United States Patent [19]

Dugger et al.

[11] **3,757,833**

[45] **Sept. 11, 1973**

[54] **DEPOSITING APPARATUS**

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[22] Filed: **Aug. 31, 1971**

[21] Appl. No.: **176,459**

[52] **U.S. Cl.** **141/186,** 99/494, 141/67

[51] **Int. Cl.** **A21c 9/04,** B65b 37/14

[58] **Field of Search** 99/494; 141/183–186, 238, 242–245, 67

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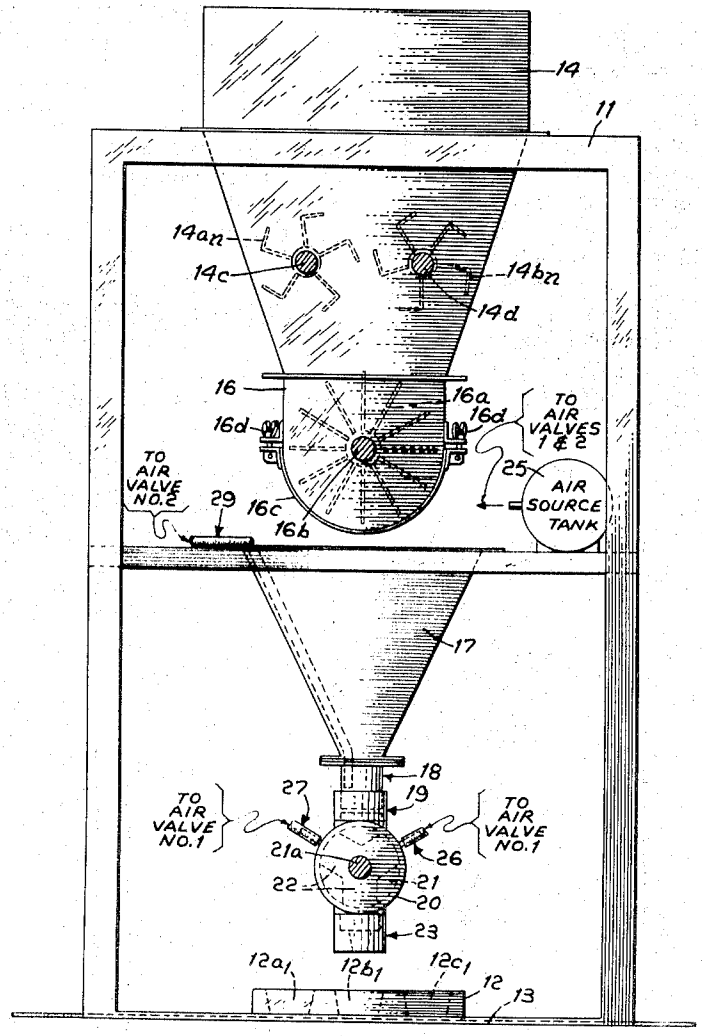
[57] **ABSTRACT**

The depositing apparatus described provides an arrangement wherein a hopper is positioned to direct a flow of material into a multiple number of individual streams. A rotating drum having a series of Y-shaped bores revolvable about an axis is positioned for individually communicating with a stream of said material in a first position, and successively depositing the material accumulated in each of said bores in another position. The arrangement includes means for controlling the movement of said drum and for insuring the measured amounts of the material are deposited after each filling of the bores in said drum with said material.

10 Claims, 5 Drawing Figures



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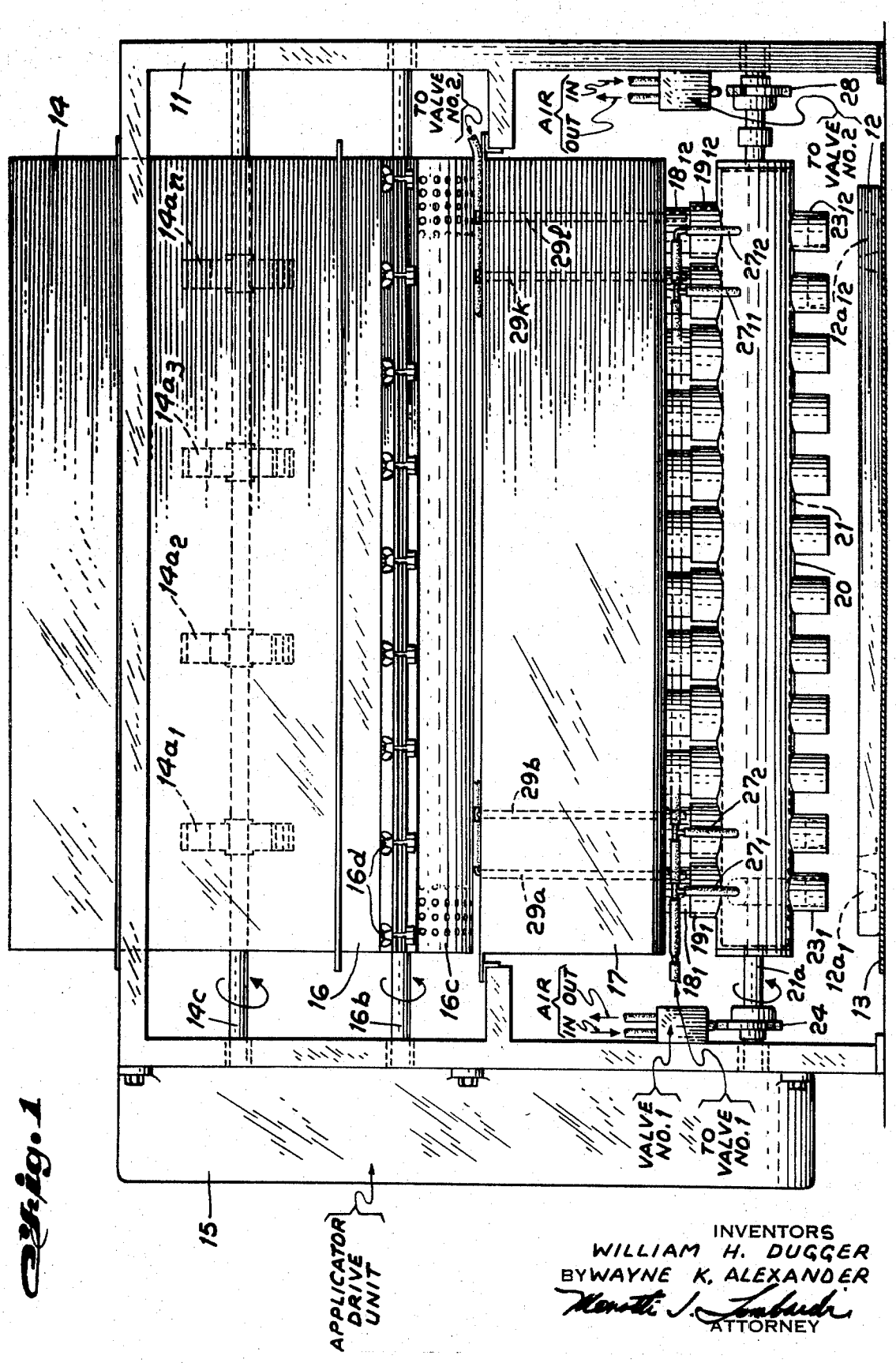

Fig. 1

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Fig. 2

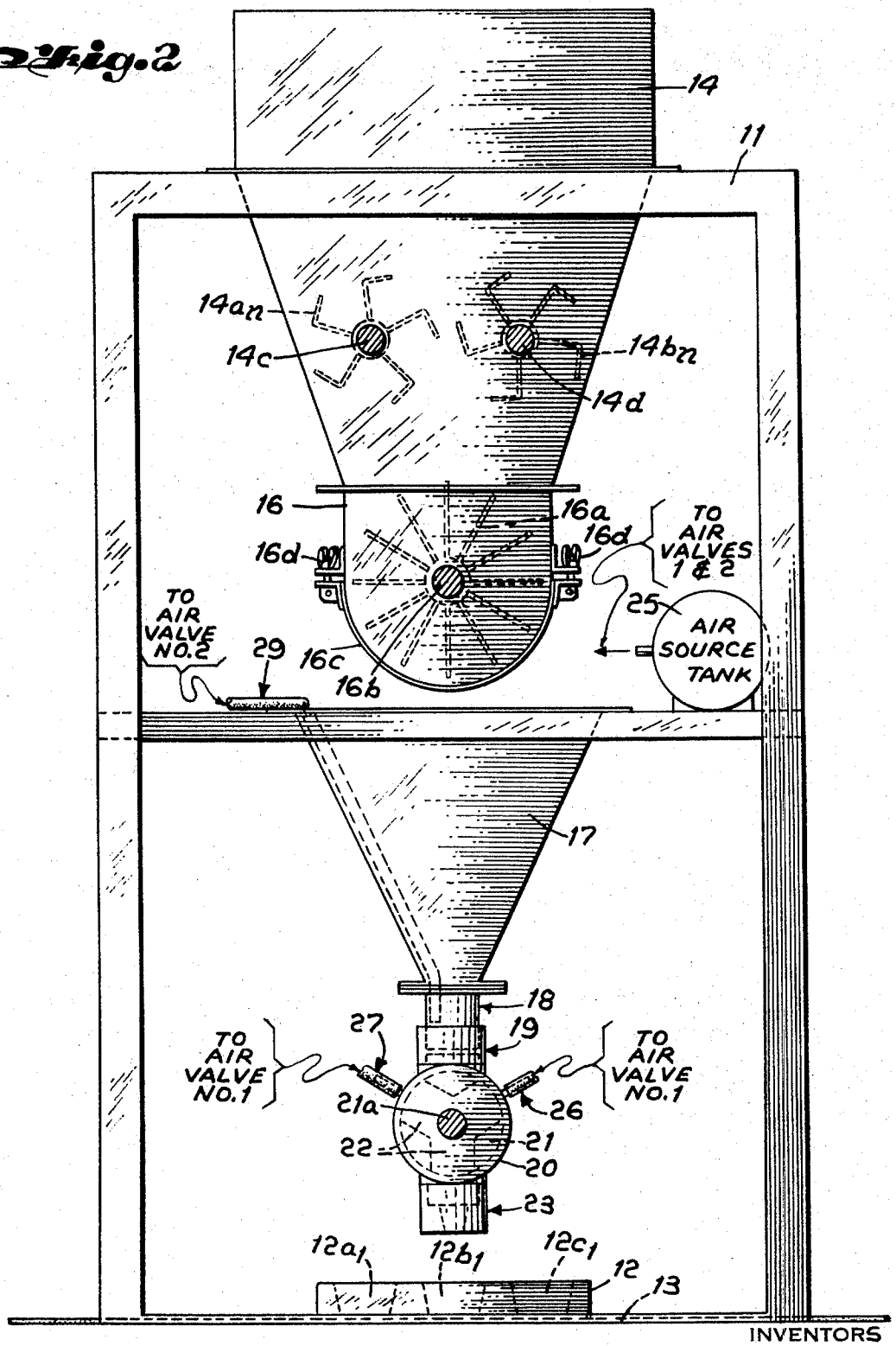

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Fig. 4

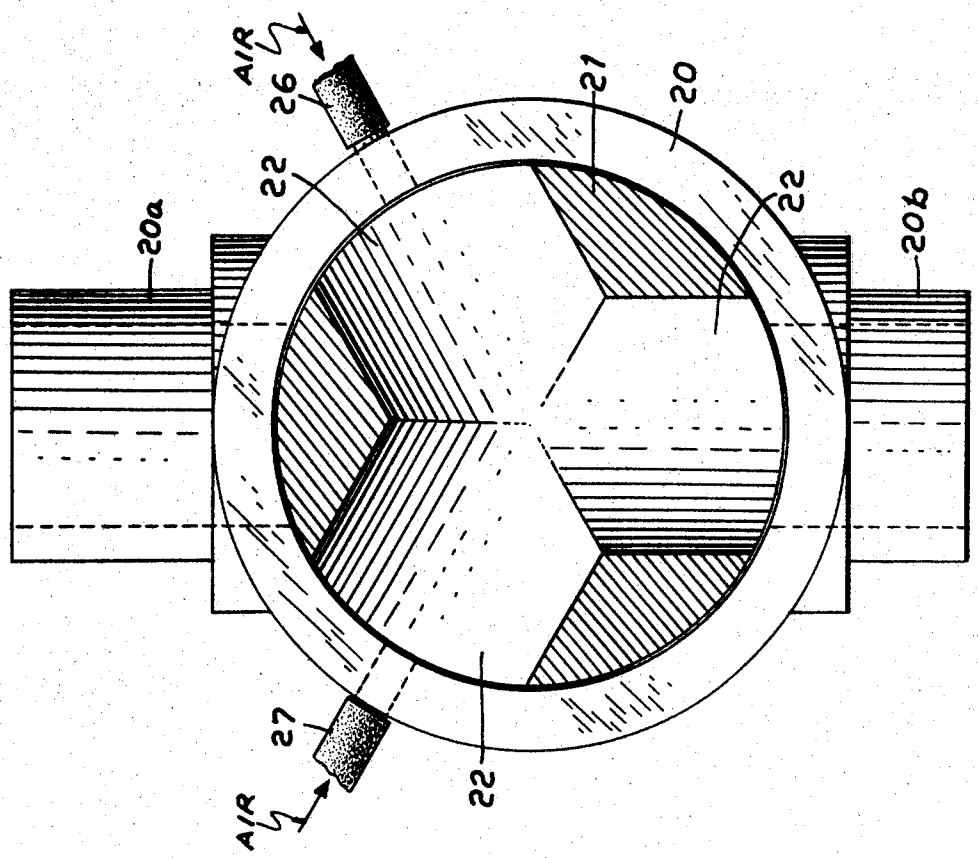
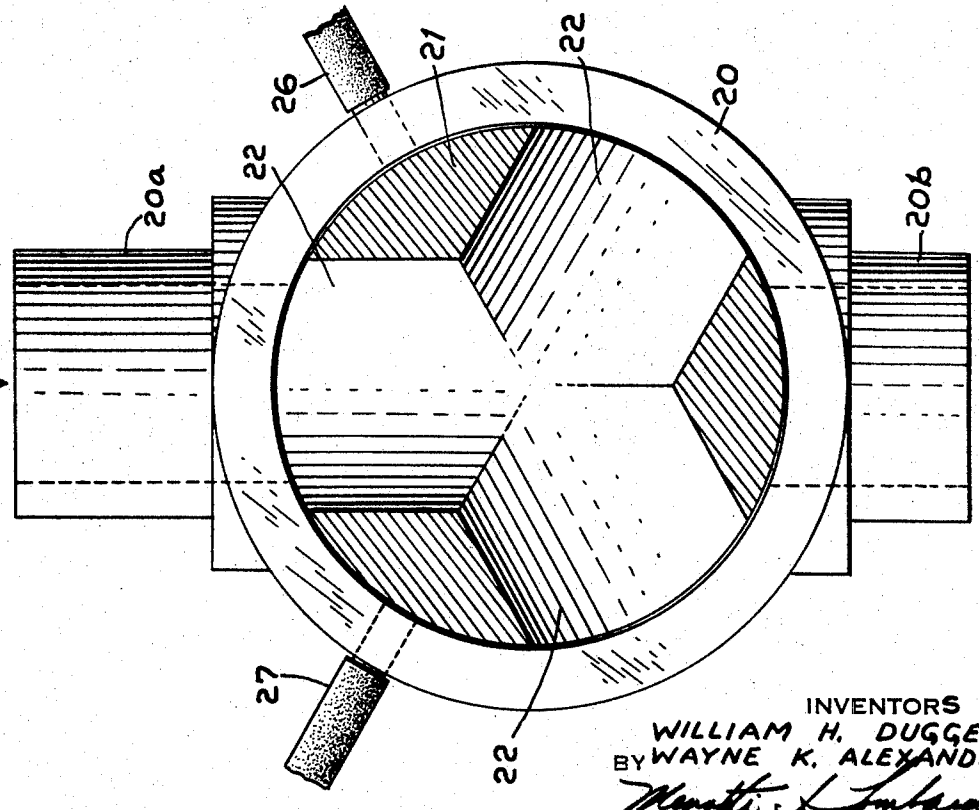


Fig. 3



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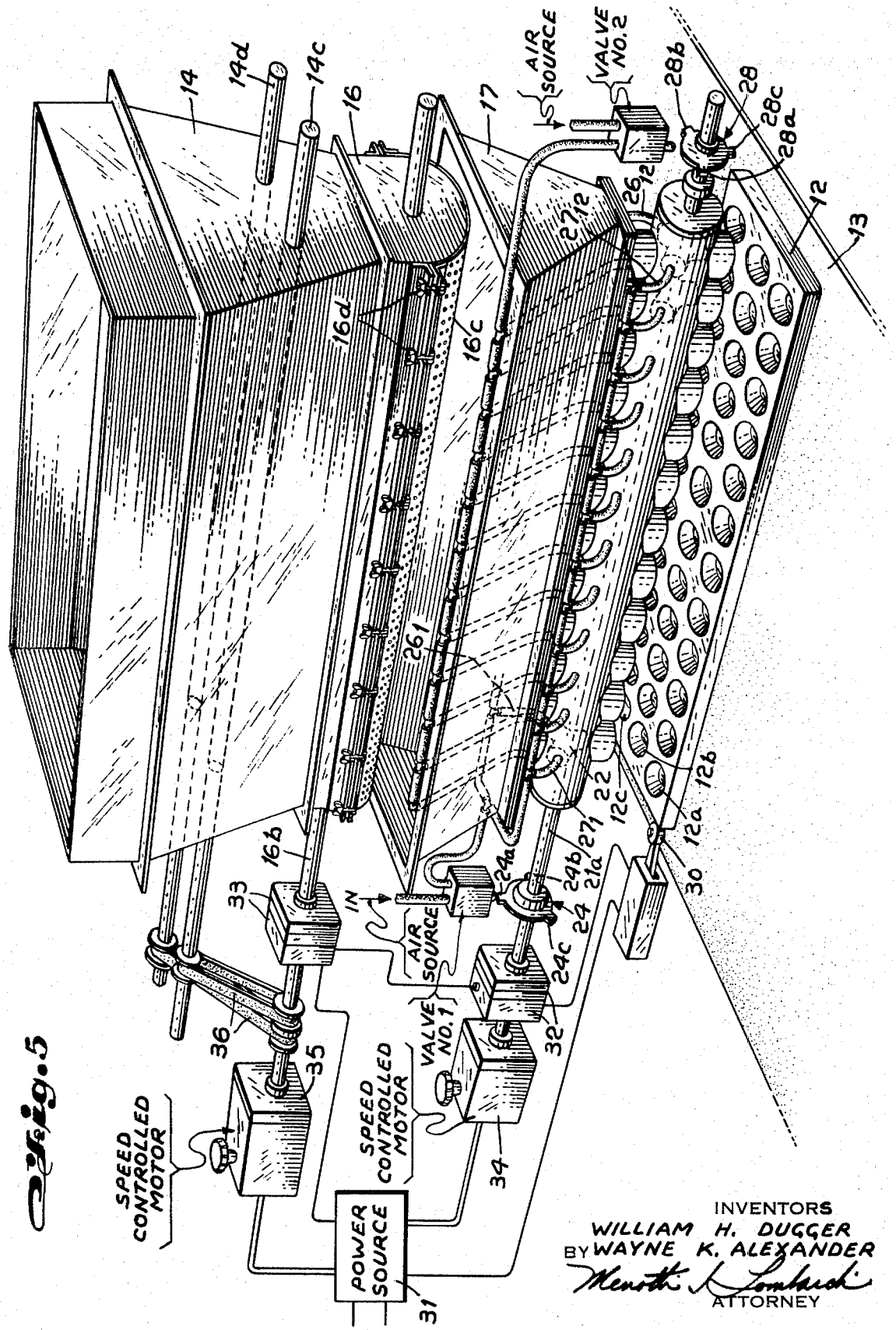

Fig. 5

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DEPOSITING APPARATUS

BACKGROUND OF THE INVENTION

In general, the invention relates to material depositing apparatus, and more particularly to a crumb dispensing apparatus for streusel type cake products.

It is a well known problem in the baking industry to handle and produce streusel type cake or cupcake products. One considerable difficulty is encountered in trying to deposit measured amounts of the streusel in a uniform and accurate manner on the cake products. For example, if the deposited amount is not accurately measured and properly dispensed, the resulting product, after baking, is uneven, unappealing, and results in considerable waste during the on-line processing. Another of the problems, in depositing the streusel type material, is due to the composition of the mixture itself. A typical type mixture utilized in producing a streusel type cake product comprises approximately a 20 percent shortening, a 25 percent granulated and brown sugar, a 42 percent flour, and a 10 percent combination of almond paste, honey, cinnamon and salt. As should be readily understood by one skilled in the bakery art this mixture, if not properly handled and dispensed, will cause considerable clogging and gumming of any dispensing equipment, so as to make high speed production with minimal waste of the ingredients virtually impossible.

These and other problems were overcome by the apparatus according to the invention. The apparatus efficiently handles the streusel type material to control the depositing, and insures that equal amounts are deposited on the cake products in a high speed uniform manner as hereinafter described.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide an improved depositing apparatus.

Another object of the invention is to provide depositing apparatus capable of handling streusel type cake materials in a controlled manner.

According to the broadest aspects of the invention there is provided depositing apparatus including material dispensing means, a rotatable cross bored drum positioned to receive material from said dispensing means in a first position, and means coupled to said drum to cause said material to be deposited in a controlled manner when said drum is in a second position.

A feature of the invention is to provide depositing apparatus useful in producing streusel cupcake type products comprising a housing having an entrance port coupled to a source of material and an exit port positioned to discharge said material in a number of controlled deposits, a drum mounted coaxially in said housing for rotatable movement, said drum having a series of Y-shaped bores, means for intermittently rotating said drum so that each branch in each Y-shaped bore of said series communicates first with said entrance port to be filled and then with said exit port for dispensing said material, and means are coupled to assist the filling and dispensing of said material.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and features of the invention will be better understood if reference is made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a front view of the apparatus according to the invention;

FIG. 2 is a side view of the apparatus according to the invention;

FIG. 3 illustrates the position of the cross bored drum in a filling position;

FIG. 4 is a drawing showing the cross bored drum in a depositing position; and

FIG. 5 illustrates the means of controlling and timing the operation of the apparatus according to the invention.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 and 2, the general concept and design of the apparatus according to the invention will be described. A frame 11 is positioned to mount the apparatus over cupcake pans 12 which are moving on a conveyor belt 13. Each pan 12 comprises a series of 12 cups, 12_{a1} through 12_{a12}, across its length and three rows of cups 12*a*,*b*,*c*.

An upper storage hopper 14 is mounted on the frame and equipped with a series of power driven agitator fingers 14*an* and 14*bn* to continuously break up the source material to prevent packing. A variable applicator drive unit 15, more particularly described in connection with FIG. 5, drives the agitators by means of coupling shafts 14*c* and 14*d*. The variable drive for these agitators is coupled from the applicator reel drive as illustrated in FIG. 5. The material to be deposited which is placed in the upper storage hopper 14 is broken up into varying size lumps by the agitator fingers and forced into the lower applicator hopper 16. The hopper 16 is equipped with an eight-blade applicator reel 16*a* mounted and driven by shaft 16*b* from applicator drive unit 15. The applicator reel 16*a* in the lower hopper 16 wedges the material through a perforated screen 16*c* from where it falls directly into the discharge manifold 17 mounted in the frame 11 below hopper 16. The perforated screens are removable and fixed to the lower hopper by means 16*d*, so that it may be cleaned and different screens with varying size holes may be used depending on the product.

The discharge manifold 17 directs the waterfall flow of the material coming from the lower hopper into the top of the multiple number of individual tubes 18_1 through 18_{12}, there being one tube for each of the cups in pan 12. The feed tubes are coupled by collars 19 to drum housing 20. Rotatably mounted within the drum housing 20 is a cross bored drum 21 having 12 serially positioned Y-shaped cross bored holes 22. In a first position the cross bored holes are first filled by the flow of the material from the manifold 17, and in another position deposit the material through the discharge nozzles 23 which are positioned above the cups in pan 12. Rotatably mounted with the cross bored drum shaft 21*a* is a first rotating actuating cam 24 which actuates valve number 1 to control the air pressure from the air tank source 25 to the air connecting tube means 26 and 27 mounted on the drum housing. In a similar manner, another control cam 28 controls the actuation of valve number 2 which controls the air pressure from source 25 into each one of the air tubes 29*a* through 291. The tubes are coupled from valve number 2 to the multiple number of individual feed tubes 18.

FIG. 3 illustrates the filling position of the cross bored drum 21 which is rotatably mounted within drum

housing 20. Drum housing 20 has an entrance port 20*a* and an exit port 20*b*. During the filling of the Y-shaped cross bored holes 22 the material drops through the entrance port and completely fills the Y-shaped cavity 22, the material filling being assisted by air pressure which is coupled by tubes 29 from air valve number 2 as illustrated in FIGS. 1 and 2. The drum housing 20 includes air connecting tube means 26 and 27, the entrance of which is blocked during filling of the bore by the solid portions of drum 21.

FIG. 4 illustrates the position of the rotatable drum during depositing of the material from exit port 20*b*. It will be observed that during the depositing sequence the entrance port 20*a* is blocked by the solid portion of the cross bored drum 21, and the air connecting tube means 26 and 27 are cleared to permit the air assisted flow of the material accumulated within cavity 22 to be deposited. The air assist insures the complete removal of the volume of material accumulated, to insure controlled depositing of the material into the cups in pan 12.

Referring now to FIG. 5, the control and timing means for the operation of the apparatus discussed above is illustrated. The entire mechanism is activated, stop or start, by switch means 30 which is activated or closes a circuit to power source 31. The pan 12, as it passes underneath the individual discharge nozzles 23, is timed to cause the energization of the slip-type disc clutch 32 and 33 to enable the speed-controlled motors 34 and 35 to respectively drive shafts 21*a* and 16*b*, and via coupling means 36 shafts 14*c* and 14*d*. The motors are individually gear adjustable in a manner well known in the art. The timing of the air from valve number 1 and number 2 is controlled by the rotating cams 24 and 28. Cam 24 is in the shape of a flat disc having three protruding actuating portions 23*a*, 23*b* and 23*c* which are spaced 120° apart and intermittently act on valve number 1. When cam portion 23*a*, 23*b* or 23*c* activates valve number 1, air from air source tank 25 is caused to be coupled by the out air coupling tube of the valve to each of the air connecting tube means 26_1 through 26_{12} and 27_1 through 27_{12}. During this time the position of the cross bored drum 21 is as illustrated in FIG. 4.

Camming disc 28 also has three protruding cam activating portions 28*a*, 28*b* and 28*c* which are spaced 120° apart, but out of phase with the protruding portions of disc 24 by 60°. After portion 23*a* of disc 23 leaves its actuating position of valve number 1, then valve number 1 shuts off the air supply, and then valve 28*a* comes into position to actuate valve number 2 and causes the air from source 25 to be coupled by lines 29 to the feed tubes to assist in again filling the Y-shaped cross bored holes 22. At this time the cross bored drum is in the position illustrated in FIG. 3. When cam 23*a* was in the activating position, the material was deposited into cups 12*a*, and during the travel of the pan from the position of cups 12*a* to 12*b*, the valve number 2 was activated by portion 28*a* so that when cup 12*b* is in the position to be filled, cam portion 23*b* activates valve number 1 and a complete deposit of the material is made into cups 12*b*. This cycle repeats itself three times for each pan 12 so that equal and controlled deposits are made into each row of 12 cups. It is of course understood, that during this time the agitator hopper 14 and the applicator hopper 16 are rotating at a predetermined speed to insure a proper flow of material into manifold 17.

Each pan causes the following sequential operations: turning on of system, filling the Y-shaped bores with an air assist, depositing in a row of cups with an air assist, repeating the filling and dropping two more times, and turning off of the system.

Reviewing the overall operation of the system in connection with the above, the objects and features should now be apparent as well as alternative embodiments to those skilled in the art. The material to be applied is placed in the upper storage hopper with agitator fingers break up the material in varying size lumps which are forced into the lower applicator hopper. The applicator reel in the lower hopper wedges the material through a perforated screen where it falls into the discharge manifold directly below. The manifold directs the waterfall flow coming from the applicator housing into the top of multiple spouts in the drum housing. The material is directed and air assisted into individual ones of the Y-shaped cross bored holes. Cam control means are coupled to the drum to control depositing into the cups of the pans which are continuously traveling underneath the discharge nozzles positioned at the bottom of the drum housing. The entire mechanism is activated, start or stop, by a switch means which is tripped as each individual pan frame passes underneath the nozzles. The speed of the reel applicator is variable and controls the amount of material deposited in the individual cups on each cycle, and the cross bored drum drive is variable and synchronizes the deposit from each Y-shaped bored hole into the cups of the pan without overflow to the sides between the multiple cups in each row of the pan. In order to compensate for variations in spacing between pans as they move along under this device on the conveyor, a slip-type disc clutch and locking cam are used for the purpose of indexing each series of three rows of cups in one pan frame. This also obviously eliminates any progressive error in depositing directly into every cup without overflow.

Although I have described above the depositing apparatus in connection with specific embodiments and examples, it is to be clearly understood that this description is given by way of example only and is not to be considered as a limitation on the scope of the invention as defined by the objects and features thereof and in the accompanying claims.

We claim:

1. Apparatus for handling and depositing streusel type material comprising:

a storage hopper and applicator for handling and directing the flow of the material;

a discharge manifold having dividers to direct the flow of the material into a multiple number of individual streams;

a housing with upper connectors to said manifold and lower nozzle spouts positioned above the depositing position;

a drum mounted coaxially in said housing and having a series of Y-shaped borings revolving about an axis, said borings successively communicating first with said upper connectors and then with said lower nozzles;

means to assist the filling and depositing of said material in a controlled manner;

said material is placed in an upper storage hopper having agitator fingers to break up said material

into varying size lumps which are forced into a lower applicator hopper; and

means to activate and deactivate said system as an individual pan frame passes the depositing position.

2. The apparatus according to claim 1 including means for varying the speed of the applicator reel so that the amount of material deposited in individual cups of a pan frame is controlled.

3. Apparatus for handling and depositing streusel type material comprising:

a storage hopper and applicator for handling and directing the flow of the material;

a discharge manifold having dividers to direct the flow of the material into a multiple number of individual streams;

a housing with upper connectors to said manifold and lower nozzle spouts positioned above the depositing position;

a drum mounted coaxially in said housing and having a series of Y-shaped borings revolving about an axis, said borings successively communicating first with said upper connectors and then with said lower nozzles;

means to assist the filling and depositing of said material in a controlled manner; and

means to synchronize said drum so that the material is deposited into individual cups in a pan frame in a controlled and variable manner.

4. The apparatus according to claim 3 including clutching and indexing means to compensate for variations in spacing between pan frames as they move past the depositing position.

5. A crumb cake depositing apparatus comprising:

a storage hopper and applicator for handling and directing the flow of a source of streusel type material;

a discharge manifold coupled to direct the flow of said material into a multiple number of individual streams;

a housing coupled to said manifold and having a series of lower nozzles positioned above the depositing position;

a drum mounted coaxially in said housing and having a series of Y-shaped borings revolving about its axis, said borings successively communicating first with said manifold to be filled and then with said lower nozzles to deposit simultaneously said material onto serial arranged cake cups in a pan;

means to assist the filling and depositing of said material in a controlled manner;

said storage hopper and applicator includes agitator fingers to break up said material into varying size lumps which are forced into a lower applicator hopper;

an applicator reel in the lower hopper to wedge said material through a perforated screen attached to said hopper such that said material falls into said discharge manifold directly below; and

means to activate and deactivate said system as each individual cup frame passes the depositing position.

6. The apparatus according to claim 5 including means for varying the speed of the applicator reel so that the amount of material deposited in individual cups is controlled.

7. The apparatus according to claim 5 including means to synchronize said drum so that the material is simultaneously deposited into all cups in a row in a pan frame in a controlled manner.

8. The apparatus according to claim 5 including clutching and indexing means for controlling each series of three rows of cups in one frame to compensate for variations in spacing between frames as they move past the depositing position.

9. The apparatus according to claim 5 wherein said means to assist the filling and depositing of said material include first means for coupling air into each of said Y-shaped bores during the depositing of said material, and second means coupled to direct air to each of said Y-shaped bores during filling with said material.

10. The apparatus according to claim 9 including first and second valves coupled to control, in response to first and second cams, the introduction of air into said borings by said first and second means.

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