

March 23, 1954

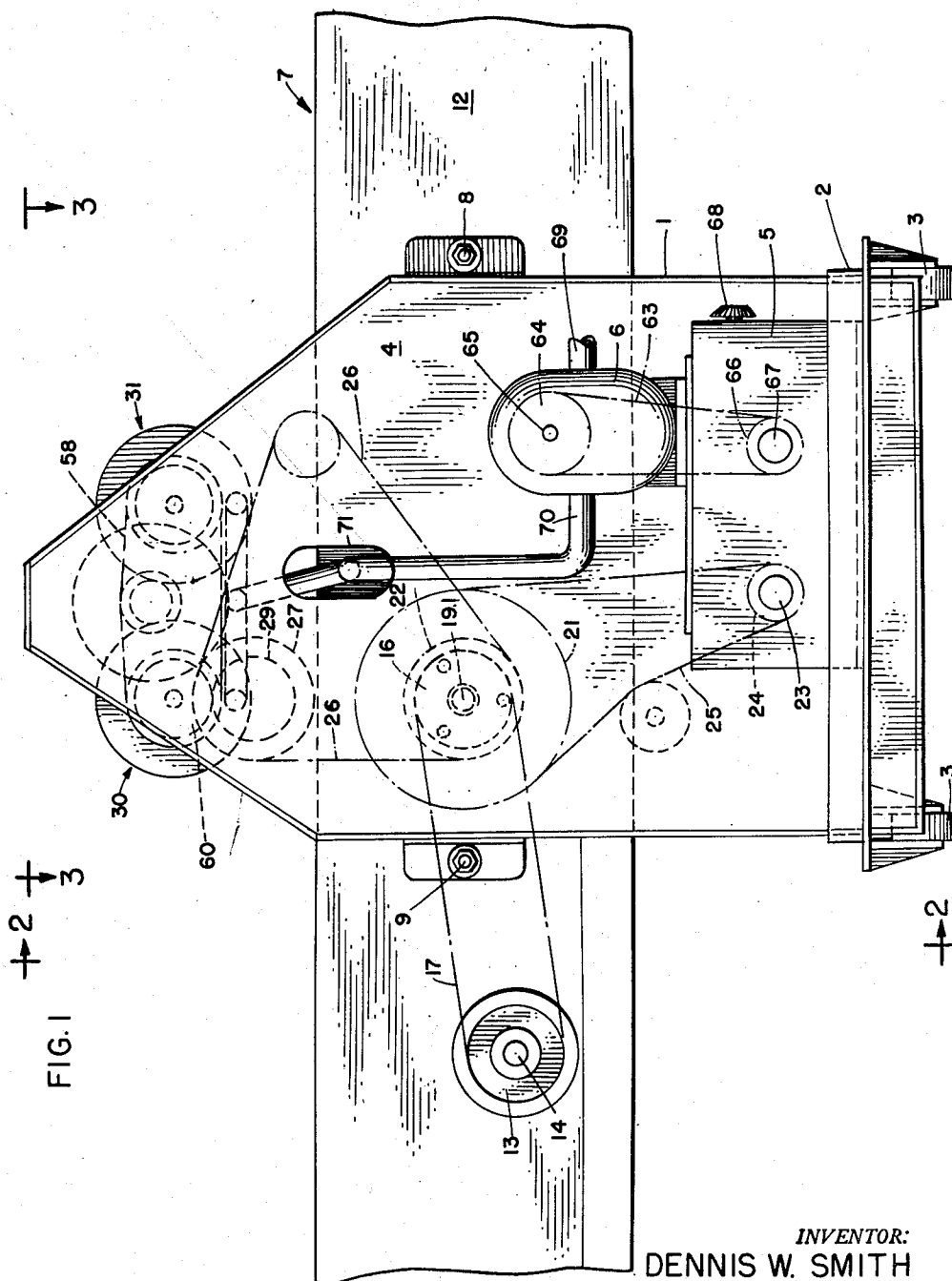
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2,673,019

RECEPTACLE FILLING MACHINE

Filed Feb. 15, 1952

5 Sheets-Sheet 1



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RECEPTACLE FILLING MACHINE

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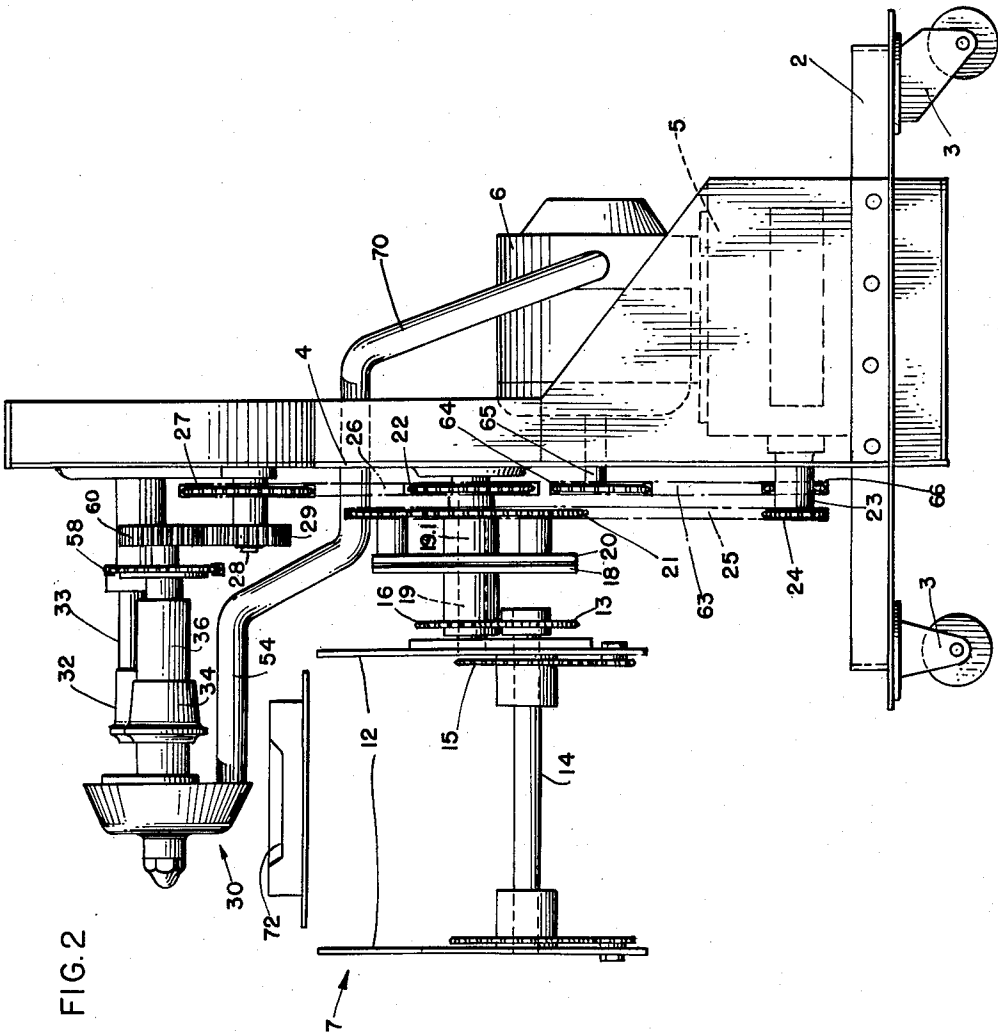


FIG. 2

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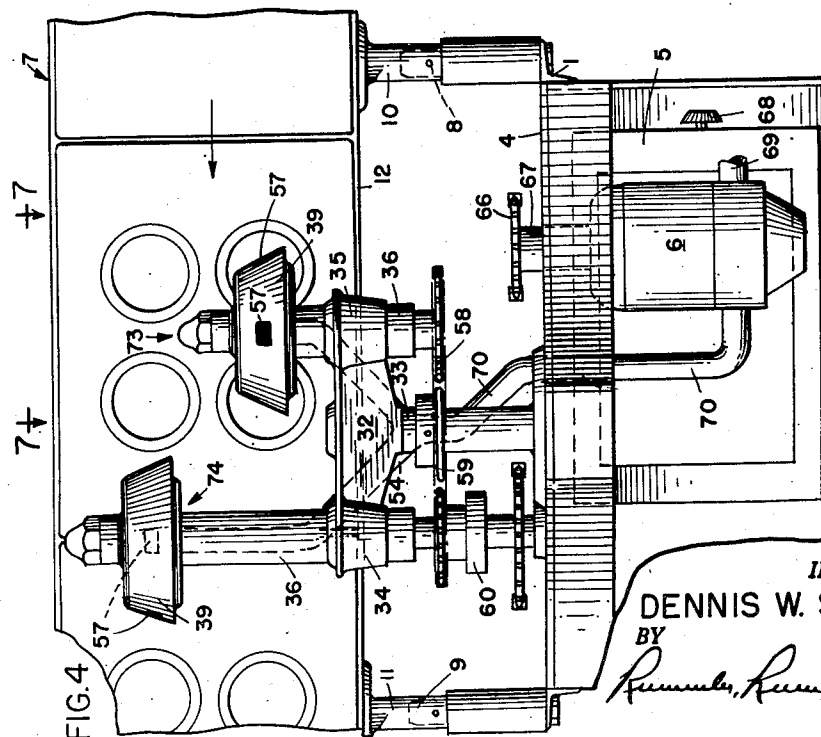
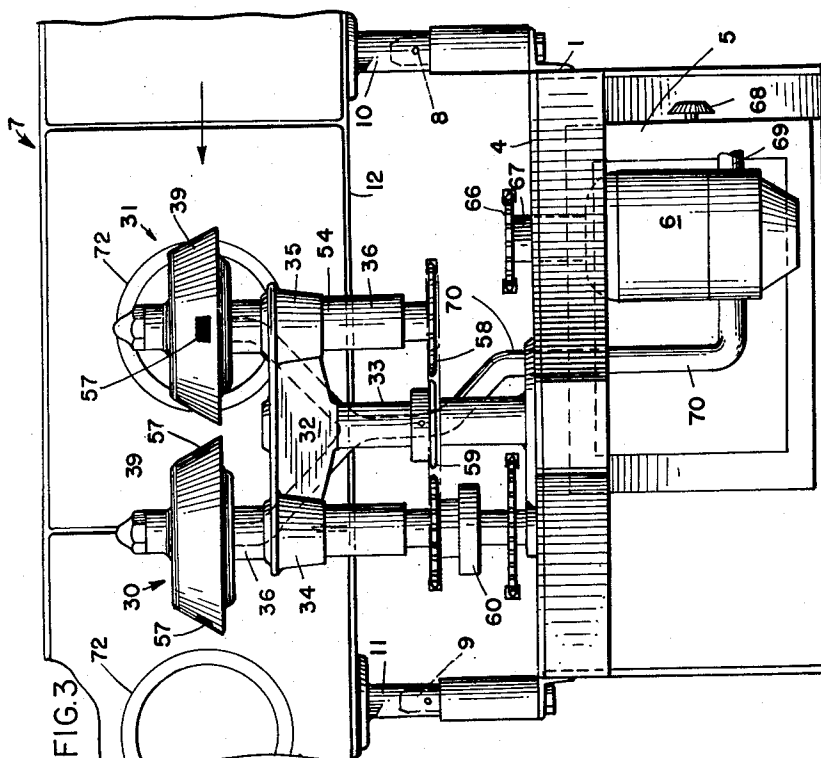
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RECEPTACLE FILLING MACHINE

Filed Feb. 15, 1952

5 Sheets-Sheet 3



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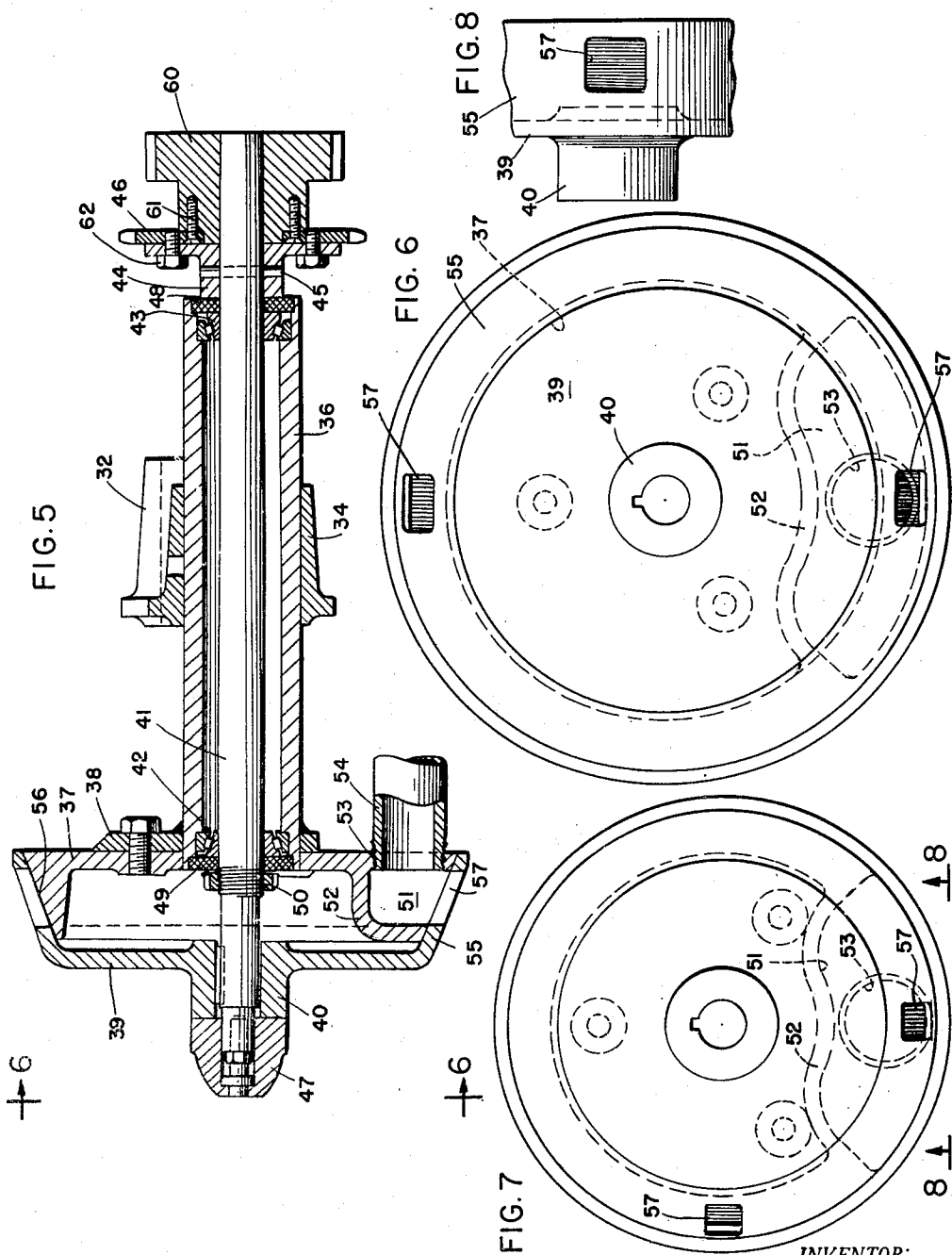
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RECEPTACLE FILLING MACHINE

Filed Feb. 15, 1952

5 Sheets-Sheet 4



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RECEPTACLE FILLING MACHINE

Filed Feb. 15, 1952

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FIG. 9

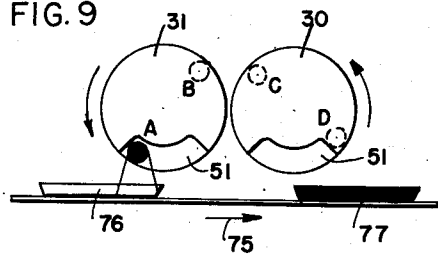


FIG. 14

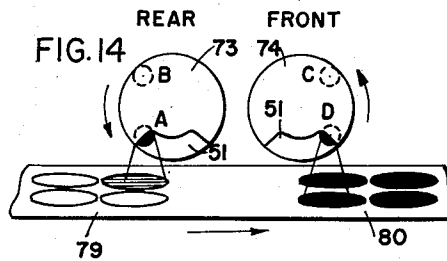


FIG. 10

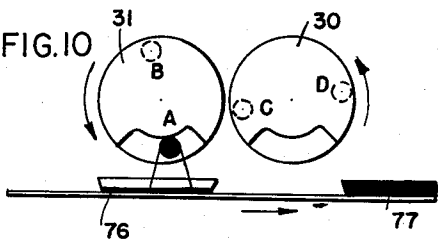


FIG. 15

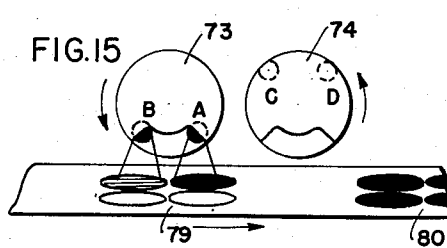


FIG. 11

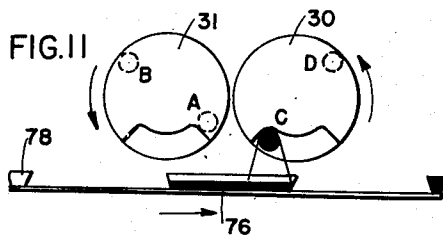


FIG. 16

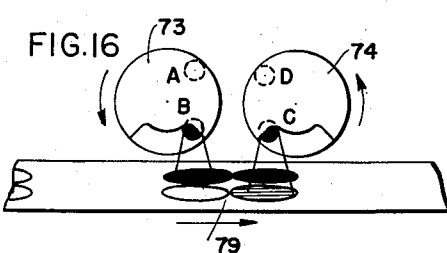


FIG. 12

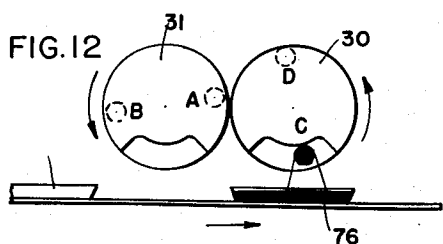


FIG. 17

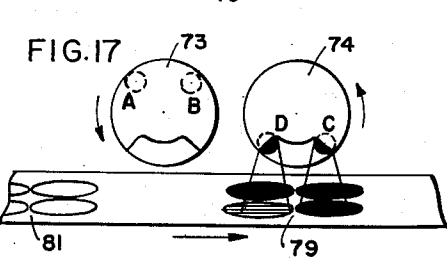


FIG. 13

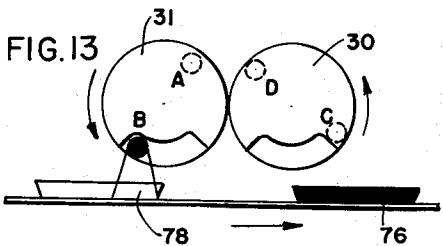
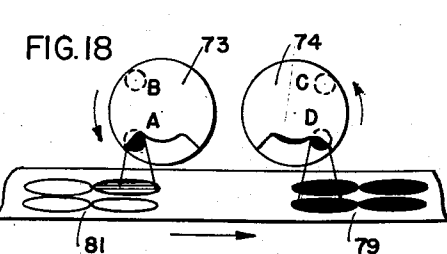


FIG. 18



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UNITED STATES PATENT OFFICE

2,673,019

RECEPTACLE FILLING MACHINE

Dennis W. Smith, Chicago, Ill., assignor to Colborne Manufacturing Co., a corporation of Illinois

Application February 15, 1952, Serial No. 271,732

9 Claims. (Cl. 226—95)

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This invention relates to receptacle filling apparatus and particularly to devices for automatically depositing predetermined amounts of fluid material, or material capable of flowing, into receptacles or containers while they are traveling along a predetermined path.

In particular this invention is an improvement over the filling mechanism disclosed in the copending application of Marion C. Jahn, Walter E. Shapcott and Dennis W. Smith, Serial No. 165,402, filed June 1, 1950, for Fluid Substance Depositors, now Patent No. 2,663,478, and comprises improvements in the depositing mechanism and in the construction of the apparatus whereby it is more readily adaptable to existing receptacle conveyor installations.

The main objects of this invention are to provide an improved and simplified fluid substance depositing mechanism; to provide an improved depositor head; to provide such a device that is operable with either stationary or moving receptacles; to provide such a device whereby the quantity of material deposited during each operation may be accurately regulated and maintained mechanically; to provide an improved depositing mechanism for fluid substances wherein a uniform pressure in the material handled is continuously maintained during its operation; to provide such a mechanism whereby a continuous flow of the material from a supply source, at a constant rate, is maintained; and to provide such a mechanism that will handle material containing whole fruit, or relatively large fruit pieces, without breakage or crushing.

Other particular objects of this invention are to provide an improved fluid substance depositor of more simple construction; to provide such a device of unitary construction which can readily be applied to existing receptacle conveyor mechanisms; to provide such a device that is of relatively small size and which can be easily removed for cleaning purposes; and to provide an improved depositor in which all material handling elements can be readily dismantled and cleaned and easily reassembled for use.

A specific embodiment of this invention is shown in the accompanying drawings in which:

Figure 1 is a view in elevation showing the improved depositing apparatus in relation to a conveyor for receptacles to be filled.

Fig. 2 is a side elevational view of the depositing apparatus as taken on line 2—2 of Fig. 1.

Fig. 3 is a top plan view of the same as taken on line 3—3 of Fig. 1.

Fig. 4 is a similar view showing a modified ar-

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angement of the mechanism for depositing material into two rows of receptacles.

Fig. 5 is a longitudinal sectional view showing details of the improved depositor head.

Fig. 6 is a front end view of a depositor head as taken on line 6—6 of Fig. 5.

Fig. 7 is a similar view of a depositor head having a modified arrangement of the discharge openings.

Fig. 8 is a fragmentary edge view of a depositor head as taken on line 8—8 of Fig. 7 to show the shape and location of a discharge opening.

Figs. 9 to 13 inclusive, are diagrammatic views illustrating the sequence of operations of a pair of depositor heads as they function to fill relatively large receptacles moving in a single row, and

Figs. 14 to 18 inclusive, are diagrammatic views showing the sequence of operations of a pair of depositor heads as they function to fill grouped receptacles arranged to two rows, as with the modified form of the apparatus shown in Fig. 4.

In the form shown, the improved depositor mechanism is embodied in an apparatus for automatically depositing filler material into moving pie plates as they travel along a predetermined path in a pie making machine, and as shown, the apparatus is a unitary construction substantially independent of the pie making machine, which may be used as an accessory or attachment for the pie making machine.

As shown, the improved apparatus comprises a vertical stand or frame 1, which is mounted upright on a rectangular base 2, which in turn is provided with castors 3 on which the apparatus can readily be moved. The upright frame 1, which includes a mounting plate 4, carries the depositor mechanism adjacent its upper ends and also supports the drive for the depositor mechanism, and means for taking power from the conveyor mechanism with which the apparatus is to be associated. The base or platform 2 also carries a variable speed drive 5 and a pump 6, which are located on the rearward side of the upright plate 4, with the driving and driven shafts of the variable speed drive 5, and the driven shaft of the pump 6, extending through the plate 4 to the forward side thereof on which the depositor mechanism and the driving connections for the apparatus are located.

As shown in Figs. 1 to 4 inclusive, the depositor apparatus is positioned alongside of a conveyor mechanism 7, and is attached thereto in fixed predetermined spaced relation by a pair of rigid coupling pins 8 and 9, which extend forwardly

from each side of the frame 1 and enter into suitable outwardly projecting sockets 10 and 11 mounted fast on the conveyer mechanism side plate 12, each of the coupling pins being held in its socket by a suitable cotter.

In this arrangement power for driving the depositor apparatus is taken from a sprocket 13, which is mounted on a shaft 14 extending through the conveyer mechanism side plate 12 and suitably driven by a sprocket 15 having positive driving connection with the drive chain of the conveyer mechanism. The sprocket 13 has positive driving connection with the main driving sprocket 16 of the depositor mechanism by means of a chain 17.

As shown, the main driving sprocket 16 for the depositor mechanism is mounted fast on the hub of a clutch member 18, which in turn is rotatably mounted on a stub shaft 19 attached to and extending outwardly from the side plate 12 of the conveyer mechanism 7, the second part 20 of the clutch being likewise mounted rotatably on a stub shaft 19.1 extending forwardly from the mounting plate 4 of the frame 1 and axially aligned with the shaft 19. The clutch part 20 is in turn directly connected to sprockets 21 and 22, which are mounted on a common hub, on the shaft 19.1.

The sprocket 21 is connected by a chain 25 to the driving shaft 23, of the variable speed drive 5, by means of a sprocket 24 mounted fast on the shaft 23; and the sprocket 22 is connected, by a chain 26, with a sprocket 27 which is rotatably mounted on a stub shaft 28, projecting from the upright plate 4. The sprocket 27 is directly mounted on a common hub with a gear 29 from which a positive drive for the depositor mechanism is obtained as will be hereafter explained.

In the form shown the depositor mechanism comprises a pair of parallel horizontally spaced rotatable heads 30 and 31 which are carried on a yoke-like bracket member 32 rigidly mounted on an arm 33 attached to and extending forwardly from the frame 1 adjacent its upper end. The yoke 32 is located at the outer end of the arm 33 and is horizontally disposed with its arms 34 and 35 extending equidistant from the center of the main support arm 33. Each of the arms 34 and 35 of the yoke or bracket carries a tubular shaft support member 36 which is rigidly secured to the respective arms.

As shown in detail in Fig. 5, the tubular support member 36 for each depositor head extends through a suitable opening formed adjacent the end of the respective arm of the yoke member 32 and at its outer end carries a depositor head body 37 which in turn is rigidly secured to a flange 38 suitably fastened to the support member 36. The depositor head body 37 is an annular disc-like member having a forwardly tapered, substantially conical, peripheral surface over which an annular conical valving member 39 is fitted in nested relation.

The valving member 39 is a hollow dish-like element in the form of a truncated cone and has a central hub 40 which is mounted on and keyed to a shaft 41 which extends through the hollow support member 36. The shaft 41 is rotatably mounted in the support member 36 on conical roller bearings 42 and 43, and at its rearward end carries a flanged hub 44 which is suitably fastened to the shaft, as by a tapered pin 45. The flange of the hub 44 carries a drive sprocket 46.

The forward end of the shaft 41 extends through the hub 40 of the valving cone 39 and

its outer end is enclosed by a cap nut 47, which also serves as a means for adjusting the valving member 39 axially with respect to the shaft 41. As shown, the shaft 41 is held against axial movement in the support member 36 by means of bearing members or discs 48 and 49 set into respective ends of the support member 36, the hub 44 at the sprocket end of the shaft engaging the outer surface of the bearing member 48, and a bearing nut 50 adjacent the forward end of the shaft 41 engaging the outer surface of the bearing member 49.

As shown in Figs. 5, 6 and 7, the conical wall of the depositor head body 37 is provided with a peripherally extending, radially opening, pocket or cavity 51, which extends an annular distance of substantially 90°; the pocket 51, in the form of the device herein illustrated, being located at the bottom portion of the depositor head and centered directly below the shaft axis so as to extend an equal distance on either side of a vertical plane through the shaft axis.

As shown, the pocket 51 is defined by an inner wall 52 and an internally threaded opening 53 in the rear wall of the valve body is provided for connection of the pocket with a supply conduit 54 whereby material to be deposited may be supplied to the pocket.

The pocket 51 is normally closed by the conical wall 55 of the rotatable valving member 39, which wall slidably fits the conical periphery of the valve body 37. The adjoining surfaces of the wall 55 and conical wall 56 are finished and lapped together to provide a substantially leak-proof running seal, and at predetermined locations on the periphery of the rotatable valve member 39, valve openings 57 are provided which, when registered with the pocket 51, serve as discharge ports for the material supplied to the pocket by the conduit 54. The location of the openings 57 about the periphery of the valve member 39 is determined by the timing requirements of the depositing mechanism with respect to the movement of the receptacles to be filled, as will be hereafter explained.

As herein shown, the depositing apparatus utilizes two of the depositing heads just described, and in the case of each depositing head, the valve body member 37 is stationary and the valving member 39 is rotary. Thus in order to keep the two valving members in precisely timed relation with each other with respect to their rotation, the sprockets 46 at the rearward ends of the shafts 41 are connected by a chain 58, the upper run of which is carried over a flange or guide 59 on the arm 33 in order to span the arm 33. As shown in Figs. 1 and 2, the drive for the depositor heads 30 and 31 is taken from the gear 29 which is meshed with a gear 60 mounted on the shaft of the depositor head 30; and, as shown in Fig. 5, the gear 60 is fastened directly to the sprocket 46 by means of screws 61 which extend through the sprocket into the hub of the gear 60. The sprocket 46 is in turn secured to the flange of the hub 44 by means of bolts 62. In this manner the drive for the depositor heads 30 and 31 is positively connected with the driving sprocket 22 which in turn is positively connected with the sprocket 16 driven directly from the conveyer mechanism as shown in Figs. 1 and 2, and the timing of the rotation of the valving members comprising the depositor heads 30 and 31 is at all times in fixed relation with the movement of the conveyer mechanism.

The clutch, comprising the separate members

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18 and 20, interposed between the sprockets 16 and 21—22 on the fixed shaft 19.1, is of the automatic, self-indexing type which will disengage whenever an excessive load or jamming occurs in any part of the driven apparatus. In this type of clutch the parts, when mated by attachment of the depositor apparatus to the conveyor by the pins 8 and 9, are held in engagement by the spring loaded elements, not shown, angularly spaced about the clutch axis, which yield to permit slipping of one part relative to the other upon overload; and the spring loaded engaging elements are so disposed as to cause engagement of the clutch parts only when they are in predetermined angular relation. Thus slipping of the clutch, under overload conditions, will not disrupt the timing relation of depositing apparatus with respect to the conveyor mechanism with which the apparatus is connected.

The object of the depositing apparatus is to discharge a fluid material into receptacles as they are carried beneath the depositor heads by the conveyor mechanism and hence the speed of rotation of the depositor valving members, and the angular spacing of the discharge ports 57 therein, must coincide with the speed of movement of the receptacles as they pass beneath the depositor heads and with the spacing of the receptacles along the conveyor path. It is for this reason that the drive for the depositing apparatus is taken directly from the conveyor mechanism so that the timing relation will always be constant.

It is also an object of this invention to provide for a constant rate of flow of material from the pump 6 to the supply conduits leading to the depositor heads and in order to accomplish this, in the depositing apparatus herein shown, two depositor heads are employed and the angular spacing of the discharge ports or openings 57 with respect to each other, and the angular relation of the valving member of one depositor head with respect to the valving member of the other depositor head, is such that at least one of the discharge openings 57 will be in communication with a valve body pocket 51 at all times. Thus, since the angular length of the pockets 51 is substantially 90° and each valve port or opening 57 will be in communication with a pocket 51 for at least 90° of its angular movement, the quantity of material to be discharged through the valve port 57 will be dependent upon the speed of rotation of the valving cones and the rate of discharge of the supply pump 6. Therefore, since the speed of the valving cones is constant, to control the quantity of material discharged through a valve port 57 while it is in registry with a valve pocket 51, the speed of pump 6 must be adjusted accordingly.

As shown in Figs. 1 and 2, the drive for the pump 6 is taken from the variable speed mechanism 5 by means of a chain 63 running between a sprocket 64 on the pump drive shaft 65 and a sprocket 66 mounted on the driven shaft 67 of the variable speed drive. The speed of the pump 6 may be thus regulated by varying the speed of the driven shaft of the variable speed drive mechanism which is accomplished by means of an adjusting knob 68. As shown, the pump 6 has an inlet connection 69 leading from a reservoir of the filling material, not shown, and a discharge connection 70 which leads through an opening 71 in the support plate 4 to the branch connections 54 which lead to the respective depositor heads. The pump 6 is preferably a positive displacement rotary pump and such pumps,

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suitable for handling filler material, and particularly such material having whole fruit or relatively large fruit piece content, are available on the open market.

As shown in Figs. 1, 2 and 3, the depositor heads 30 and 31 are disposed and arranged for filling large size pie plates as they are transported by the conveyor mechanism of a pie making machine 7, and since the pie plates are carried in a single row by the conveyor, the depositor heads are located directly over the center line of the conveyor and the path of pie plate travel. Ordinarily large size pie plates, for example, ten inch plates, are carried on the conveyor in individual plate holders 72 which are spaced on twenty inch centers along the path of conveyor travel. Thus, the depositor heads 30 and 31 must function in timed relation with each other and with the movement of the pie plates to deliver filling material to each pie plate as it passes beneath the depositor heads, and the speed of rotation of the valving member 39 of the depositor heads, together with the angular location of the discharge openings 57, must be such as to open and close, or cut off, flow from the depositor head cavities 51 while a pie plate is in proper position to receive the filling material.

In order to accomplish this result, and with the form of the apparatus shown in Figs. 1 to 3 inclusive, the depositor heads are arranged on ten inch centers, and each depositor head functions to deliver to each pie plate, one-half of the total quantity of material required to fill the pie plate. Also, the openings 57, in each rotating valving member 39, are disposed diametrically opposite each other, or 180° apart, and the two valve members are arranged relative to each other so that the openings of one valve member are 90° in advance of the corresponding openings of the other valve member.

With this arrangement, the speed of rotation of the valve members is such that the openings 57 will have an angular speed of substantially one-half the speed of lineal travel of the pie plates on the conveyor 7. That is, the valving members will turn through one-half revolution while the receptacles move a distance of twenty inches. Thus, since the cavity 51 in each valve body has an angular length of 90°, each opening 57 in the valving member 39 will deliver material from the cavity 51 during one-quarter of the revolution of the valving member 39, or during the interval that a pie plate moves through a distance of ten inches.

In this case, the speed of the pump 6 is adjusted to deliver filling material at a rate equivalent to one-half the total quantity required to fill the pie plate during the interval that a valve port is open; and, since the depositor heads are on ten inch centers and the discharge openings of one are 90° out of phase with the openings of the other, each pie plate will receive a deposit of one-half of the total required amount of filling material as it passes under the filler head 31 and will receive the balance of the filling material from the second depositor head 30, a valve opening 57 in the first depositor head closing at the same time that a valve opening in the second depositor head is opening. Also, since the depositor head valve members 39 are rotating at the same speed, the total discharge opening for passage of fluid material from the pump to the pie plates will at all times be constant so that the rate of flow of filling material through

the pump and the conduit 70 will likewise be constant.

A detailed front view of the depositor head valve member 39, with the valve body 37 indicated in dotted outline, is shown in Fig. 6. In this case the diameter of the valve body 37 at its base, or large end, is approximately nine and one-half inches, and the angle of inclination of the conical side wall, from the axis of the valve body, is $22\frac{1}{2}^\circ$. The over-all thickness of the depositor head is approximately two and one-half inches and the valve openings 57 are substantially one and one-quarter inches square.

Fig. 4 of the drawings shows an arrangement of the depositor heads for filling individual-size pie plates having a diameter of five inches or less, in which case each plate holder of the pie making machine conveyer mechanism holds a group of four of the small size plates. In this case each depositor head must function to completely fill two pie plates, of each group of four, while the plate holder travels beneath the depositor head, and, since the pie plates are arranged in two rows as shown in Fig. 4, the depositor heads must be staggered relative to each other, transversely of the conveyer, so that each depositor head will serve a single row of pie plates.

For grouped receptacles, or pie plates the only change in the depositor mechanism is in the size and mounting of the depositor heads, and in the sprocket sizes which determine the speed of rotation of the depositor valving member 39. Also, the valve openings 57 in each depositor head are spaced apart an angular distance of 90° and the two valving members are arranged to be 180° out of phase with each other.

In this case, and since the plate holders are on twenty inch centers, the depositor heads, which are on ten inch centers, are driven at a speed such that each will make one complete revolution while the plate holders travel twenty inches on the conveyer mechanism 1. As in the arrangement for filling the large size pie plates, and since the two valve members 39 rotate at precisely the same speed, a valve opening 57 will at all times be in communication with a cavity 51 in one of the valve bodies so that the total area of discharge opening for passage of material from the pump to the receptacles will at all times be constant.

A face view of this modified form of depositor head is shown in Fig. 7, and in this case the diameter of the valve body at its base, is approximately seven and seven-eighths inches, otherwise the over-all thickness of the depositor heads is substantially the same as in the case of the larger size depositor heads. Also, in the smaller depositor heads, the discharge ports 57 are preferably smaller than in the large heads, for example, one-half the area, in order to prevent too rapid discharge from the cavity 51 for adequate supply of the next discharge port.

In order to more fully demonstrate the operation of the depositor heads as they function to fill pie plates or other receptacles, as they are moved continuously along a predetermined path by a conveyer mechanism, a complete filling operation for both the large size receptacles and the small size grouped receptacles, is illustrated in Figs. 9 to 18 inclusive. Figs. 9 to 13 inclusive, show the various phases of a complete filling operation of the depositor heads for a single large size receptacle as it passes beneath the depositor heads; and Figs. 14 to 18 inclusive, show the op-

eration of the depositor heads arranged for filling receptacles carried in groups.

Referring particularly to Figs. 9 to 13 inclusive, the depositor heads 31 and 30 are of the type in which the discharge openings are diametrically opposite each other, and in which one depositor head is 90° out of phase with respect to the other depositor head. In this case, the pie plates or other receptacles travel in the direction indicated by the arrow 75 and are uniformly spaced apart along the path of travel. The direction of rotation of the depositor head is such that the discharge openings, as they pass the depositor head cavities 51, move in the same direction as the receptacles. Fig. 9 shows the orifice or discharge opening A of the depositor head 31 in position where it is fully regulated with the cavity 51 and fully opened as at the first part of a filling operation for the receptacle 76. At this point, the next previous receptacle 77 has been completely filled and the orifice D of the depositor head 30 is completely closed.

Fig. 10 shows the relation of the receptacle 76, with respect to the depositor heads, as the orifice A is approaching its cut off position, and the orifice C of the depositor head 30 is approaching its opening position, the receptacle 76 at this point having received a little more than one-fourth of its total filling.

Fig. 11 shows the relation of the elements at the point where the orifice A of the depositor head 31 has become completely closed and the orifice C of the depositor head 30 is in completely open position, the two depositor heads having turned through an angular distance of substantially 90° and the receptacle 76 having progressed one-half the distance that the successive receptacles are spaced apart.

Fig. 12 shows the relation of the elements where the orifice B of the depositor head 31 is approaching its opening positions and where the orifice C of the head 30 is approaching its cut off position. At this point the receptacle 76 is almost seven-eighths full and the next succeeding receptacle 78 is approaching its filling position.

Fig. 13 shows the relation of the elements when the receptacle 76 has become completely filled, the orifice C of the depositor head 30 is fully closed and the orifice B of the depositor head 31 has reached fully opened position for delivering material to the next receptacle 78.

From the foregoing it will be seen that the orifice opening A of the head 31 and the orifice opening C of the head 30 function successively to fill one receptacle; that orifices B and D of the two heads function successively to fill the next succeeding receptacle; and that a complete revolution of the two depositor heads will accomplish the complete filling of two receptacles. It will also be seen that by the arrangement of the orifice openings of the discharge heads and the angular length of the pockets 51, the total opening area through which material may flow is at all times constant, the orifice of one head beginning to open at the same instant that the orifice of the other head begins to close and speed of movement of the two orifices being the same.

Referring to Figs. 14 to 18 inclusive, wherein the depositor heads 73 and 74 are of the type and arrangement shown in Fig. 4 of the drawings for operation to fill individual or small size receptacles which are carried in groups of four by the conveyer mechanism, the depositor head 73 is indicated to be operating on the rear row of receptacles and the head 74 is indicated as operat-

ing on the front row of receptacles. In this case, the orifice openings A—B and C—D in the respective depositor heads are spaced apart an angular distance of 90° from each other and the depositor head 73 is 180° out of phase with respect to the depositor head 74. Also, in this case, the speed of rotation of the depositor heads 73 and 74 is substantially the same as the lineal rate of travel of the receptacles beneath the heads and the depositor heads are spaced apart one-half the distance between the groups of receptacles.

In Fig. 14, the orifice A of the head 73 is opening to fill the first receptacle in a group 79 of four receptacles, and the orifice D of the head 74 is closing after having substantially filled the fourth receptacle of a group 80.

Fig. 15 shows the orifice A of the head 73 closing and the orifice B of the head 73 opening to fill the second receptacle of the group 79.

Fig. 16 shows the orifice of the head 73 closing and the orifice C of the head 74 opening to fill the third receptacle of the group 79.

Fig. 17 shows the orifice C of the head 74 closing and the orifice D opening to fill the fourth receptacle of the group 79. This figure also shows the next succeeding group of receptacles 81 moving into position to be filled.

Fig. 18 shows the orifice D of the head 74 closing upon completion of the filling of the fourth receptacle of group 79 and shows the orifice A of the head 73 opening to fill the first receptacle in the next succeeding group 81.

In any case of a receptacle filling operation, the quantity of material delivered by each orifice opening as it registers with the cavity 51 of the depositor head, will be determined by two factors, namely, the speed of rotation of the valving member of the depositor head, and the rate of material delivery from the pump 6 of the depositing apparatus. The speed of rotation of the depositor head valving members is directly related to the speed of travel of the conveyer mechanism, and is constant with respect thereto because of the direct drive connection between the depositor mechanism and the conveyer mechanism. Thus variation in the rate of delivery of material from the depositor heads to accommodate receptacles of different sizes is obtained, generally, by variation of the speed of the delivery pump.

It will be understood that the angular relation of the orifice openings in the depositor heads, as well as the angular length of the depositor head cavities 51 and the lateral spacing of the depositor heads, may be altered to accommodate various spacing distances of the receptacles along the conveyer path. However, in any case, the arrangement of orifices should be such that, as between the two depositor heads, the total area of orifice opening for the discharge of material will, preferably, be constant at all times. Also depending upon the nature of the material being handled, the angular location of the cavities 51 may be altered to move the cut off point closer to the vertical plane so as to minimize dripping and running of the material on the outer surface of the valving member.

It will also be understood that in certain filling operations and depending upon the material to be deposited, a single depositor head of the kind herein disclosed may be used for filling receptacles moving along a predetermined path and depositing a predetermined quantity of material in each receptacle.

The main advantages of this invention reside in the over-all simplicity of the depositing appa-

ratus and the arrangement whereby the apparatus can be readily moved, as a unit, away from the conveyer mechanism for cleaning purposes; in the arrangement in which all parts of the apparatus are completely and readily accessible for cleaning or adjustment purposes; and in the construction and arrangement of the depositor mechanism whereby the use of reciprocating parts or mechanism for following the receptacles as they move along the conveyer path is obviated.

Other advantages reside in the simple construction and arrangement of the depositor heads whereby precisely timed and accurately measured depositing of material is obtained; in the arrangement of the depositor heads whereby a discharge opening of constant area is maintained at all times so as to permit a continuous, uniform flow of the material from the supply pump; in the fact that the improved depositor heads will deliver desired quantities of material at such a rate as to obviate splashing, spurting and spilling; in the over-all efficiency of operation and relatively small space requirements for the depositor apparatus; and in the adaptability of the depositor apparatus for association with substantially any receptacle conveyer mechanism.

Although two embodiments of this invention have been herein shown and described, it will be understood that numerous details of the constructions shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A device for filling uniformly spaced containers moving successively along a predetermined path, comprising an annular body member and an annular valving member mounted on a common axis in face to face engagement with each other above the container path, said common axis being substantially normal to the container path, said valving member being rotatable against said body member, said body member having a cavity therein opening to the surface engaged by the valving member and the cavity-opening extending angularly with respect to said common axis and substantially parallel with the container path, said valving member having a plurality of angularly spaced discharge openings each of less angular length than the cavity-opening and successively registrable therewith upon rotation of the valving member, said discharge openings being spaced apart an angular distance at least equal to the angular length of the cavity-opening, means for turning said valving member about said common axis and registering said discharge openings successively with the cavity-opening in timed relation with the movement of the receptacles, a supply connection on said body member having communication with said cavity, and means for supplying filling material to said supply connection at a constant predetermined pressure and volume rate.

2. A device for filling containers moving successively along a predetermined path, comprising a body mounted on a horizontal axis above and normal with the container path and having an internal cavity opening to the surface of said body on the side thereof adjacent said path, the cavity-opening extending in the direction of said container path, a valving member surrounding said body in surface to surface engagement therewith and rotatable in a vertical plane normal to the body axis, said valving member enclosing said cavity-opening and having a plurality of discharge ports registrable therewith, said dis-

charge ports being spaced from each other in the direction of valving member rotation a distance at least equal to the length of the cavity-opening, and each of said discharge ports being of less length than said cavity-opening, means for turning said valving member and moving the discharge ports successively into registry with and along said cavity opening in timed relation with the movement of said containers, a supply connection on said body having communication with said cavity, and means for supplying filling material to said supply connection at a constant predetermined pressure and volume rate.

3. A device for filling containers moving successively along a predetermined path, comprising an annular body mounted on a horizontal axis above and normal to the container path and having an internal cavity opening to the surface of said body on the side thereof adjacent said path, said cavity-opening extending angularly with respect to the axis of said body, an annular valving member surrounding said body in surface to surface engagement therewith and rotatable about the body axis, said valving member enclosing said cavity-opening and having a plurality of angularly spaced discharge ports registrable therewith, said discharge ports being each of less length than said cavity-opening and being spaced apart an angular distance at least equal to the length of said cavity-opening, means for rotating said valving member and moving the discharge ports thereof successively into registry with and along said cavity-opening in timed relation with the movement of said containers, and a supply connection on said body having communication with said cavity.

4. A device for filling receptacles moving successively along a predetermined path, comprising a plurality of depositors mounted side-by-side in predetermined spaced relation along and above the receptacle path; each of said depositors comprising a body having a horizontal axis normal to the receptacle path and an internal cavity opening to the body surface adjacent said path, the cavity-opening having a predetermined length in the direction of said path, and a rotatable valving member surrounding said body in surface-to-surface engagement therewith for enclosing the said cavity-opening, said valving member being rotatable in a vertical plane parallel with the receptacle path and having a discharge port registrable with the cavity-opening, and said discharge port being of predetermined length less than that of the cavity-opening in the direction of valving member rotation; means for turning the valving members and moving the discharge ports thereof successively into registry with and along the respective cavity-openings in timed relation with the movement of the receptacles, said valving members having their discharge ports displaced relative to each other in the direction of their movement a distance at least equal to the length of the said cavity-openings, and a supply connection on each body communicating with the respective cavity and leading from a common supply source.

5. A device for filling receptacles moving successively along a predetermined path, comprising a plurality of depositors mounted side-by-side in predetermined spaced relation along and above the receptacle path; each of said depositors comprising a body having a horizontal axis normal to the receptacle path and an internal cavity opening to the body surface adjacent said path, the cavity-opening having a predetermined

length in the direction of said path, and a rotatable valving member surrounding said body in surface to surface engagement therewith for enclosing the said cavity-opening, said valving member being rotatable in a vertical plane parallel with the receptacle path and having a plurality of discharge ports successively registrable with the cavity-opening, and said discharge ports each being of predetermined length less than that of the cavity-opening in the direction of valving member rotation; means for turning the valving members and moving the discharge ports thereof successively into registry with and along the respective cavity-openings in timed relation with the movement of the receptacles, each valving member having its discharge ports displaced in the direction of their movement and relative to the ports of the adjacent valving member a distance at least equal to the length of the said cavity-openings, and a supply connection on each body communicating with the respective cavity and leading from a common supply source.

6. A device for filling receptacles moving successively along a predetermined path, comprising a plurality of depositors mounted side-by-side in predetermined spaced relation along and above the receptacle path; each of said depositors comprising an annular body having a horizontal axis normal to the receptacle path and an internal cavity opening to the periphery of the body on the side adjacent said path, the cavity-opening having a predetermined angular length, and a rotatable valving member peripherally surrounding said body in surface-to-surface engagement therewith for enclosing the said cavity-opening, said valving member being rotatable about the axis of said body and having a discharge port registrable with the cavity-opening, and said discharge port being of predetermined angular length less than that of the cavity-opening; means for rotating the valving members simultaneously and moving the discharge ports thereof successively into registry with and along the respective cavity-openings in timed relation with the movement of the receptacles, said valving members having their discharge ports angularly displaced relative to each other a distance at least equal to the angular length of said cavity-openings, and a supply connection on each body communicating with the respective cavity and leading from a common supply source.

7. A device for filling receptacles moving successively along a predetermined path, comprising a plurality of depositors mounted side-by-side in predetermined spaced relation along and above the receptacle path; each of said depositors comprising an annular body having a horizontal axis normal to the receptacle path and an internal cavity opening to the periphery of the body on the side adjacent said path, the cavity-opening having a predetermined angular length, and a rotatable valving member peripherally surrounding said body in surface-to-surface engagement therewith for enclosing the said cavity-opening, said valving member being rotatable about the axis of said body and having a plurality of angularly spaced discharge ports successively registrable with the cavity-opening, and said discharge ports each being of predetermined angular length less than that of the cavity-opening; means for rotating the valving members simultaneously and moving the discharge ports thereof successively into registry with and along the respective cavity-openings in timed relation with the movement of the receptacles; each valving member having its discharge ports displaced

angularly relative to the ports of the adjacent valving member a distance at least equal to the angular length of the said cavity-openings; and a supply connection on each body communicating with the respective cavity and leading from a common supply source.

8. A device for filling uniformly spaced receptacles moving successively along a predetermined path, comprising a pair of depositors mounted side-by-side in predetermined spaced relation along and above the receptacle path; each of said depositors comprising an annular body having a horizontal axis normal to the receptacle path and an internal cavity opening to the body surface on the side adjacent the said path, the cavity-opening having an angular length of substantially 90°, and a rotatable valving member peripherally surrounding said body in surface-to-surface engagement therewith for enclosing the said cavity-opening, said valving member being rotatable about the axis of said body and having a pair of discharge ports registrable with the cavity-opening, said discharge ports each being of predetermined angular length less than that of the cavity-opening and being diametrically opposite each other in the valving member periphery; means for rotating the valve members simultaneously and moving the discharge ports thereof successively into registry with and along the respective cavity-openings in timed relation with the movement of the receptacles, said valving members being arranged with the discharge ports of one displaced 90° angularly relative to the discharge ports of the other; and a supply connection on each body communicating with the respective cavity and branching from a common supply conduit.

9. A device for filling uniformly spaced receptacles moving successively in two parallel rows along a predetermined path, comprising a plurality of depositors mounted side-by-side in predetermined spaced relation along and above the re-

ceptacle path, one of said depositors being disposed above each row of receptacles, each of said depositors comprising an annular body having a horizontal axis normal to the receptacle path and an internal cavity opening to the body periphery on the side adjacent said path, the cavity-opening having an angular length of substantially 90°, and a rotatable valving member peripherally surrounding said body in surface-to-surface engagement therewith for enclosing the said cavity-opening, said valving member being rotatable about the axis of said body and having a pair of angularly spaced discharge ports successively registrable with the cavity-opening, and said discharge ports being spaced apart substantially 90° from each other and each being of predetermined angular length less than that of the cavity-opening; means for rotating the valving members and moving the discharge ports thereof successively into registry with and along the respective cavity-openings in timed relation with the movement of the receptacles, the discharge ports of one valving member being displaced angularly substantially 180° with respect to the discharge ports of the other valving member, and a supply connection on each body communicating with the respective cavity and branching from a common supply conduit.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,075,534	Ash	Oct. 14, 1913
1,260,636	Campbell	Mar. 26, 1918
1,305,584	Yahle	June 3, 1919
1,332,363	Schwarzer	Mar. 2, 1920
1,420,222	Schmidt	Apr. 6, 1922
1,919,155	Ayars	July 18, 1933
2,315,932	Burt et al.	Apr. 6, 1943
2,351,732	Almono et al.	June 20, 1944