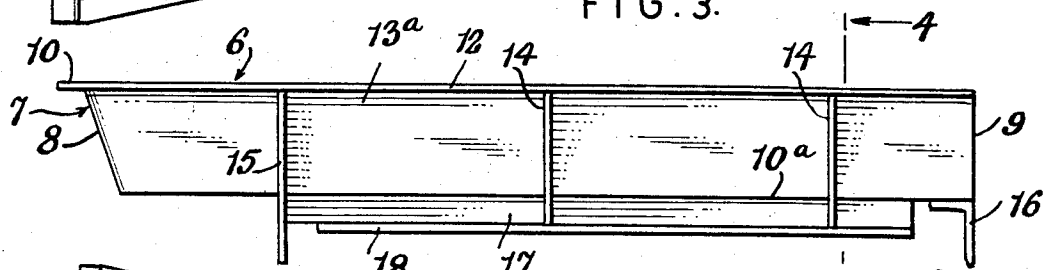
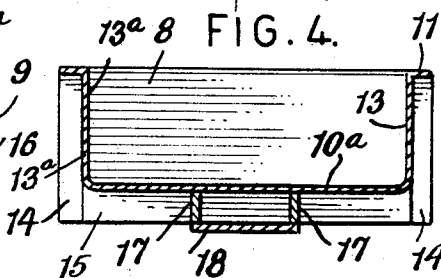


FIG. 5.

FIG. 4.



INVENTOR.  
Vincent Di Gennaro

BY

Attorney

1

3,400,728

## VIBRATING APPARATUS

Vincent Di Gennaro, Nutley, N.J., assignor to Vibro-Plus Products, Inc., Stanhope, N.J., a corporation of New York

Filed Apr. 28, 1966, Ser. No. 546,088

3 Claims. (Cl. 134-151)

### ABSTRACT OF THE DISCLOSURE

A vibrating device for finely powdered materials and in which an inclined pan or chute is springably supported from an inclined base. A vibrator located adjacent to the forward or lower end of the chute connects to the under side of the same. The spring means for the chute consists of a leaf spring having one end attached to the base and its other end attached to a bracket on the bottom of the chute. The spring is located between the vibrator and the rear end of the chute. Spray means directs a spray onto material at the rear or closed end of the chute.

This invention relates to vibrating devices, and more particularly to those used in connection with a spraying means for the purpose of increasing the solubility of certain fine-powdered materials such as are used for example, in the chemical and food industries. The spray employed in conjunction with the present vibrating apparatus may be water or it can be any liquid that is compatible with the powdered material or it can, if desired, contain a chemical having a reaction with the material.

It is an object of the present invention, to provide a device which provides for a forward movement of the material together with a violent vertical agitation, and particularly at a point where the material comes into contact with the spray. The spray can thus penetrate the upper layers of the material and surround the individual particles thereof, causing globules to be formed and which roll down a pan or chute to the exit thereof.

It is an object of the invention to provide a device of this character in which a variation in direction and amplitude of vibration on different points of a material-holding pan or chute can be obtained by combining a linear motion with a rotary motion so that the resultant vector is different at each point along the pan. It is a further object of the invention to provide means by which the amount of eccentricity of motion can be varied to produce different effects if necessary to suit the characteristics of the material being handled.

More particularly, the invention comprises a base or mounting for a vibrating device, and a pan or chute disposed over the base and above the vibrating device; the pan at least being disposed at an angle to horizontal and having a closed higher end and an open lower end. The vibrating device, in the present embodiment, engages the pan or chute adjacent to the open lower end. The vibrating device so imparts the vibratory movement that the vibration at the higher end of the pan is greater. At a point remote from the vibrating device the pan is springably connected by a leaf spring to the base.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is shown,

FIG. 1 is a side elevational view of a vibrating device constructed in accordance with the invention;

FIG. 2 is a top plan view of the pan or chute;

FIG. 3 is a side elevational view of the pan;

2

FIG. 4 is a sectional view, taken substantially on the line 4-4 of FIG. 3, looking in the direction of the arrows; and

FIG. 5 is a view, in a reduced scale, of the pan or chute as seen from below, and

FIG. 6 is an end view as seen from the left of FIG. 1. With reference to the drawings, the base of the vibrating device is indicated at 1, the same being mounted on rubber or similar springy feet 2 secured to the surface 3 which is disposed at an angle or inclination to a horizontal surface 4.

The powdered material 5 to be treated, is delivered manually or by suitable mechanical feeding means not shown, into a receptacle in the form of a pan or chute 6, the constructional details of which are disclosed in FIGS. 2 to 5, inclusive. The pan is preferably, but not necessarily, made in the wedge shape shown in FIG. 2 and is thus wider at its closed rear end 7, having a slanted or inclined rear wall 8 and being open at its lower or forward end 9, from which open end the material 5 is delivered as it rolls down the inclined pan toward said open end.

The pan has a bottom 10a provided at its rear and side edges with the walls 8, 13 and 13a respectively. There is an outturned flange 10 at the top of the rear wall 8 and similar flanges 11 and 12 are provided at the top of the side walls 13 and 13a. Reinforcing flanges or strips 14 are provided at the sides of the pan. A cross piece 15 extends across the bottom of the pan relatively close to the rear end of the pan, and an angle bracket 16, shown only in FIGS. 3 and 5, is located across the bottom at the narrower or forward open end of the pan. For securing a suitable balance of the device, weights can be attached to the cross piece 15 and/or to the bracket 16.

Mounted on the bottom of the pan and on longitudinal strips 17, is a mounting plate 18 provided with groups of holes 19 permitting longitudinal adjustment and location of the pan relatively to the base and to the vibrator.

The vibrating device is generally indicated at 20 and the same may be of any known construction suitable for the purpose and is preferably, but not necessarily, of the electromagnetic type. In the embodiment shown in FIG. 1 the vibrator is located on the base below the pan at the lower open end of the pan.

The vibrator 20 is shown as being mounted on an angularly and upwardly extending arm 30 of the base 1 and the armature of the vibrator is provided with an attached plate 27 secured by a bracket 28, attached by bolts or screws 29 to the mounting plate 18 on the bottom of the pan 6. The plate 27 and hence the pan 6 are moved in one direction by the energization of the vibrator and springs of the vibrator move the armature in the opposite direction, thus securing the required vibratory motion of the pan.

Between the vibrator and the upper and wider end of the pan, the pan is provided on its bottom with a separate bracket 32 which attaches by bolts or screws 33 to one end of a leaf spring 21 which has its opposite end attached by bolts 34 to a bracket 22 affixed to the top of the base 1.

From the foregoing, the operation of the described vibrating apparatus will be apparent. The material 5, to be treated, and which may be a relatively fine powdered substance, is deposited in the pan 6 in the wider or upper end of the same and the function of the described apparatus is to provide a forward feeding motion, plus a violent agitation of the material and particularly at the point where the material comes into contact with a liquid spray 24 directed from a nozzle or nozzles 25, down on the material. The spray is thus directed on the material near the rear or higher end of the pan and it penetrates

the upper layers of the material and surrounds the individual particles thereof, thereby causing globules to be formed and which move down the pan toward and out of the open lower end thereof.

The feeding action of the pan, caused by its vibratory movement, is greater on the fine powder than it is on the round globules so that the globules eventually roll down the pan to reach and emerge from the lower open end 9 thereof. The size of the finished particles is determined by the angle of inclination of the pan since a steep angle produces a smaller mesh product than is produced by a shallow angle.

The variation in direction and the amplitude of vibration is obtained by combining a linear motion with a rotary motor and the resultant vector is different at each point along the pan. The vibrator produces the linear force while the rotary force is obtained by directing this same linear force through a point some distance from the center of gravity of the device. By changing the location of the pan relative to the base, utilizing the required holes 19 for this purpose, and by adding weights on the parts 15 and/or 16, the amount of eccentricity can be varied to produce different types of motion best suited for the characteristics of the material being handled.

Also while I have herein suggested that the vibrator be located adjacent to the lower open end of the pan, it might if the occasion demands it, be located under the pan adjacent to the upper or closed end.

The pan is provided with the inclined rear wall 8 to prevent compacting of the material as it is tumbled against that end of the pan.

Having thus described an embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A vibrating apparatus comprising, an inclined pan into which powdered material is deposited directly into

said pan at the rear thereof and adjacent to a higher end of the pan, said pan being closed at the rear thereof, spray means for directing a liquid spray into the pan and against said material at a point at the higher end of the pan, a fixed supporting base, a leaf spring disposed between the base and the pan at a point located rearwardly of the vertical center of the pan and having one end attached to the top of the base and having its other end attached to the bottom of the pan, a vibrator mounted on the base at a point remote from the leaf spring and adjacent to the lower open end of the pan and between the leaf spring and the lower end of the pan, the said lower end of the pan being open to permit the emergence of the material as the material moves downwardly in the pan under the vibratory motion provided to the pan by the vibrator.

2. A vibrating apparatus according to claim 1, wherein the vibrator is operative on the under portion of the pan and the pan is provided at its forward and rear ends with means for the attachment of weights.

3. A vibrating device according to claim 1, wherein the base is mounted in a manner to dispose it at an angle to horizontal and the pan is similarly inclined.

#### References Cited

##### UNITED STATES PATENTS

|           |         |        |            |
|-----------|---------|--------|------------|
| 657,393   | 9/1900  | Buss   | 198—220 XR |
| 2,336,561 | 12/1943 | Muskat | 198—220    |
| 2,915,183 | 12/1959 | Saxe   | 209—367    |
| 3,214,363 | 10/1965 | Amori  | 209—367 XR |

##### FOREIGN PATENTS

|         |         |          |
|---------|---------|----------|
| 433,960 | 9/1926  | Germany. |
| 119,666 | 4/1958  | U.S.S.R. |
| 130,837 | 10/1959 | U.S.S.R. |

ROBERT L. BLEUTGE, *Primary Examiner.*