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METHOD OF CLEANING MICA AND SIMILAR MATERIAL

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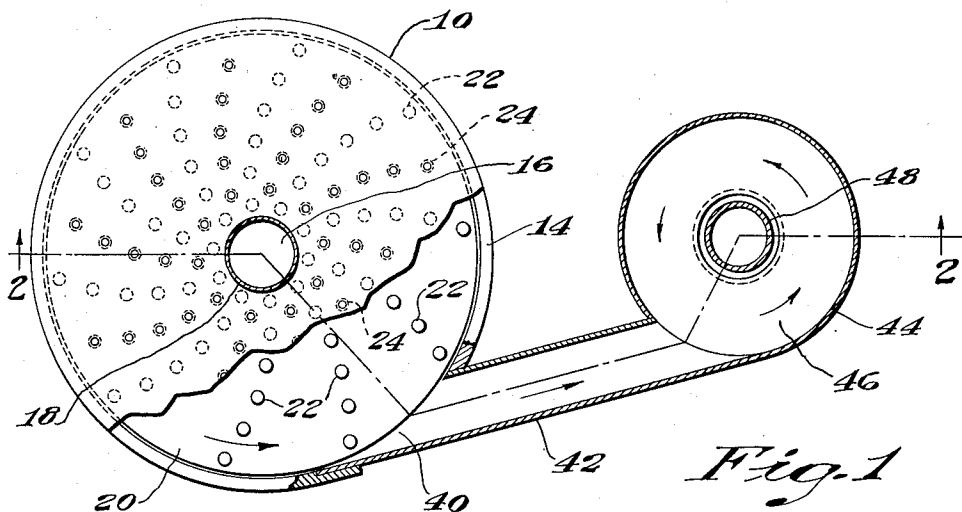
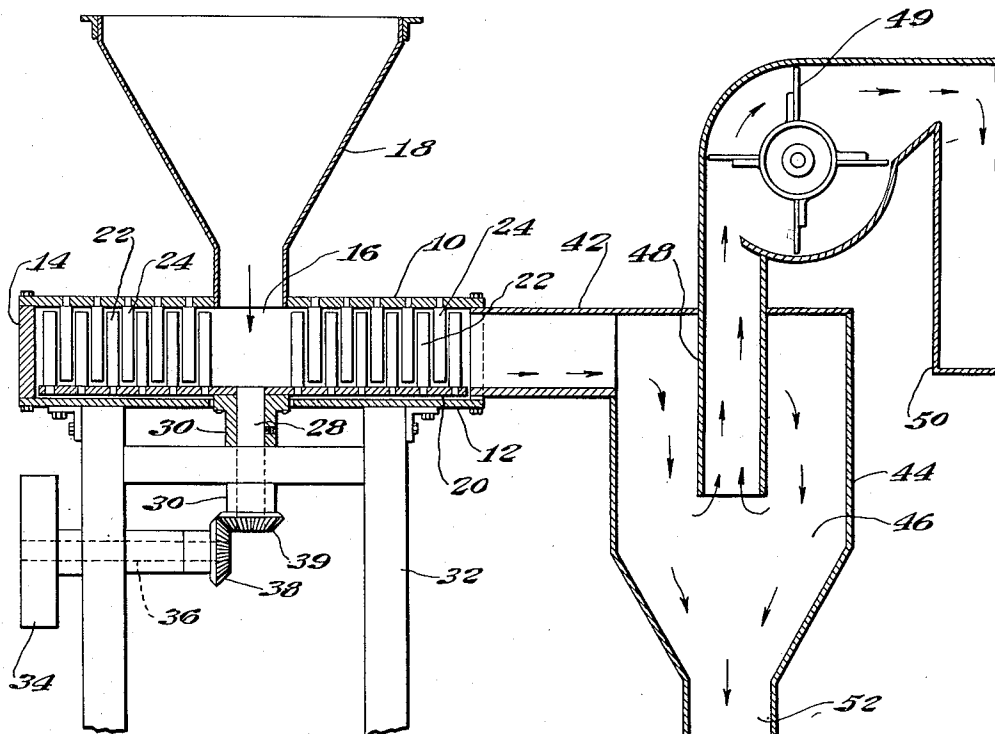


Fig. 2

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METHOD OF CLEANING MICA AND SIMILAR MATERIAL

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4 Claims. (Cl. 209—2)

This invention relates to a method of and to apparatus for dry cleaning flexible material, and particularly laminated flexible material such as mica.

5 The object of the invention is to provide a novel and superior method and novel and highly efficient apparatus for effecting the dry cleaning of flexible material, which are particularly useful in separating the quartz, sand and dirt from
10 mica and similar laminated flexible materials in an efficient and rapid manner.

With this general object in view, and such others as may hereinafter appear, the invention consists in the method of cleaning and in the
15 cleaning apparatus hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing I have illustrated a sufficient portion of a cleaning apparatus embodying the
20 invention and for practicing the present method, as will enable the invention to be understood, wherein Fig. 1 is a view partly in section and partly in plan of the preferred form of cleaning apparatus; and Fig. 2 is a sectional view on the
25 line 2—2 of Fig. 1.

The present invention finds particular use in dry cleaning mica and similar materials and for convenience of description will be described in connection with the dry cleaning of mica, and
30 in accordance therewith the mica is subjected to successive blows in a manner such as to effect the crushing of the quartz, sand, dirt, or other brittle material, while permitting the flakes or laminae of mica to flex without injury, thus reducing the dirt or foreign matter to a finely divided state, and at the same time dislodging the
35 same from adherence to the mica flakes or laminae without substantially effecting the mica flakes or particles. In the preferred and illustrated form of dry cleaning apparatus, the desired action is secured by causing the mica flakes to pass between successive rows of concentrically
40 arranged impinging members such as pins, which are rotated to impart blows to the mica while permitting the mica to flex around the pins and be gradually moved outwardly through the same by centrifugal force. The apparatus also preferably embodies a separating device for pneumatically separating the finely divided foreign
45 matter from the much larger and cleaned mica flakes after the foregoing action has taken place.

Referring now to the drawing, the illustrated cleaning apparatus comprises an operating chamber formed by an upper plate 10, a lower plate
50 12 spaced therefrom, and a circular plate 14

forming the side wall of the chamber and to which the upper and lower plates 10, 12 are bolted, as shown. The upper plate 10 is provided with an axially arranged inlet opening 16 into which a
5 hopper 18 is fitted to deliver the mica or other material to be cleaned into the operating chamber. The operating chamber has disposed within the lower portion thereof a rotatable plate 20 having a series of impinging members 22 herein
10 shown as comprising pins upstanding therefrom and arranged to extend nearly to the upper plate 10 forming the top of the chamber. The upper plate 10 is provided with a series of similar impinging members 24 arranged to project downwardly from the plate and the two sets of
15 impinging members 22, 24 are arranged concentrically with the axis of rotation of the plate 20 but at different radial distances so that the rows of stationary and movable pins 22, 24 are alternately disposed.

Provision is made for rotating the plate 20 and its pins 22 at relatively high speed, and as
20 herein shown the plate 20 is mounted upon the upper end of a vertical shaft 28 journaled in suitable bearings 30 supported in the frame 32, and the power from any suitable source may be
25 transmitted through the driving pulley 34, shaft 36 and beveled gears 38, 39 on the ends of the shafts 36 and 28 respectively. The side wall 14 of the operating chamber is provided with a discharge opening 40, and as herein shown the opening 40 is connected by a conduit 42 tangentially
30 disposed with respect to the rotatable plate 20 and through which the mica, after having been subjected to the action of the pins 22, 24, is thrown by centrifugal force into a pneumatic separator 44 of any usual or preferred design and
35 which as herein shown comprises a separating chamber 46 into which the larger and finer particles of the material such as mica and the finely divided dirt are introduced and from which
40 the fine particles of dirt and other foreign matter may be withdrawn through the pipe or conduit 48 by a fan 49 and discharged into a dust collecting bag, not shown, within the chamber 50. The clean mica or other material is discharged
45 through a discharge chute 52 from the lower end of the chamber 46.

From an inspection of Figs. 1 and 2 it will be observed that the pins or impinging members 22,
50 24 are arranged in rows radiating from the center of the operating chamber and are arranged so that a movable pin 22 alternates with a stationary pin 24 and the pins are arranged sufficiently close together so as to exert a crushing action on
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the quartz, sand or other dirt particles while permitting the flexible mica flakes to pass substantially uninjured between the pins during the movement of the flakes outwardly to the periphery of the operating chamber. As a result it will be observed that the present apparatus exerts not only a flexing and beating action upon the mica flakes but also a crushing action upon the larger particles of quartz, sand or other dirt particles, thus facilitating the ultimate operation of the finely divided dirt and much larger mica flakes.

In the operation of the apparatus, the mica to be cleaned is introduced into the hopper 18 where it is delivered by gravity into the operating chamber at a central or axial point therein so that as the plate 20 is revolved at relatively high speeds, such for example as from six to eight hundred revolutions per minute, the mica flakes are caused to move outwardly in radial directions between the successive rows of the movable and stationary pins or impinging members 22, 24. As a result of the movement of the mica by the centrifugal force imparted thereto by the rotating plate 20, and the pins 22 carried thereby, the mica flakes are subjected to a flexing action as they wind their way in and out between the pins, and at the same time the flakes are subjected to impulses or blows from the moving pins 22. As each of the mica flakes passes a stationary pin it snaps and the combined effect of the flexing, the sudden beating of the pins against the flakes, together with the snapping action as the flakes leave the pins in their movement outwardly, causes all or substantially all of the dirt and foreign matter to be dislodged from the mica flakes, so that when the material reaches the periphery of the operating chamber and is thrown outwardly through the discharge conduit 42 into the separator as above described, the fine material including the dust and dirt is readily separated from the larger flakes of mica and the latter are discharged in a clean condition through the discharge outlet 52. In this manner the separation of the dirt and foreign matter from the flakes of the mica or other similar material may be accomplished in a simple, economical and highly efficient manner.

While the preferred apparatus for cleaning mica and similar material has been herein illustrated and described, it will be understood that

the invention may be embodied in other forms within the scope of the following claims.

This application is a continuation in part of my application Serial No. 90,960, filed July 16, 1936.

Having thus described the invention, what is claimed is:

1. The method of cleaning mica and similar material which consists in subjecting the mica to be cleaned to a combined flexing and beating action to mechanically dislodge the dirt and foreign matter from the laminae thereof by passing the mica between closely adjacent relatively moving overlapping pins so spaced and operating at a speed to accomplish said flexing and beating action and mechanical dislodging of dirt and foreign matter.

2. The method of cleaning mica and similar material which consists in subjecting the mica to be cleaned to a combined flexing and beating action to mechanically dislodge the dirt and foreign matter from the laminae thereof by passing the mica between closely adjacent relatively moving overlapping pins so spaced and operating at a speed to accomplish said flexing and beating action and mechanical dislodging of dirt and foreign matter, and subsequently separating the finely divided dirt and foreign matter from the larger mica flakes.

3. The method of treating mica and similar laminated material to remove dirt and other foreign impurities therefrom, which comprises passing the mica between relatively smooth members moving relative to each other at such a speed and so spaced as to engage the laminae at spaced points and produce essentially a snapping and flexing of the laminae accompanied by a grinding of the larger particles of the impurities and a dislodging of the impurities from the laminae.

4. The method of cleaning and separating mica and similar laminated materials from dirt and other foreign impurities which comprises passing the mica between relatively smooth members moving relative to each other at a speed and so spaced as to engage the laminae at spaced points and produce essentially a snapping and flexing of the laminae accompanied by a grinding of the larger particles of the impurities and a dislodging of the impurities from the laminae, and pneumatically separating the cleaned mica from the impurities.

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