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METHOD OF APPLYING COATINGS TO EDIBLE TABLETS OR THE LIKE

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Fig. 1

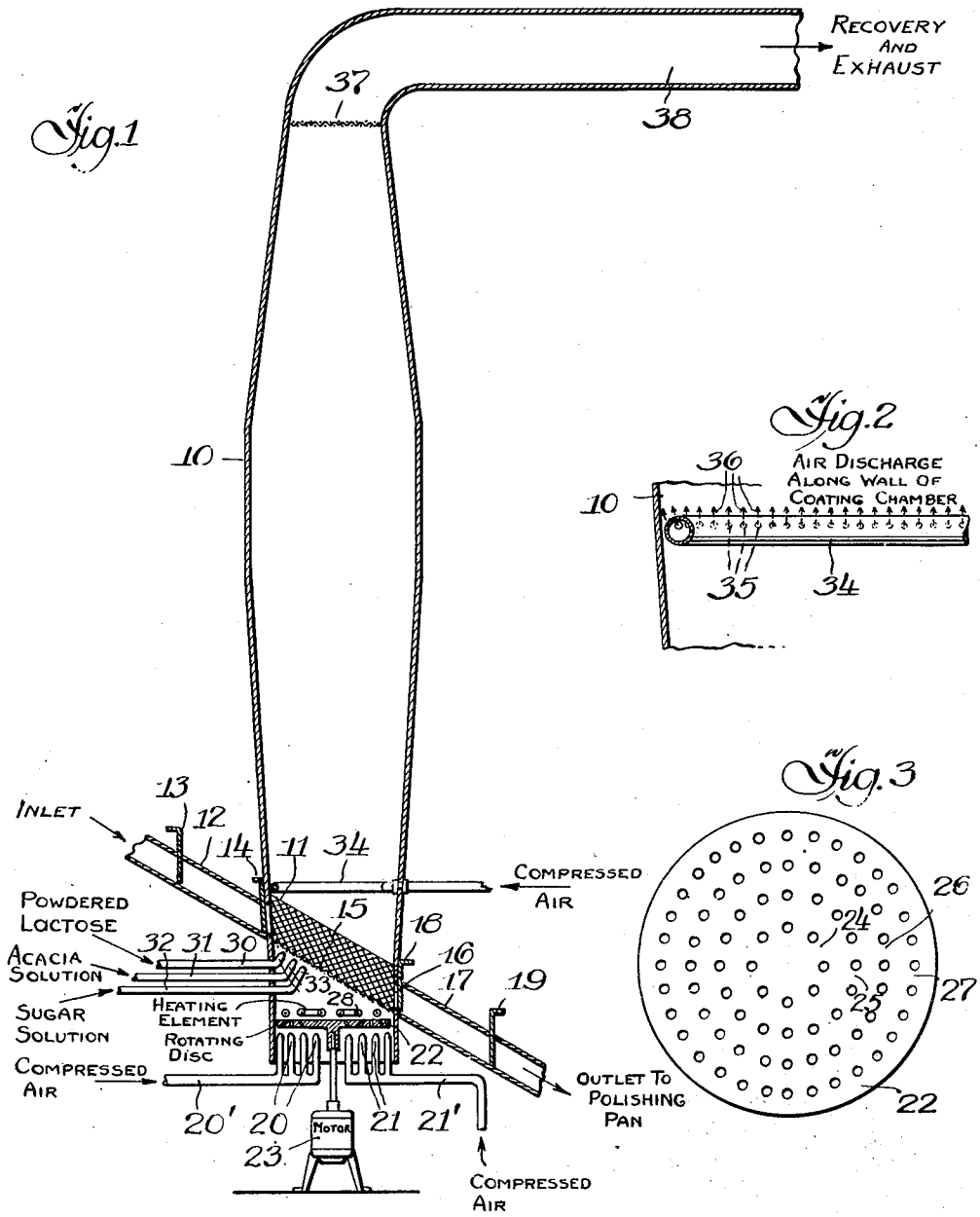

Fig. 2

Fig. 3

INVENTOR.

Dale E. Wurster,

BY

George O. Haight

Atty.

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METHOD OF APPLYING COATINGS TO EDIBLE TABLETS OR THE LIKE

Dale E. Wurster, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis., a corporation of Wisconsin

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My invention relates, generally, to methods of and means for applying coatings, and it has particular relation to the coating of medicinal tablets, chewing gum, candy, nuts, etc.

Among the objects of my invention are: To support the tablets in air in a coating chamber and to coat the same while they are so positioned; to support the tablets in an upwardly flowing air stream; to heat the air prior to its contact with the tablets to dry the coating thereon; to cause the air to flow in a turbulent fashion and tumble the tablets so that they may be coated uniformly; to move the tablets downwardly on a bias transversely of the air stream while they are being coated; to introduce the coating material into the air stream underneath its initial contact point with the tablets; to introduce individually into the air stream different coating materials; and to direct a current of air upwardly in the coating chamber along its inner surface to prevent the coating material from impinging thereon.

Other objects of my invention will, in part, be obvious and in part appear hereinafter.

This invention is disclosed in the embodiment thereof shown in the accompanying drawing and it comprises the features of construction, combination of elements, arrangement of parts and method steps which will be set forth in detail hereinafter and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of my invention, reference can be had to the following detailed description, taken together with the accompanying drawing, in which:

Figure 1 is a longitudinal sectional view of a coating mechanism constructed in accordance with my invention;

Figure 2 is a view partly in section and partly in elevation at an enlarged scale showing in more detail the construction of the manifold which directs air upwardly along the inner surface of the coating chamber; and

Figure 3 is a top plan view of the rotating disc which causes the air to flow in a turbulent fashion.

Referring now particularly to the drawing, it will be observed that the reference character 10 designates a vertically positioned coating chamber which may be formed of metal or glass. The coating chamber 10 preferably has a circular cross section, and it may be of conical, modified conical, or cylindrical shape as may be desired. Near its lower end there is provided an entrance 11 for the tablets to be coated. An inlet tube 12 communicates with the entrance 11 and slides 13 and 14 are positioned therein to permit the introduction of the tablets to be coated into the chamber 10 in batches.

Within the chamber 10 there is a screen 15 which extends transversely thereacross and on

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a bias so that the tablets to be coated and while they are being coated move across the chamber 10 and downwardly to an exit 16 with which an outlet tube 17 communicates. The tube 17 may discharge into a polishing pan or similar receptacle. Slides 18 and 19 may be provided in the outlet tube 17 for controlling the flow of the coated tablets therethrough in batches similar to the manner in which they are permitted to flow onto the screen 15 by the slides 13 and 14.

It is desirable that the uncoated and partially coated tablets above the screen 15 be supported in air so that they can be evenly coated. For this purpose air jets 20 and 21 are positioned in the lower end of the chamber 10 below the screen 15 and are directed upwardly to supply an air stream flowing upwardly in the chamber 10 of sufficient velocity to maintain the uncoated and partially coated tablets slightly out of contact with the screen 15. The air jets 20 and 21 may be connected by conduits 20' and 21' to a suitable source of compressed air, the pressure of which is adjusted so as to maintain the uncoated and partially coated tablets slightly above the screen 15 to be coated in a manner to be described presently.

Not only is it desirable that the tablets be supported in the air stream which flows upwardly through the coating chamber 10 but also it is desirable that they be tumbled so as to coat the same more uniformly. For this purpose the flow of air through the coating chamber 10 is arranged so that, in place of it being a streamlined flow, it is a turbulent flow. For this purpose a disc 22 is provided which may be rotated at a constant speed by a motor 23. As shown more clearly in Figure 3 the disc 22 has circular rows 24, 25, 26, and 27 of perforations through which the air from the jets 20 and 21 flows. As shown in Figure 1 the air jets 20 and 21 register with the circular rows 24, 25, 26, and 27 of perforations so that the air from the former is directed by the row of perforations individual thereto. Also as shown in Figure 1 the rows 24 and 27 of the perforations are inclined inwardly while the row 25 of perforations is inclined outwardly. The remaining row 26 extends vertically through the disc 22. The several air streams thus directed by the perforations 24, 25, 26, and 27 impinge on the uncoated and partially coated tablets above the screen 15 in a turbulent fashion and cause them to be tumbled so that they can be evenly and completely coated with the coating material.

With a view to drying quickly the coating material on the tablets, provision is made for heating the air as it passes upwardly through the chamber 10 underneath the screen 15. For this purpose an electric heater element 28, in the form of a grid, may be positioned immediately above the rotating disc 22. It will be understood that the heater element 28 may be con-

nected for energization to a suitable current source and that the degree of heat can be varied by varying the amount of current flowing therethrough.

The material for coating the tablets may be supplied through conduits **30**, **31** and **32**, the number being determined by the number of different coating materials to be employed. Each of the conduits **30**, **31** and **32** terminates in a nozzle **33** which, as shown in Figure 1, is directed against the tablets near the upper edge of the screen **15** so that the coating material is supplied to the tablets as soon as they pass through the entrance **11**. It will be understood that various coating materials can be supplied. As illustrated in Figure 1, the conduit **30** is arranged to have powdered lactose blown therethrough. The conduit **31** carries an acacia solution, while the conduit **32** may carry a sugar solution. It will be understood that these particular materials are mentioned for illustrative purposes only and that other coating materials can be used as may be desired.

Certain of the coating materials may tend to adhere to the inner surface of the coating chamber **10** particularly in the immediate vicinity of the screen **15**. In order to prevent this a ring-like manifold **34** may be positioned just above the screen **15**. As shown in Figure 2 the manifold **34** has outwardly and upwardly directed openings or apertures **35** which cause air supplied to the manifold **34** from a suitable source of compressed air to flow in the directions indicated by the arrows **36** over the inner surface of the chamber **10** for preventing the coating material from engaging the same.

At the upper end of the coating chamber **10** a screen **37** may be provided to prevent the escape of tablets in the event that the pressure supplied through the jets **20** and **21** should be sufficiently great as to cause them to rise to this position. An exhaust tube **38** connects the coating chamber **10** to a suitable recovery and exhaust chamber as will be understood readily.

In operation, the motor **23** is energized to drive the disc **22** at the desired speed. Air under pressure is supplied through the conduits **20'** and **21'** to the jets **20** and **21** respectively so that the uncoated and partially coated tablets on the screen **15** will be tumbled thereabove. This air pressure also is adjusted so that when the tablets are fully coated it will be insufficient to maintain them above the screen **15** at the lower end thereof adjacent the exit **16**. The current flowing through the heating element **28** is adjusted so that the coating applied to the tablets above the screen **15** is dried satisfactorily. The coating materials supplied to the conduits **30**, **31** and **32** are arranged and adjusted so that the desired proportions will be applied to the tablets at rates which will provide the desired thickness of coating. Air is supplied to the manifold **34**, it being understood that the pressure at the apertures **35** therein is slightly greater than the air pressure at the air jets **20** and **21** so that the desired air flow takes place along the inner surface of the chamber **10** to prevent the coating material from impinging thereon.

Now, the slide **13** is raised to permit a charge of uncoated tablets to flow downwardly through the inlet tube **12** against the slide **14**. The slide **13** is closed and then the slide **14** is opened. The uncoated tablets flow through the entrance **11** onto the upper end of the screen **15** and are immediately lifted thereabove and tumbled. At the same time they are subjected to the atomized flow of coating materials from the nozzles **33** which are supplied individually by the conduits **30**, **31** and **32** in the manner described. The partially coated tablets move transversely of the chamber **10** and downwardly on a bias but are still being tumbled above the screen **15** until the coating thereon is sufficiently heavy so that the upwardly flowing air stream is insufficient to maintain them out of contact with the screen **15**. When all of the tablets have been completely coated, the slide **18** is opened and they are allowed to discharge through the exit **16** into the outlet tube **17**. Thereafter the slide **18** is closed and the slide **19** is opened to permit the coated tablets to be discharged into the polishing pan or other receptacle as may be desired.

It will be obvious that certain changes can be made in the foregoing construction and method without departing from the spirit and scope of this invention. Accordingly, it is intended that all matter shown in the accompanying drawing and described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. The process of covering eatable tablets of the type of medicinal tablets, chewing gum, candy and nuts with a sugary coating which comprises: moving an air stream in a confined space upwardly past the eatable tablets with a force sufficient to suspend them continuously therein, and introducing the sugary coating material into said air stream prior to its contact with the eatable tablets.

2. The invention, as set forth in claim 1, wherein the coating is wet on application and the air stream is heated to dry quickly the coating applied to the tablets.

3. The invention, as set forth in claim 2, wherein the air stream is turbulent to tumble the tablets whereby they receive a coating of uniform thickness.

4. The invention, as set forth in claim 1, wherein the tablets move downwardly on a bias transversely of the air stream while being coated.

5. The invention, as set forth in claim 4, wherein the coating material is introduced into the air stream at a position close to the initial contact point thereof with the tablets.

6. The invention, as set forth in claim 1, wherein the coating material comprises a plurality of different materials and they are introduced separately into the air stream.

DALE E. WURSTER.

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