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[54] **DEPOSITING APPARATUS**

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Related U.S. Application Data

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[52] **U.S. Cl.** **222/189**, 141/186, 222/368, 222/373

[51] **Int. Cl.** **G01f 11/24**

[58] **Field of Search** 141/13, 35, 36, 67, 74, 141/129, 183–186, 238, 242–245; 99/494; 222/194, 189, 216, 236, 252, 367, 368, 373, 427

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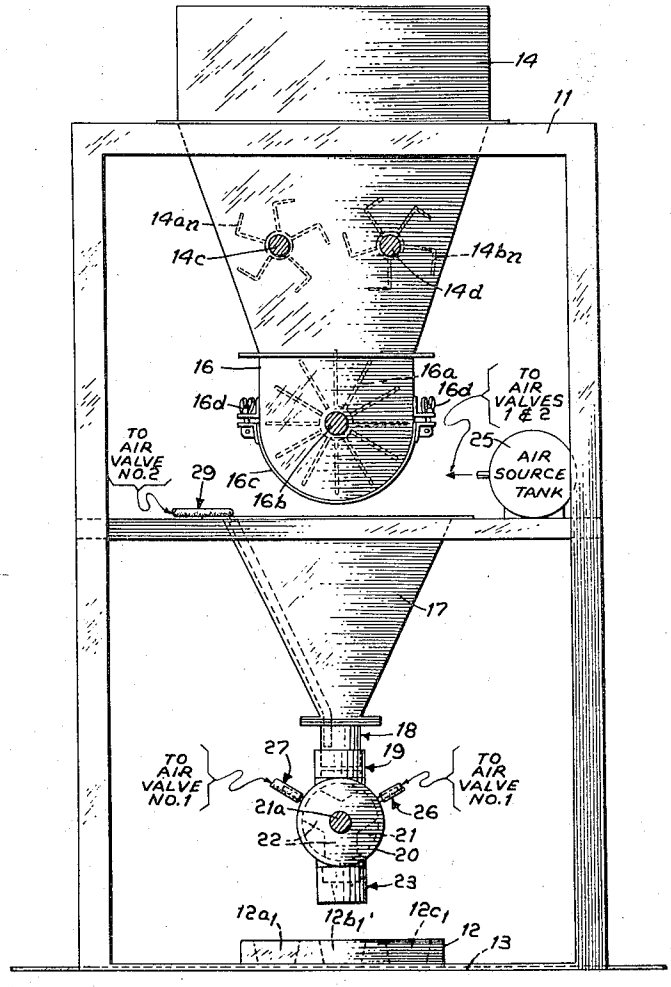
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[57] **ABSTRACT**

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.

8 Claims, 5 Drawing Figures



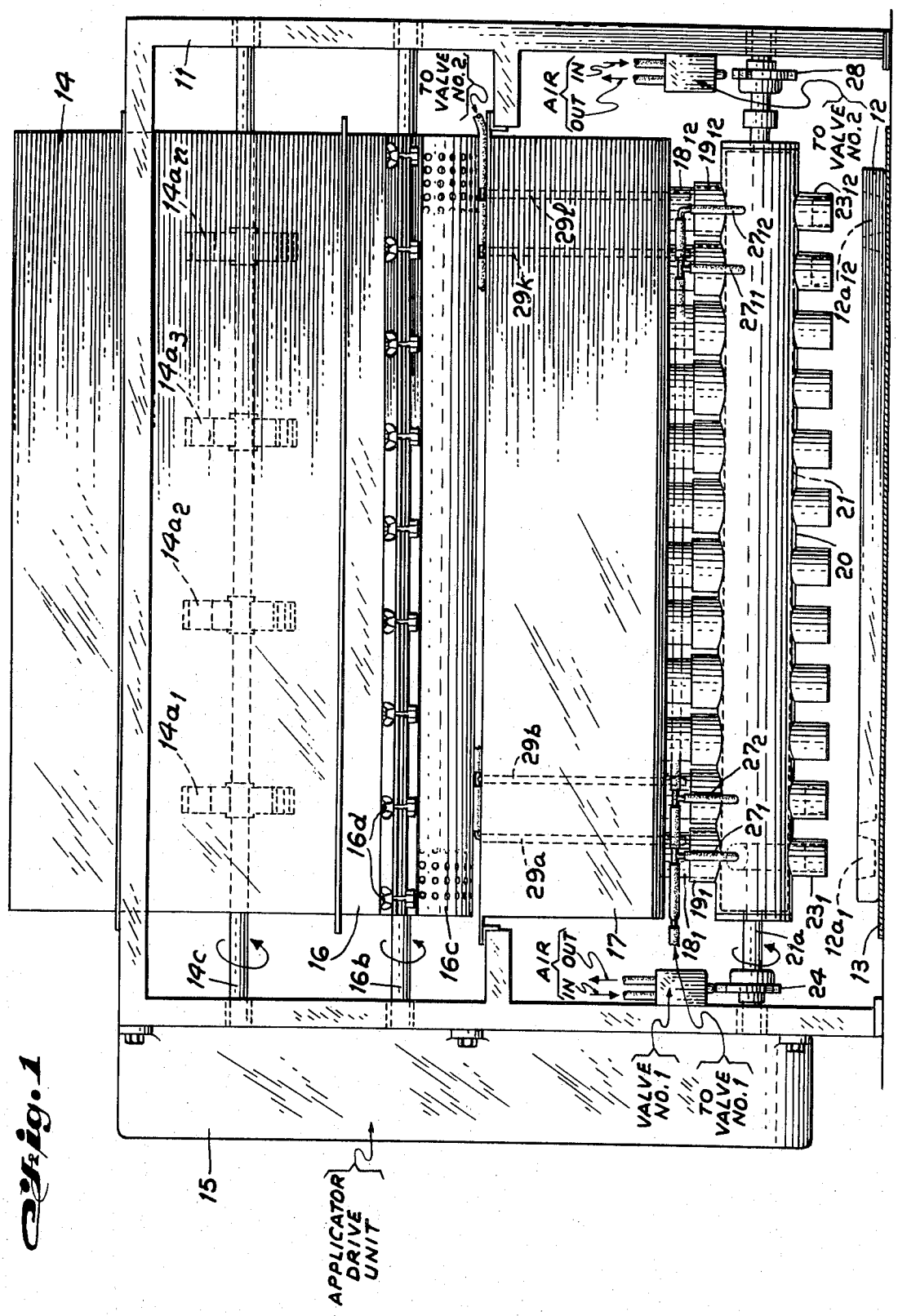

14
11
14a1
14a2
14a3
14a4
TO VALVE No.2
AIR IN OUT
28
12
18 12
19 12
TO VALVE No.2
23 12
27 11 — 27 12
12a 12
29k
29l
21
20
29b
27 2
27 1
16d
16
16b
16c
14c
29a
AIR IN OUT
17
18 1
19 1
21a
23 1
12a 1
13
24
VALVE No.1
TO VALVE No.1
15
APPLICATOR DRIVE UNIT

Fig. 1

Fig. 2

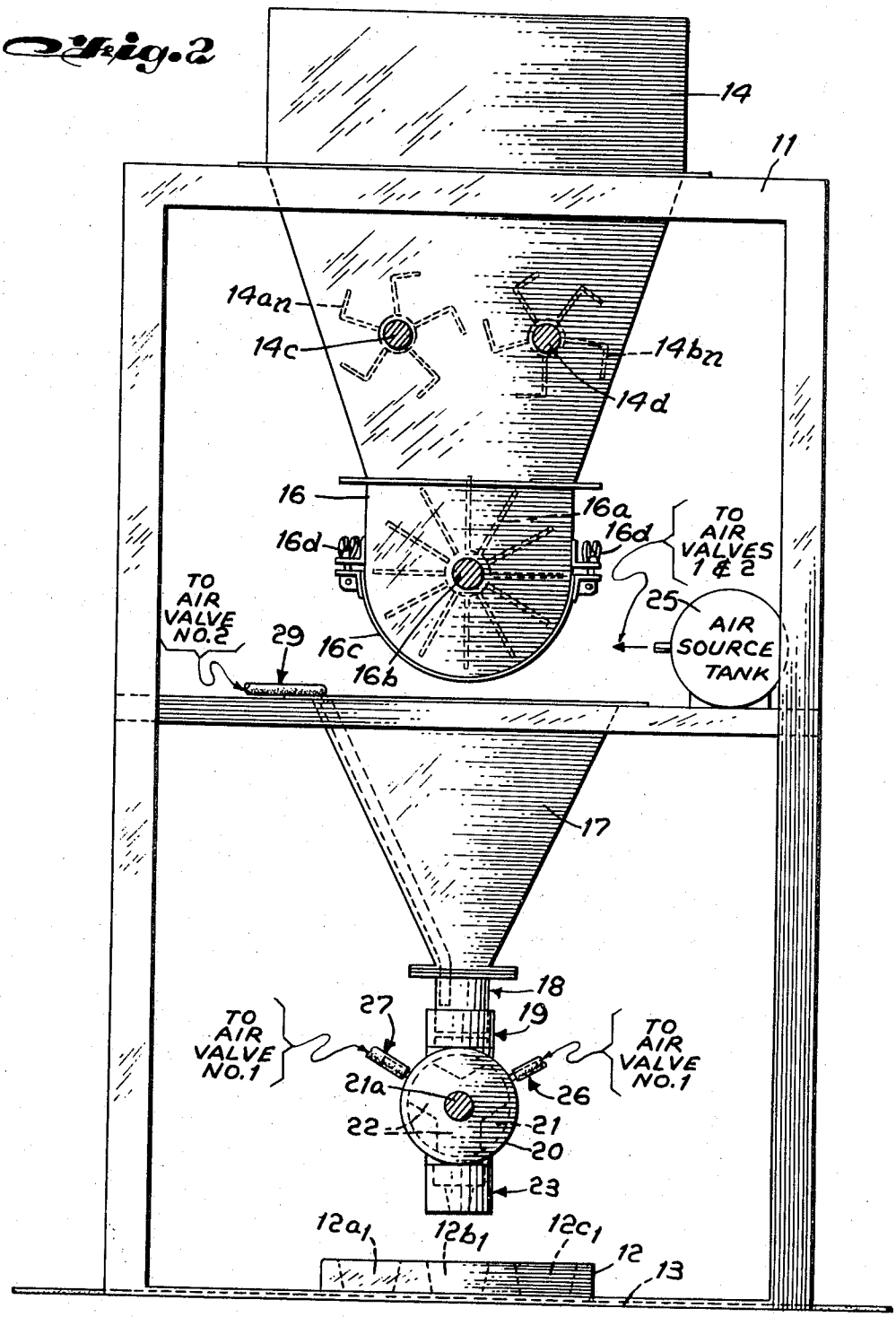

14
11
14an
14c
14bn
14d
16
16a
16d
16d
TO AIR VALVES 1 & 2
25
AIR SOURCE TANK
TO AIR VALVE NO. 2
29
16c
16b
17
18
19
27
TO AIR VALVE NO. 1
TO AIR VALVE NO. 1
21a
26
22
21
20
23
12a1
12b1
12c1
12
13

Fig. 4

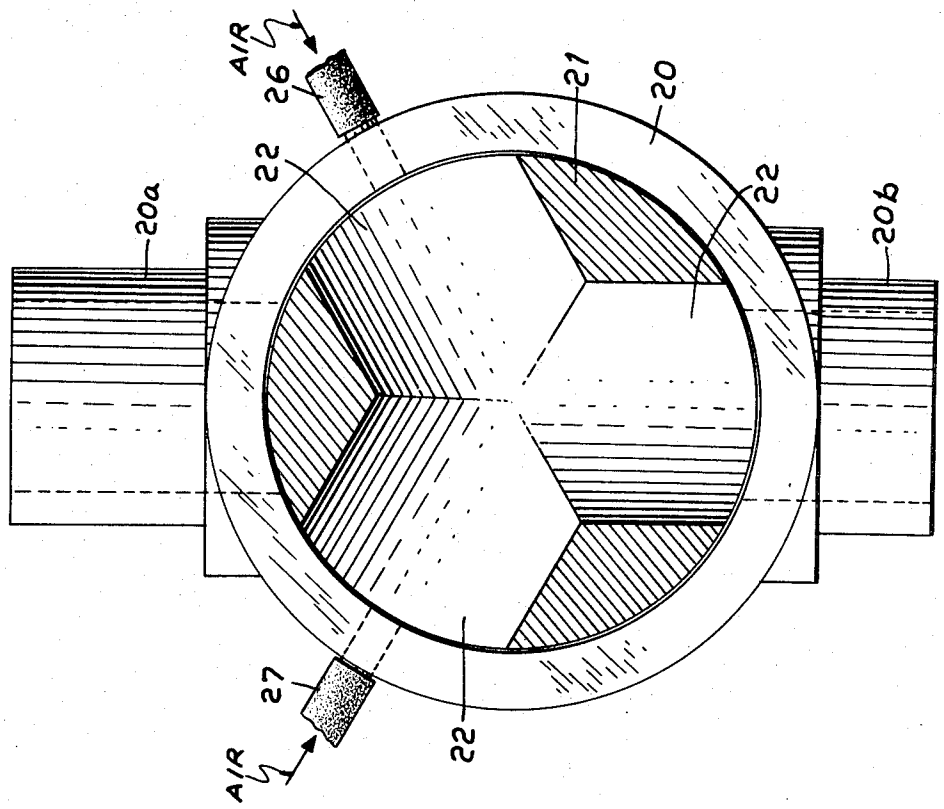
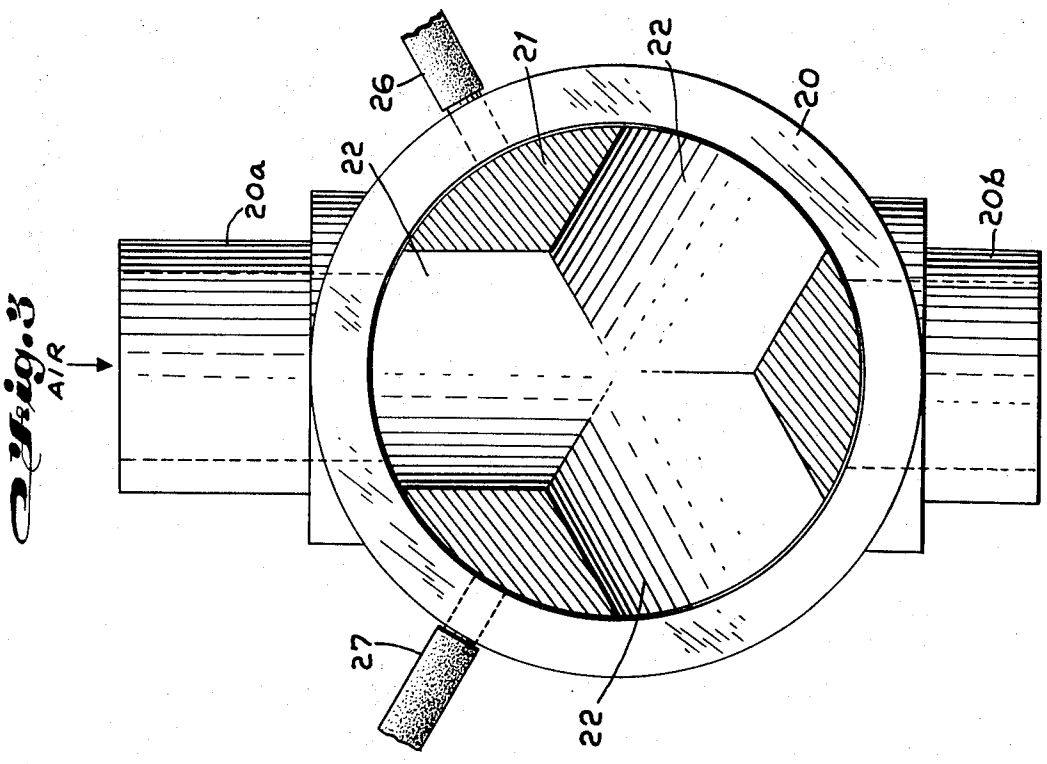


Fig. 3



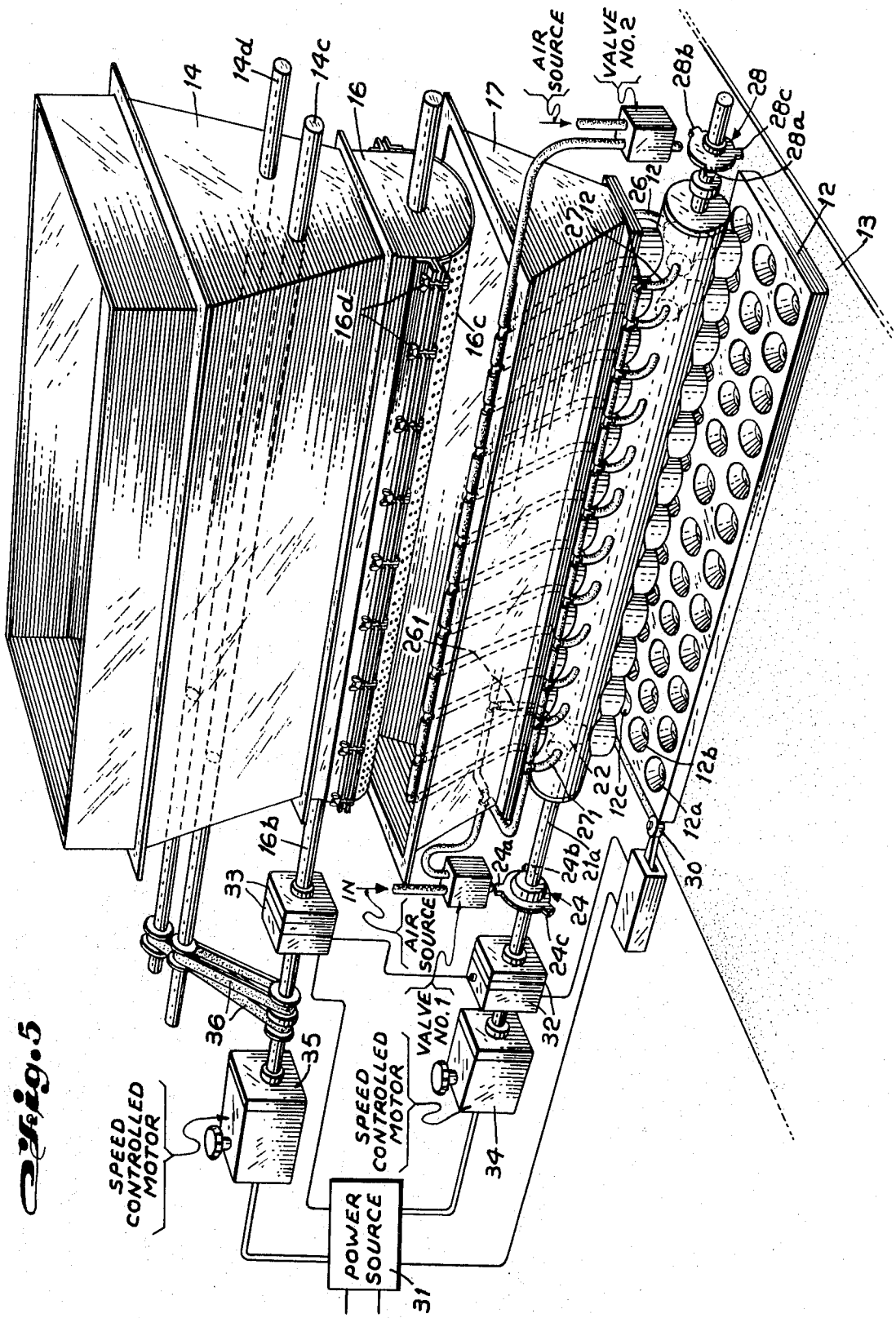

14
14d
14c
16
17
AIR SOURCE
VALVE No.2
28b
28
28c
28a
12
13
26
27
12
16d
16c
261
16b
33
IN
AIR SOURCE
24a
24b
27
21a
24
24c
22
12c
12b
12a
30
VALVE NO.1
32
36
35
SPEED CONTROLLED MOTOR
SPEED CONTROLLED MOTOR
34
POWER SOURCE
31

Fig. 5

DEPOSITING APPARATUS

This is a division of application Ser. No. 176,459, filed Aug. 31, 1971 now U.S. Pat. No. 3,757,833.

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 **45** 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 postitioned 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 twelve 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 **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 illustrateed 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 24*a*, 24*b* and 24*c* which are spaced 120° apart and intermittently act on valve number 1. When cam portion 24*a*, 24*b* and 24*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 24*a* of disc 24 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 24*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 where 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 gripped 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. Material depositing apparatus comprising:

a housing having an entrance and exit port;

material dispensing means positioned adjacent said entrance port for dispensing a material into said entrance port;

a drum mounted coaxially in said housing for rotational movement, said drum having branches defining a Y-shaped bore with each branch of said bore being spaced approximately 120° in a plane perpendicular to the drum axis;

means coupled to said housing to assist the filling of said bore and depositing of said material from said bore; and

means for intermittently rotating said drum so that one branch of said bore communicates first with

said entrance port to fill said Y-shaped bore with said material and then another branch of said bore communicates with said exit port for depositing said material from said Y-shaped bore.

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

an upper storage hopper and lower applicator hopper for handling and directing the flow of the material;

a discharge manifold being positioned to receive the material from said lower application hopper and having dividers to direct the flow of the material into a multiple number of individual streams;

a depositing position;

a housing mounted between said manifold and depositing position with upper connectors to said manifold and lower nozzle spouts directed at the depositing position;

a drum mounted coaxially in said housing by a shaft and having a series of branches defining a series of Y-shaped borings revolving about an axis, each branch of said borings in said series being coincident and the branches in each bore being equally spaced apart from each other in a plane perpendicular to said shaft;

means for rotating said drum so that one series of branches first communicates with said upper connectors to completely fill the Y-shaped series of borings and then another series of branches communicates with said lower nozzles to completely deposit the material from said Y-shaped series of borings in a sequential order; and means to assist the filling and depositing of said material in a controlled manner.

3. The apparatus according to claim 2 including agitator fingers mounted in the upper storage hopper to break up said material into varying size lumps which are forced into the lower applicator hopper.

4. The apparatus according to claim 3 including an applicator reel in the lower hopper to wedge said material through a perforated screen attached to said lower hopper such that said material falls into said discharge manifold directly below.

5. The apparatus according to calim 2 wherein said means to assist the filling and depositing of said material includes:

a source of air flow;

first means coupled to said housing for directing said source of air flow into said Y-shaped borings during the depositing of said material; and

second means coupled to said manifold to direct said source of air flow to said borings during filling with said material.

6. The apparatus according to claim 5 including first and second valves coupled to control in response to first and second cams mounted on said drum shaft the introduction of air into said first and second means during the filling and depositing position.

7. A crumb cake depositing apparatus comprising: a storage hopper and a lower applicator hopper for handling and directing the flow of a source of streusel type material, said storage hopper including agitator fingers to break up said material into varying size lumps which are forced into the lower hopper, and said lower hopper including an applicator reel to wedge said material through a perforated screen attached to said lower hopper;

a discharge manifold coupled to said storage hopper and applicator hopper to receive and direct the flow of said material into a multiple number of individual streams;

a housing coupled to said manifold and having a series of depositing nozzles;

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 depositing nozzles to deposit simultaneously said material onto serial arranged cake cups in a pan; and

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

8. In an automatic cupcake streusel machine, apparatus comprising in combination:

a housing having an entrance and exit port;

a drum coaxially mounted in said housing for rotational movement about its axis, said drum having a series of branches defining a series of Y-shaped bores with each branch of said bores in said series being coincident and the branches in each bore being spaced approximately 120° apart from each other branch in a plane perpendicular to the drum axis;

means for filling said bores with streusel material and for assisting depositing and said material; and

means for intermittently rotating said drum so that one series of branches communicates first with said entrance port so that all the bores are filled with said material, and then another series of branches communicates with said exit port so that said material accumulated in all said bores is deposited in a sequential and cyclic manner.

* * * * *