

[54] **TABLET COATING APPARATUS**

[75] Inventors: **Shimesu Motoyama; Shuri Yamada**,
both of Tokyo, Japan

[73] Assignee: **Freund Ind. Co., Ltd.**, Tokyo, Japan

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abandoned.

[30] **Foreign Application Priority Data**

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118/418, 63; 117/109, 119; 210/378, 380;
34/92, 140; 68/20; 134/159, 153; 209/270, 303

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Primary Examiner—Morris Kaplan
Attorney, Agent, or Firm—Kane, Dalsimer, Kane,
Sullivan and Kurucz

[57] **ABSTRACT**

An apparatus for applying pharmaceutical tablets or the like with coat of other material such as sugar or the like is provided. The apparatus comprises a single drum supported for rotation and having a plurality of discrete perforation areas discretely provided along the cylindrical wall of the drum. These perforated areas are air-tightly covered by respective suction ducts which are adapted to be communicated with a stationary exhaust conduit disposed at one side of the drum every time when the corresponding perforated area comes to a predetermined angular position during the rotation of the drum. The supply of air to dry the coating of tablets is carried out by way of a supply conduit which is disposed at the other side of said drum and opens therein.

1 Claim, 4 Drawing Figures

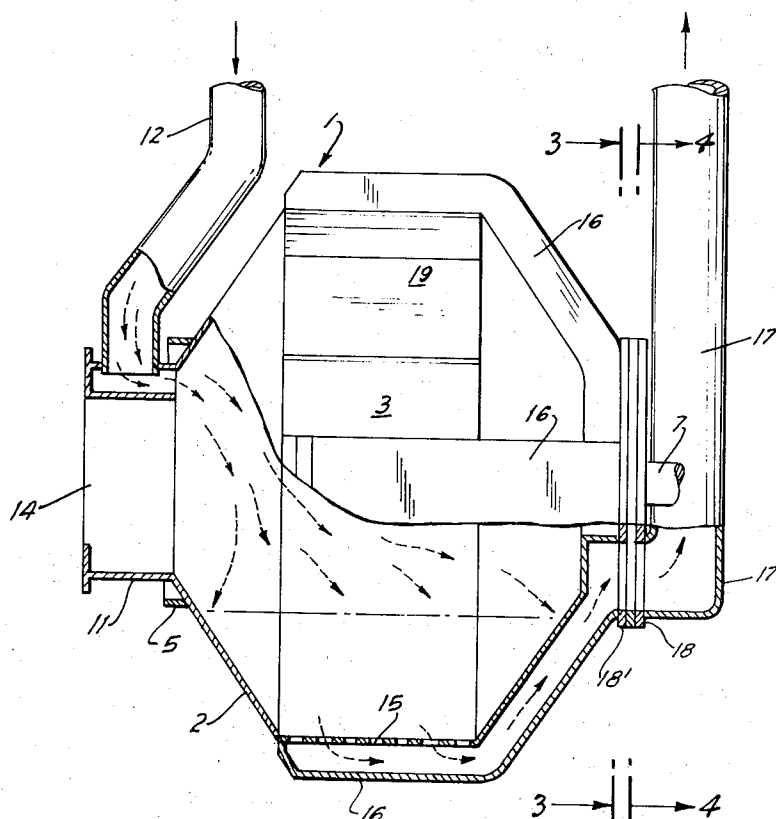
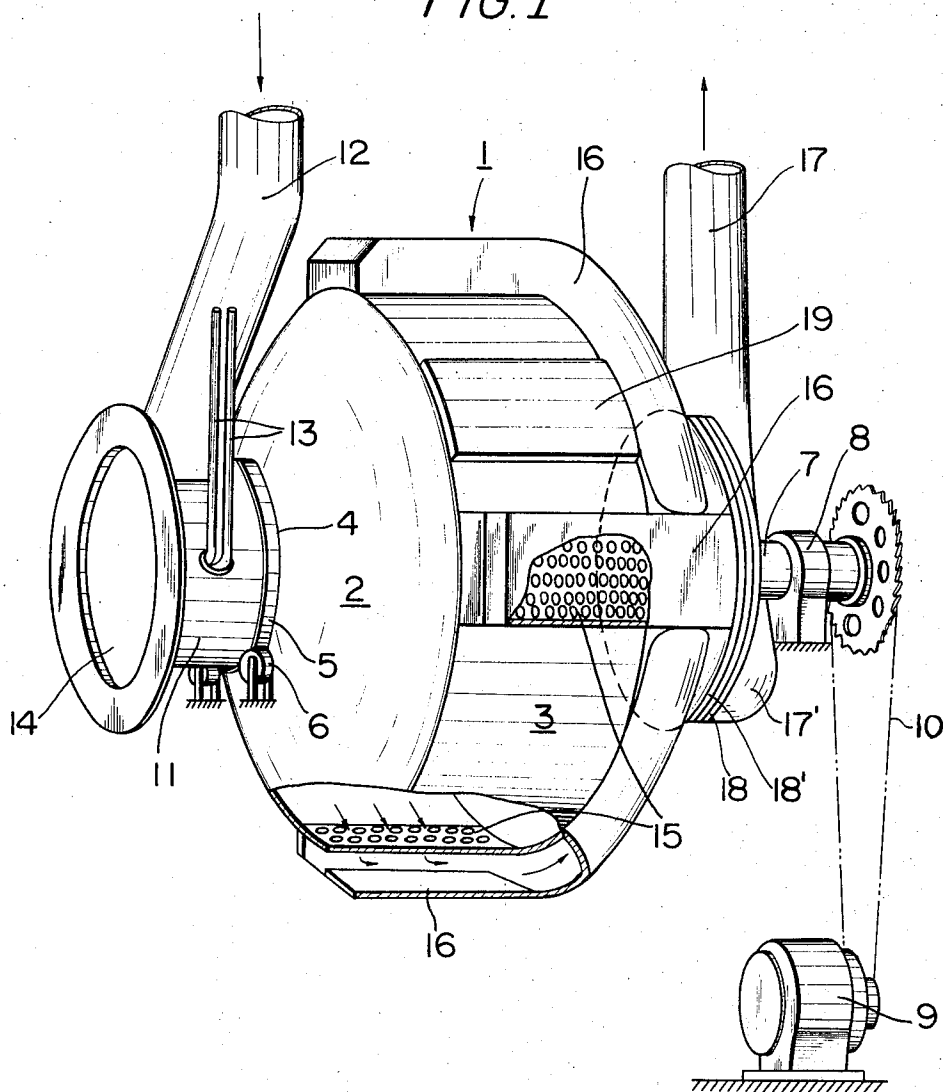
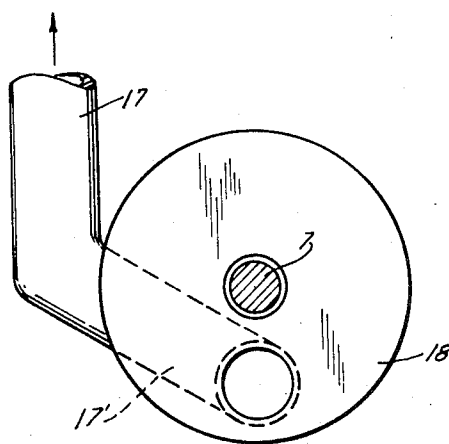
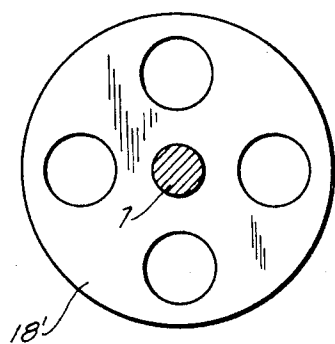
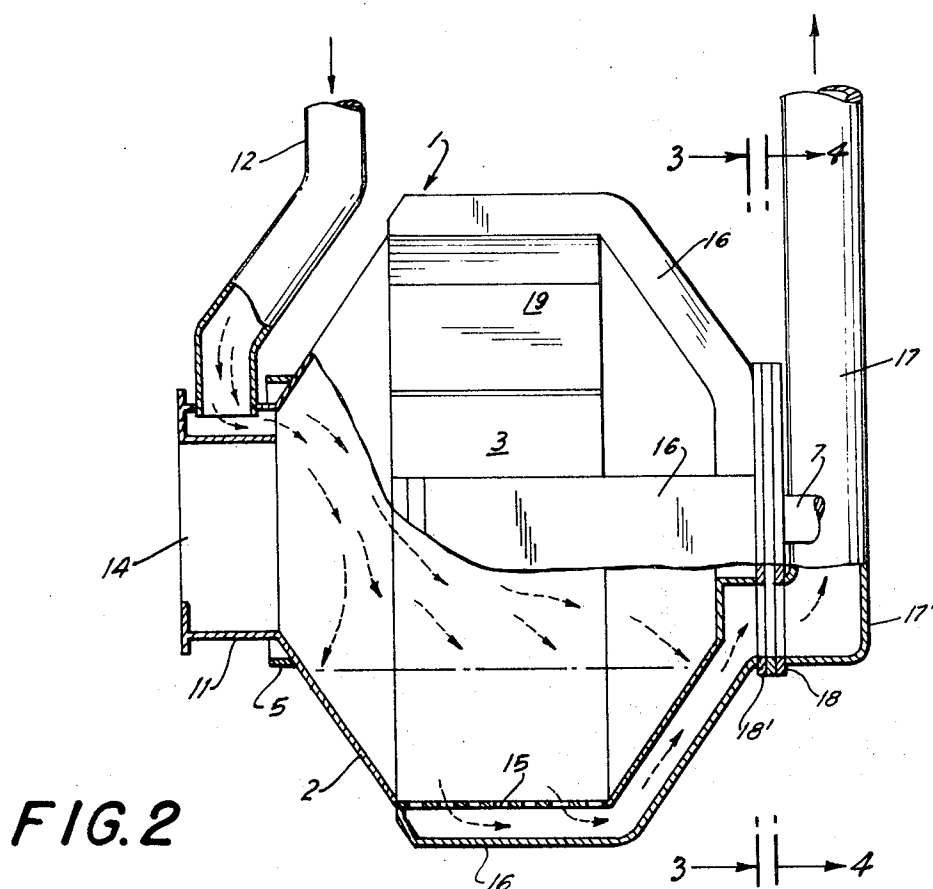


FIG. 1





TABLET COATING APPARATUS

This is a continuation of application Ser. No. 261,934, filed 6/12/72, now abandoned.

DETAILED DESCRIPTION OF THE INVENTION:

This invention relates to an apparatus for applying pharmaceutical tablets or the like with a layer of other predetermined medicinal composition, sugar coat or outermost finishing coat of the like properties.

Apparatus generally employed in the tablet coating art of this kind comprises a cylindrical container or drum mounted for rotary movement for the purpose of tumbling the tablets charged therein. The coating material in solution or suspension is introduced into the drum by a conventional means such as hydraulic spraying equipment. As the tablets tumble in the drum, they become coated with the fluid coating material. The coating or coated layer thus applied to tablets has to be thereafter dried to be hardened or solidified. To this end, the whole rotary drum of the hitherto known apparatus is made of perforate plates to thereby make it possible to forcibly blow hot air into the interior of the coating drum. Another known apparatus has a rotary drum provided with transverse hollow ribs on the inner wall thereof, said hollow ribs being formed with perforations, whereby the supply of hot air into the drum to dry the coating on the tablets is made possible and at the same time the agitation of tablets is enhanced.

These prior known apparatus have serious disadvantages. For example, in case of the first apparatus wherein the rotary drum composed of perforate plate is used, another stationary container must be provided in such a manner as enclosing the perforate rotary drum in order to collect the solution of coating material and additionally prevent hot air from being expelled into atmosphere. Such provision of the stationary housing enclosing the rotary drum not only makes the apparatus very bulky but also involves the difficulties in the maintenance of fluid-tightness between the stationary external container and the rotary perforation drum. Furthermore, in order to rapidly discharge the coated or finished tablets from the coating apparatus, a discharging opening has to be provided in each of the both containers, which in turn brings about trouble in the operation of the apparatus, since the both opening must be positioned at the same place for the discharge of the finished tablets.

The second apparatus comprising the rotary drum having the perforated hollow ribs protruding into the interior of the drum has a disadvantage that the efficient inner volume of the coating drum is correspondingly reduced.

Accordingly, an object of this invention is to provide a novel apparatus used in the tablet coating art which is evaded from all the disadvantages of the hitherto known apparatus as above mentioned.

The above object of this invention can be accomplished by providing an apparatus comprising a single drum having a plurality of discrete perforation areas distributed along the cylindrical wall of the drum, said perforated areas being fluid-tightly covered by respective suction ducts which are adapted to be communicated with a stationary exhaust conduit disposed at one side of said drum every time when the corresponding perforated area comes to a predetermined angular position during the rotation of the drum. The supply of air to dry the coating of tablets is carried out by way of a

supply conduit which is disposed at the other side of said drum and opens therein.

In the apparatus according to this invention, the inner space or volume of the rotary coating drum is not reduced since there are no protruding bulky ribs. Furthermore, the stationary external container can be omitted, which results in the simple and economical construction of the apparatus together with the easiness of the operation thereof.

brief description of the drawings

In the accompanying drawings:

FIG. 1 is a perspective view schematically showing an embodiment of the present invention;

FIG. 2 is a front elevational view partly in section;

FIG. 3 is an end elevational view of the rotatable disk taken along reference lines 3—3 of FIG. 2 in the direction indicated;

FIG. 4 is an end elevational view of a stationary disk taken along reference lines 4—4 of FIG. 2 in the direction indicated.

Referring to the drawing, the tablet coating apparatus according to this invention comprises a horizontally disposed drum-like rotatable container or coating pan 1 having a pair of semi-spherical side walls 2 connected by a cylindrical drum wall 3. In the drawing only one of the side walls 2 is shown which is formed with a circular opening 4 coaxially with the axis of the container 1 and has a diameter substantially corresponding to one-third of that of the drum 3. Connected fixedly to the side wall 2 along the periphery of the opening 4 is a ring 5 which is adapted to be guided and supported by a pair of rolls 6. The other side wall which can not be seen in the drawing has a drive shaft 7 fixed thereto at the center thereof which is rotatably supported by a bearing 8 and drive by an electric motor 9 through a conventional transmission means comprising a sprocket and a drive chain as schematically indicated by 10. It will thus be understood that the container or drum 1 is rotatably supported by the guide rolls 6 and the bearing 8 and adapted to be rotated by the drive motor 9.

Projecting freely into the container 1 through the opening 4 is a stationary cylindrical portion 11 which is horizontally disposed and has an air supply conduit 12 and pipes 13 through which a solution of coating material is supplied to a conventional spray mechanism (not shown) disposed stationarily within the cylindrical portion 11 and adapted to spray the fluid coating material over the tablets tumbling within the container 1 during the rotation thereof. The other open end 14 of the cylindrical portion 11 through which the tablets are charged into the container 1 is closed by a suitable cover member not shown.

The cylindrical wall 2 of the drum 1 is provided with a plurality of perforated areas 15 angularly displaced to one another with a predetermined distance therebetween. These areas are covered substantially in a fluid-tight manner by respective cover ducts 16 which are adapted to be communicated with a stationary exhaust conduit 17 every time, when the perforated areas 15 reach at a predetermined angular position during the rotation of the drum 3. To this end, the stationary exhaust conduit 17 is disposed at the side of the drum 1 in opposition to the air supply conduit 12 and has a horn-like flared lower end portion 17' to which a stationary disk 18 having a corresponding opening is fixed

(see FIG. 4). Snugly and slideably engaged with this stationary disk 18 is a rotatable counterpart disk 18' coaxially disposed and fixed to the rotary drum 3 (see FIG. 3). The suction ducts 16 air-tightly covering the respective perforated areas 15 terminate in the respective discrete openings formed in the slideably rotatable disk 18', so that the ducts 16 are successively communicated with the exhaust conduit 17 through the intermittently aligned openings formed in the disks 18 and 18' (see FIG. 2). In this manner, when one of the ducts 16 is being communicated with the exhaust conduit 17, all the other ducts 16 are blocked. In this connection, it is important to note that the position of the perforated area at which the one of the conduits 16 is communicated with the exhaust conduit 17 during the rotation of the drum 3 is so selected in consideration of the rotational speed of the drum 3 and the tumbling movement of the tablets within the drum 3 that the tablets lie over the perforated area which is fluidtightly covered by said one conduit 16. Then air is supplied from the conduit 12 flows through the tablets and the perforated area to the exhaust conduit 17 as indicated by arrows, whereby the coating material applied to the tumbling tablets is dried to be solidified. Reference numeral 19 indicates a cover plate which is disposed over an outlet through which the finished tablets are taken out or discharged.

As is apparent from the foregoing, no stationary external container enclosing the coating drum is necessary, which makes the construction of the apparatus simpler and inexpensive. It will be selfexplanatory that plate-like ribs may be provided transversely in the drum at the inner wall thereof to improve the agitation of the tumbling tablets without incurring substantially any reduction in the volume of the drum 3 contrary to the hitherto known apparatus inhere in a box-like hollow ribs having perforations are provided within the drum. Additionally, it has surprisingly been found that the quality of the coating on the tablet is remarkably improved in comparison with the conventional apparatus. In other words, the yield of the coated tablet of high quality is increased by the treatment using the in-

ventive apparatus. The following table shows the results of comparison experiments.

TABLE

	Treatment by a conventional apparatus of a perforated drum type	Treatment by an apparatus according to this invention
Rate of occurrence of defect coating with scratches on surface	11%	less than 0.5%

It is believed that such a high rate of occurrence of the low quality of the coating is due to the fact that, in case of the apparatus having the coating drum formed with perforations all over the wall thereof, hot air will radially flow through the perforation to thereby solidify the solution adhered to the edge of the perforations, which solidified solution in turn scratches the applied coat of the tumbling tablets.

Although the invention has been described with reference to a preferable embodiment shown in the drawing, it should be appreciated that those skilled in the art can easily conceive many modifications relative to the details of the structure without departing from the spirit and scope of the invention.

Having described the invention, what is claimed is:
We claim:

1. An apparatus for applying a coating on tablets comprising: a cylindrical drum supported for rotation about a substantially horizontal axis thereof; a plurality of perforated areas of said drum discretely provided about the drum; an equal plurality of suction ducts each fluid tightly covering one of said areas and adapted to rotate with said drum; a stationary exhaust conduit; and means for alternately bringing one of said ducts into communication with said conduit and blocking the remainder of said ducts when the perforated area associated with said one duct assumes a predetermined angular position during the rotation of the drum.

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