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TABLET SORTING DEVICE

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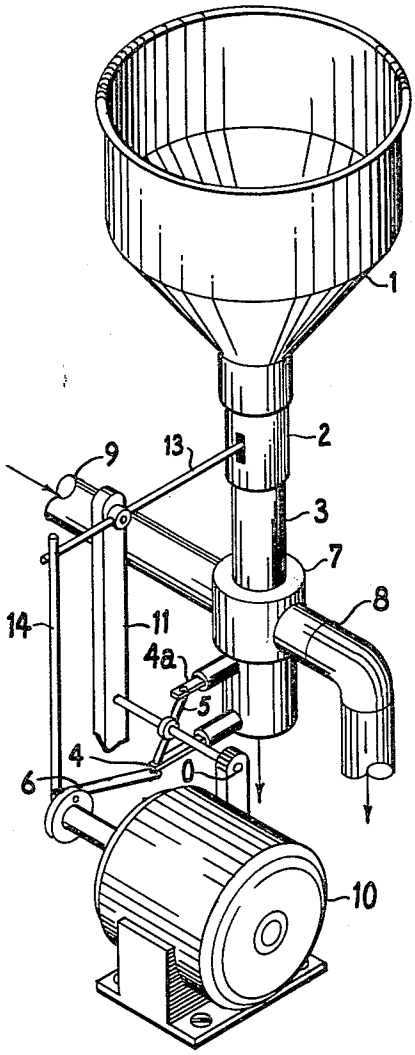


FIG. 1

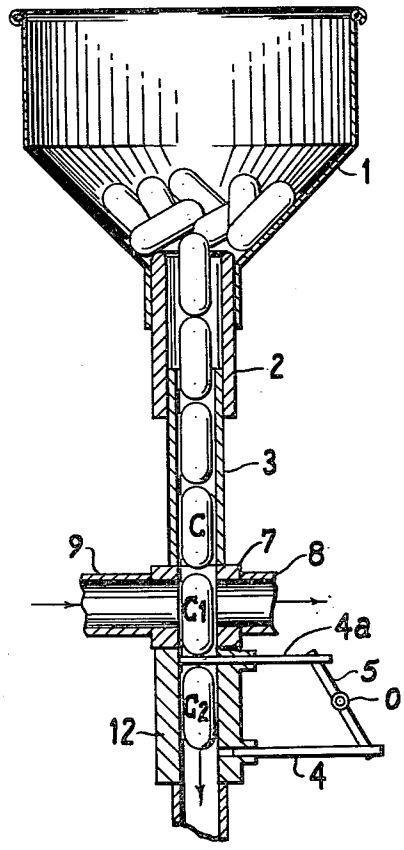


FIG. 2

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TABLET SORTING DEVICE

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This invention relates to an apparatus and a method for separating broken tablets and capsules or pieces thereof and undersize tablets and capsules from whole similar items of variable shapes.

In the manufacture of medicinal tablets and capsules, some breakage often occurs, or some tablets or capsules of sub-standard size often become mixed with the lot of standard size items. In the case of the usual sugar-coated spheroid or cap-shaped tablet this condition is overcome by a separation process utilizing perforated plates for sorting the tablets. However, for example, in the case of the usual cylindrical hard shelled gelatin capsules with rounded ends or the coated tablets shaped as such, it is not possible to effect a proper separation of broken and sub-standard pieces in this manner.

Accordingly it is a prime object of this invention to provide an apparatus for effecting the separation of fragmentary and sub-standard size tablets and the like from whole tablets.

A further object of this invention is to provide a method for sorting fragments and sub-standard size tablets or the like from whole tablets.

In carrying out the objects of the invention there is provided apparatus for separating fragments and sub-standard size tablets from whole like items including a casing having a port formed therein, duct means for causing a forced air draft to be blown through the port, a tube for feeding tablets or the like into the casing one at a time, and an escapement means for halting each tablet momentarily within the casing opposite the port. There is also formulated a method for separating fragments and sub-standard size tablets from whole like items including the steps of moving a quantity of tablets or the like past a port, momentarily halting each one of the tablets opposite the port, and blowing a draft of forced air against each tablet and through the port, whereby a fragment or a sub-standard size tablet is ejected through the port.

Further advantages and features will become apparent to one skilled in the art from the following detailed description and the accompanying drawings, in which:

FIGURE 1 is an isometric view diagrammatically illustrating the arrangement of parts of the invention.

FIGURE 2 is a longitudinal cross sectional view of the apparatus according to FIGURE 1.

It is to be understood that the embodiment illustrated is diagrammatic and is for the purpose of illustration only.

In the drawings, the apparatus comprises a casing 7 in which is formed an ejection port through the side thereof into an ejection chute 8 or the like. A gravity feed tube 3 is attached to an opening in the top of the casing 7 for feeding tablets into the casing 7 singly. A hopper 1 of any suitable size and shape is disposed above the feed tube 3. An agitator sleeve 2 forms a passage between the hopper 1 and the feed tube 3 such that the upper end of the sleeve 2 is disposed in the lower region of the hopper 1, and the lower end of the sleeve 2 encompasses the top end of the feed tube 3, as will appear.

A duct 9 is attached to an opening in the casing 7 opposite the port for supplying a draft of forced air to the casing, as will appear.

Disposed just below the casing 7 and duct is an escapement device including a pair of reciprocal gates 4 and 4*a*. Each gate is slidably mounted in suitable guides for lateral movement into and out of the escapement block

12. It will become obvious that the block 12 is formed with an opening therethrough through which whole tablets drop as the escapement device is operated. In order to operate the gates 4 and 4*a* a toggle link 5 is provided, and is pivotally mounted at O on suitable pivot blocks as at 11.

Any source of power such as an electric motor 10 may be utilized for operating the gates 4 and 4*a*. A suitable crank or cam 6 connected to the shaft of the motor 10 is also connected by a link to the toggle link 5 to effect the reciprocal movement of the gates 4 and 4*a*. A second link 14 may be connected between the cam 6 and a lever 13, which is pivotally mounted to the pivot block 11 for operating the agitator sleeve 2.

In describing the operation of the apparatus let it be assumed that a quantity of tablets C or the like are disposed in the hopper 1, and that the tablets C may or may not contain a few fragmentary or sub-standard size pieces. It is also to be understood that the duct 9 is connected to a source of forced air draft, not shown, such as a high speed blower or the like. A storage tank of compressed air may also be used. It is further contemplated that the admission of the forced air draft through the duct 9 may be effected in timed "blasts" or spurts coordinated with the operation of the gates 4 and 4*a*. The operation of the apparatus will be described with respect to the timed blasts of air. Although the timing means is not shown, any conventional means may be employed such as a solenoid valve or a cam-operated valve in the duct 9.

The motor 10 is started, causing the cam 6 to rotate and thus operate the toggle link 5 and the lever 13. The up-and-down movement of the agitator sleeve 2 by lever 13 agitates the tablets C in the hopper 1. In this manner tablets are aligned sufficiently to cause them to drop by gravity into the feed tube 3, wherein the lowermost tablet comes to rest on, for instance, gate 4*a* which may at that moment be in position to block the passage through the gate block 12. At that time, while gate 4*a* is in the "in" position, a blast of forced air is directed against the tablet, C1 in FIGURE 2, whereby if the tablet were actually a fragment or sub-standard size item it would be blown through the ejection port and out the ejection tube 8. It is understood that the port is of such size as to permit only fragments and the like to be ejected therethrough.

As the motor 10 continues to turn the cam 6 and operate the links, the gate 4*a* is withdrawn from the in position in the gate block 12 and the gate 4 moves to the in position. This permits the tablet at the position of C1 to drop to the position at C2, while the next tablet C then drops to the position at C1. The motor 10 continues to operate, and gate 4*a* now moves to the in position between the tablets at positions C1 and C2. This permits the "good" tablet at C2 to drop into any suitable container, while the next tablet at C1 receives a blast of forced air from the duct 9.

Let it be assumed that the tablet at position C1 is actually a fragment. The blast of air causes the fragment to be ejected through the port and into the ejection tube 8; and the next tablet at position C drops into place. The process then continues until all of the tablets in the hopper 1 have been sorted.

The invention also provides a new and novel method for separating fragmentary and sub-standard size tablets and the like from whole like items including the steps of; (*a*) passing the tablets one at a time past an ejection port, (*b*) directing a blast of air against each tablet as it passes the port, (*c*) momentarily halting each tablet adjacent the port while directing the blast of air thereagainst, (*d*) permitting those tablets which were not rejected through the port to pass by the port and be collected.

Those skilled in the art will readily realize the advantages in the present invention. A simple apparatus may be used, which presents little, if any, maintenance requirements. The operation of the apparatus itself is positive and direct. Each tablet is urged into the drop feed by a gentle agitation, and then moves not by machine handling, but by its own gravity. The nature of the air blast against each tablet permits only solid, whole tablets or the like to pass unrejected. Any tablets which may be cracked or otherwise weakened are urged to break up by the air blast and thus be ejected. Only standard size tablets can pass by the ejection port.

While a modification has been shown and described for the purposes of illustration, it is to be understood that the invention is not to be limited thereto, but is to be construed within the scope and spirit of the appended claims.

I claim:

1. Apparatus for separating fragmentary and sub-standard size tablets from a quantity of whole like items comprising; a casing and an ejection port formed therein, a forced air duct disposed entering said casing in alignment with said port, a tablet feed tube entering said casing for feeding tablets past said port, and an escapment device adjacent said casing for halting each tablet momentarily opposite said port.

2. Apparatus for separating fragmentary and sub-standard size tablets from a quantity of while like items comprising; a casing and an ejection port formed therein, a forced air duct disposed entering said casing in alignment with said port, a feed tube entering said casing for feeding tablets past said port and said duct, and an escapement device adjacent said casing; said device having formed therethrough a tablet passage, and reciprocal gates operably disposed in said device for halting each tablet momentarily opposite said port and said duct.

3. Apparatus for separating fragmentary and sub-standard size tablets from a quantity of whole like items comprising; a tablet feed tube, a casing and ejection port therein connected to said tube, an escapement device adjacent said casing for halting a tablet momentarily opposite said port, and a forced air duct connected to said casing for directing a blast of air against a tablet halted opposite said port.

4. A method for separating fragmentary and sub-standard size tablets from a quantity of whole like items including the steps of; passing the tablets singly to a point opposite an ejection port, halting each tablet momentarily opposite the port, directing a blast of forced air against the halted tablet opposite the port, and permitting those tablets which were not rejected through the port to pass by the port and be collected.

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