April 6, 1954 L. PLUSQUELLIC 2,674,397

LIQUID MOLD FILLING MECHANISM

Filed Feb. 27, 1951

4 Sheets-Sheet 1

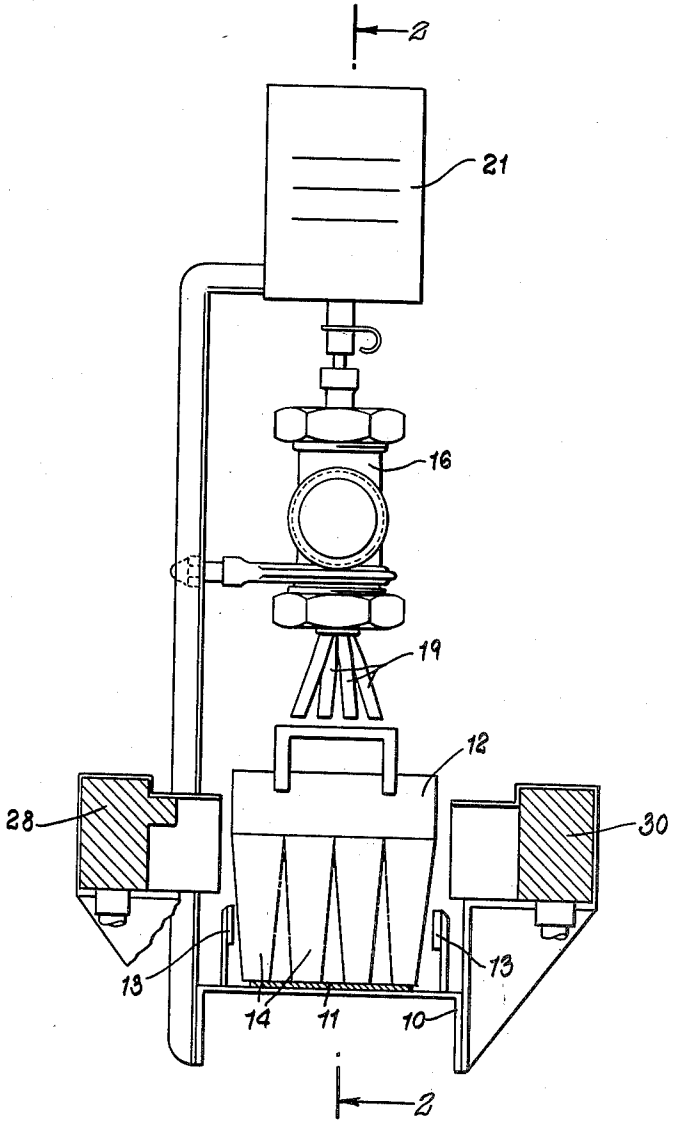

Fig. 1.

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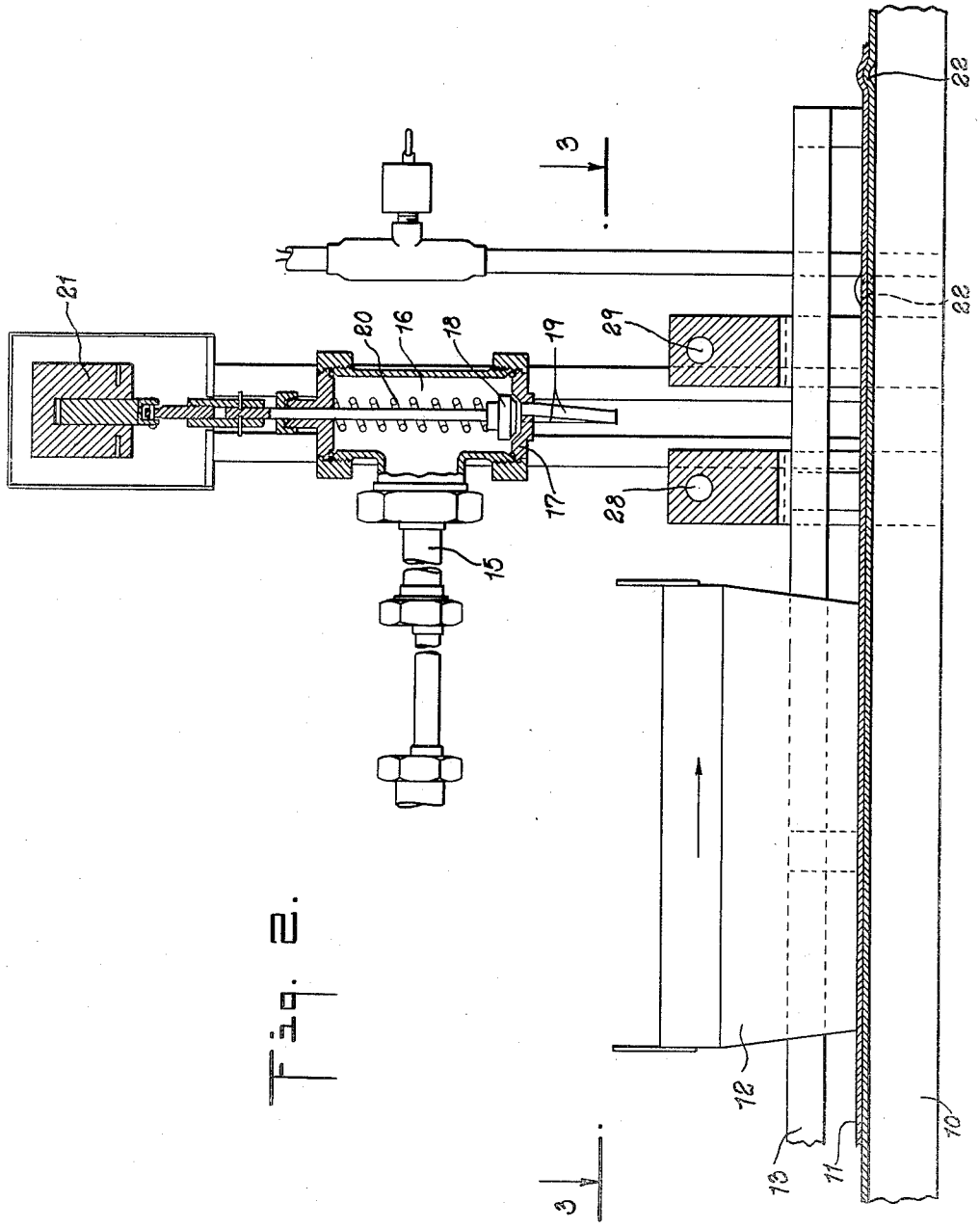

Fig. 2.

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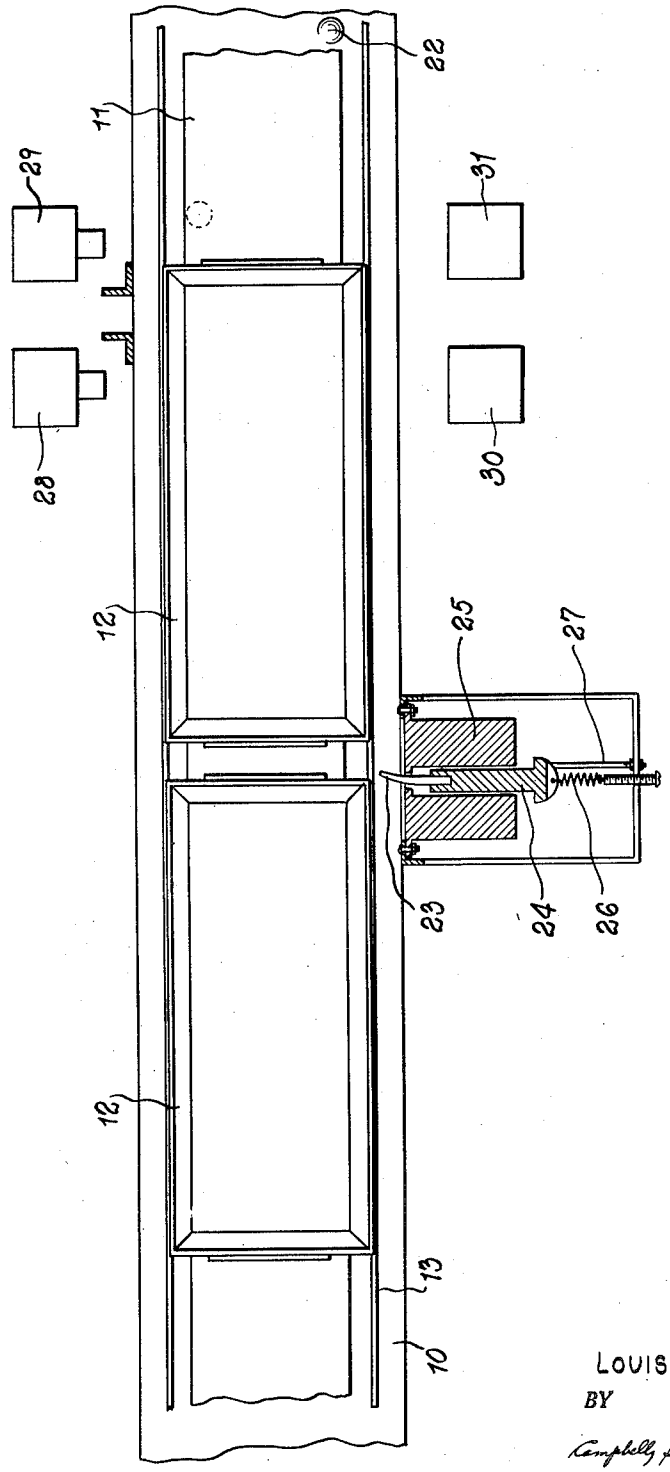

Fig. 3.

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Filed Feb. 27, 1951 4 Sheets-Sheet 4

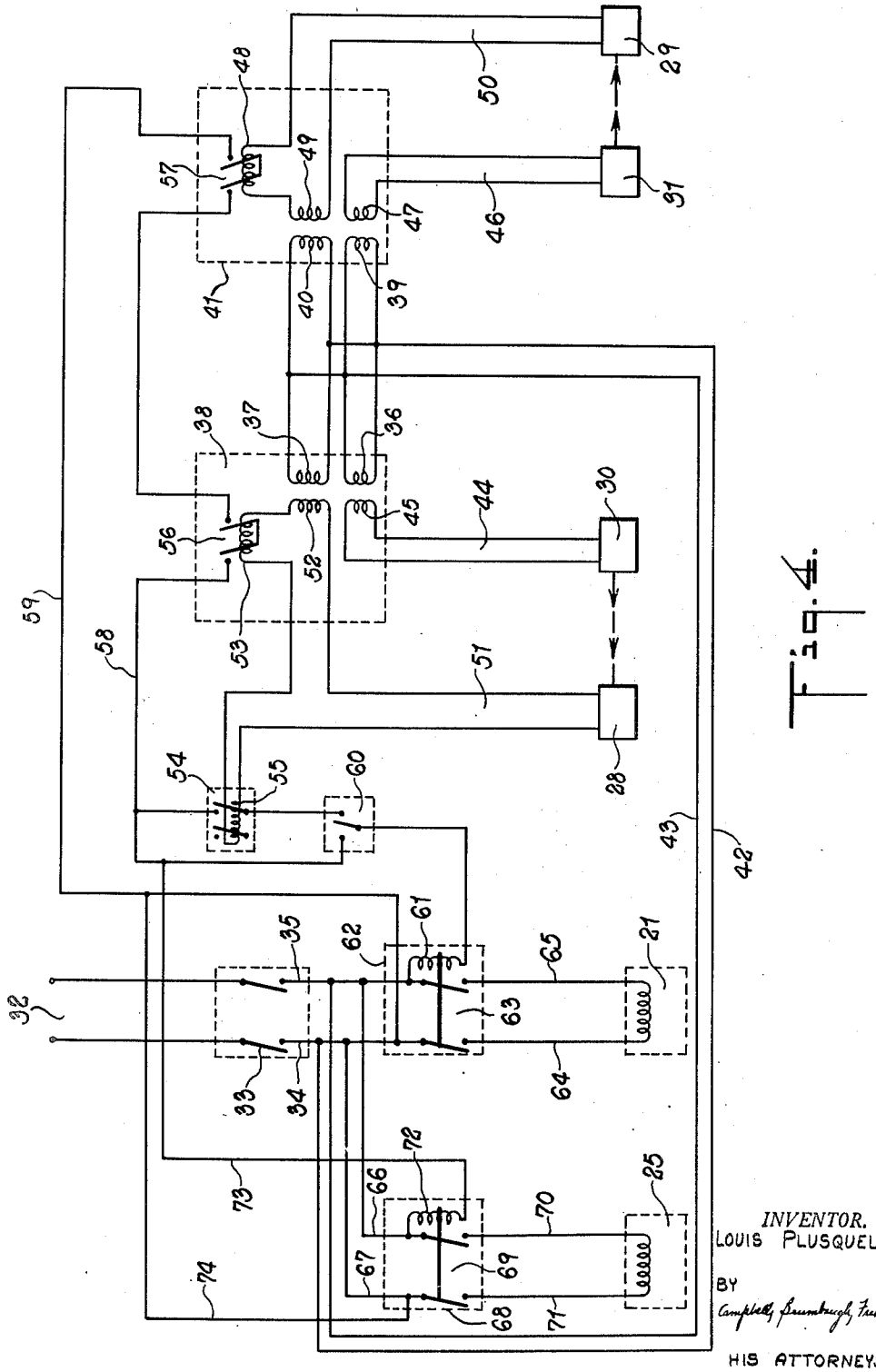

Fig. 4.

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UNITED STATES PATENT OFFICE

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LIQUID MOLD FILLING MECHANISM

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Application February 27, 1951, Serial No. 212,940

6 Claims. (Cl. 226—72)

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The present invention relates to mechanisms for filling molds and embodies, more specifically, an improved mold filling mechanism by means of which a series of molds may be filled in sequence and in such fashion that the filling operation may be accomplished automatically.

Various forms of mold filling mechanisms have been provided heretofore, the purpose of which is to fill the plurality of molds in sequence, but the supervision that has heretofore been required in connection with the operation of such existing mechanisms has given rise to operating difficulties. It is, accordingly, an object of the present invention to provide a mold filling mechanism by means of which the plurality of molds may be filled in a desired sequence automatically.

Another object of the present invention is to provide a mold filling mechanism of the above character wherein the filling operation is carried out automatically and in such fashion that all of the portions of the mold are properly filled.

Yet another object of the invention is to provide, in a mold filling mechanism of the above character, means whereby the molds may be filled automatically and without spilling any of the material outside of the molds.

A further object of the invention is to provide, in a mechanism of the above character, means whereby the supply of molds beneath a filling outlet may be controlled to cause such molds to be properly spaced as they approach the outlet.

Other and further objects of the invention will be apparent as it is described in further detail in connection with the accompanying drawings, wherein

Figure 1 is a view in vertical elevation, taken on a plane transverse to the direction of motion of the molds and showing the filling mechanism and a portion of the mechanism by means of which the filling mechanism is controlled;

Figure 2 is a view in vertical section, taken on the plane indicated by line 2—2 of Figure 1, and looking in the direction of the arrows;

Figure 3 is a view in horizontal section, taken on a plane indicated by the line 3—3 of Figure 2, and looking in the direction of the arrows; and

Figure 4 is a diagrammatic view illustrating the wiring for the control circuits of the mechanism of Figures 1 to 3.

Referring particularly to Figures 1, 2, and 3, a stationary supporting frame is illstrated at 10 over which an endless conveyor 11 moves. The conveyor 11 is adapted to support and convey a

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plurality of molds 12 in the direction indicated by the arrow in Figure 2. Stationary side rails 13 may be provided to maintain the molds in a desired position upon the conveyor 11 and, in operation, the molds 12 are supplied in sequence to the conveyor 11 in any desired fashion. Each of the molds 12 may be formed of a plurality of individual molding elements as indicated in dot-and-dash line 14 in Figure 1. The machine of the present invention may, for example, be designed for forming the comestible, commonly termed a "popsicle," or it may be formed for producing any other suitable form of comestible. The shape of the individual molds, and the material furnished by the supply pipe thus may vary in accordance with desired operating conditions, and a further discussion of this subject is unnecessary herein.

The material from which the comestible is formed is delivered through a supply pipe 15 to a manifold 16 which may form a part of a valve mechanism having a valve seat 17 and a valve member 18. In the form of the invention herein illustrated, the valve seat 17 carries a plurality of distributing outlet pipes 19 and a spring 20 normally urging the valve into a closed position. A solenoid 21 is provided to lift the valve seat when the circuit of the solenoid is suitably energized, as hereinafter described. In this fashion when the solenoid 21 is energized, the material from the supply pipe 15 is discharged through the outlets formed by the outlet pipes 19 and into the individual chambers 14 of the molds 12.

In order that the contents of the molds may be uniformly distributed after the molds pass beneath the filling outlets, the supporting frame is provided with detents or protuberances 22 (Figures 2 and 3) spaced alternately upon opposite sides of the frame so that the conveyor 11 will be deformed sufficiently to tilt the molds alternately and thus cause them to be rocked as they travel away from the filling mechanism.

In advance of the filling mechanism illustrated in Figure 2, a spacing detent 23 is provided at one side of the frame 10. This detent is carried by an armature 24 of a solenoid 25 and urged in a normally retracted position by a spring 26 against a locating stop 27. When the solenoid 25 is energized, the spacing detent 23 is advanced outwardly and into the path of molds that may be upon the conveyor 11. In this fashion, as long as the detent 23 is in such path, the conveyor

will not deliver molds beneath discharge outlets of the pipes 19.

In order that the molds may be effectively filled without causing any of the contents to be spilled, a novel electrical control system is provided. This system utilizes first and second photo-electric cells 28 and 29, respectively, light sources 30 and 31 being provided for the respective cells 28 and 29. It will be seen that the light sources 30 and 31 are spaced upon the opposite side of the conveyor 11 from their respective photo-electric cells 28 and 29. It will be observed that the photo-electric cell 28 and its light source 30 are positioned in advance of the discharge pipes 19, whereas the photo-electric cell 29 and its light source 31 are positioned following the outlet pipes 19 in the direction of travel of the conveyor 11 and molds 12.

Referring to Figure 4, a source of electrical current is indicated by the terminals 32, this source being controlled by means of a suitable switch mechanism 33 to supply wires 34 and 35. Connected across supply wires 34 and 35 are the energizing coils 36 and 37 of a relay 38 and the coils 39 and 40 of a relay 41. Wires 42 and 43 serve to connect the aforesaid coils across the circuit wires 34 and 35, thus to supply energizing current to the aforesaid relays 38 and 41. These relays may be formed with amplifying mechanism in accordance with common practice, and such mechanism is, therefore, only indicated schematically within the dotted lines to which the reference characters 38 and 41 apply. The light 30 is energized from the coil 36 by wires 44 which are connected to a coil 45 that is energized by the coil 36, and the light 31 is energized by wires 46 which are connected to a coil 47 that is energized by the coil 39.

The photo-electric cell 29 is connected in circuit with a relay coil 48 and coil 49 by means of wires 50, the coil 49 being energized by the winding 40. In like manner the photo-electric cell 28 is connected by the wires 51 with a coil 52 that is energized by the coil 37 and with a relay coil 53. Also, within the circuit 51 there is connected a selective relay 54, the coil 55 of which is connected in series with the coils 52 and 53. The selective relay may be of any conventional type by means of which successive operations of such relay cause its controlled circuit to be successively opened and closed.

Relays 38 and 41 are provided with contacts 56 and 57, respectively, which contacts are in series with wires 58 and 59 that are connected across the supply wires 35 and 34, respectively. The wire 58 includes within its circuit a control switch 60 by means of which the selective relay 54 may be connected in the circuit or cut out of the circuit. Wire 58 also includes the coil 61 of a magnetic relay switch 62. The contacts 63 of the relay switch 62 serve to connect the coil of solenoid 21 across the supply wires 34 and 35 through the circuit wires 64 and 65, respectively.

Energization of the solenoid 25 is accomplished by means of wires 66 and 67 which are connected, respectively, with the supply wires 35 and 34 and supply current to an electro-magnetic switch 68, the contacts 69 of which supply current to wires 70 and 71, thus to connect these wires and the solenoid 25 with the respective wires 66 and 67. The operating coil 72 of the relay 68 is connected to the wire 58 by means of a wire 73. Supply wire 67 is also connected to the wire 59 by means of a connecting wire 74.

Operation of the mechanism, including the above described circuits, is as follows. The molds 12 are placed upon the conveyor 11 in any suitable fashion and fed in the direction indicated by the arrow of Figure 2. Depending upon the condition of the apparatus at the filling station, the detent 23 may be in a normally retracted position or may be extending outwardly into the path of the mold. If in the latter position, the molds are prevented from further advance with the conveyor until permitted to move by retraction of the detent 23 into the position illustrated in Figure 3. In this fashion, a mold is advanced to the right, as viewed in Figure 2, and moves across the path of the light beam from the light source 30 moving toward the photo-electric cell 28. Cell 28 is thus de-energized, de-energizing the circuit 51 and permitting the switch contacts 56 to close. In view of the fact that the contacts 57 are open, nothing happens in the circuit of the wires 58 and 59. The head end of the mold then passes beneath the filler spouts and finally across the path of the light beam from the light source 31 to the photo-electric cell 29. Interrupting this light beam thus de-energizes the circuit 50 and causes the relay contacts 57 to close. At this point, the circuit of the wires 58 and 59 is energized and the relay coil 61 closed to close the switch contacts 63 and energize the relay coil 21. The valve 18 is thus moved upwardly to open the valve and permit the fluid to flow through the discharge outlets and into the mold.

The mold continues to move until its rear end passes beyond the path of the light beam from light source 30, energizing the photo-electric cell 28 and its circuit 51 and opening the relay contacts 56. As a result, the relay coil 61 is de-energized, opening the switch contact 63 and de-energizing the solenoid 21. The valve 18 then closes under influence of the spring 21, and the mold continues to move over the successive protuberances 22 causing the mold to be rocked and the contents evenly distributed into the various compartments of the mold.

It will be observed that the solenoid 25 is energized when there is a mold passing beneath the discharging outlet. This insures proper spacing of the molds beneath the discharge outlet.

While the invention has been described with specific reference to the accompanying drawings, it is not to be limited save as defined in the appended claims.

I claim:

1. Mold filling mechanism, comprising a liquid supply line having an outlet, a valve to control the flow of liquid through the line and to the outlet, a conveyor for directing molds successively beneath the outlet, detents spaced beneath said conveyor upon alternate sides thereof to subject a mold to rocking motion in a vertical plane after it has passed beneath the outlet, means normally maintaining the valve closed, electrical means to open the valve, an operating circuit for the last named electrical means, and photo-electric means to close the circuit in response to the presence of a mold beneath the outlet.

2. Mold filling mechanism, comprising a liquid supply line having an outlet, a valve to control the flow of liquid through the line and to the outlet, a conveyor for directing molds successively beneath the outlet, means normally maintaining the valve closed, electrical means to open the valve, an operating circuit for the last named electrical means, first and second photo-electric means spaced adjacent the conveyor upon oppo-

site sides of the outlet in the direction of movement of the conveyor and adapted to be actuated by molds as they are moved by the conveyor, and means connected in series in the circuit and actuated by the first and second photo-electric means to close the circuit to the valve.

3. Mold filling mechanism, comprising a liquid supply line having an outlet, a valve to control the flow of liquid through the line and to the outlet, means normally maintaining the valve closed, a conveyor for directing molds successively beneath the outlet, detents spaced beneath said conveyor upon alternate sides thereof to subject a mold to rocking motion in a vertical plane after it has passed beneath the outlet, a detent movable into the path of molds on the conveyor approaching the outlet to prevent movement thereof to the outlet, electrical means to move the detent into the aforesaid path, and photo-electric means responsive to the presence of a mold beneath the outlet to open the valve and to actuate the electrical means to move the detent.

4. Mold filling mechanism, comprising a liquid supply line having an outlet, a valve to control the flow of liquid through the line and to the outlet, a conveyor for directing molds successively beneath the outlet, detents spaced beneath said conveyor upon alternate sides thereof to subject the mold to rocking motion in a vertical plane after it has passed beneath the outlet, a detent movable into the path of molds on the conveyor approaching the outlet to prevent movement thereof to the outlet, electrical means to move the detent into the aforesaid path, means normally maintaining the valve closed, electrical means to open the valve, an operating circuit for the last named electrical means, first and second photo-electric means spaced adjacent the conveyor upon opposite sides of the outlet in the direction of movement of the conveyor and adapted to be actuated by molds as they are moved by the conveyor and means connected in series in the circuit and actuated by the first and second photo-electric means to close the circuit to the valve.

5. Mold filling mechanism comprising a liquid supply line having an outlet, a valve to control the flow of liquid through the line and to the outlet, a conveyor for directing molds successively beneath the outlet, detents spaced beneath the conveyor upon alternate sides thereof to subject the mold to rocking motion in a vertical plane

after it has passed beneath the outlet, means normally maintaining the valve closed, electrical means to open the valve, an operating circuit for the last named electrical means, first and second photo-electric means spaced adjacent the conveyor upon opposite sides of the outlet and the direction of movement of the conveyor and adapted to be actuated by molds as they are moved by the conveyor, and means connected in series in the circuit and actuated by the first and second photo-electric means to close the circuit to the valve.

6. Mold filling mechanism, comprising a liquid supply line having an outlet, a valve to control the flow of liquid through the line, a conveyor to direct a mold beneath the outlet, and detents stationary with respect to said conveyor spaced alternately immediately beneath opposite sides of said conveyor to subject said mold to a rocking motion in a vertical plane after it has passed beneath said outlet, each detent being at an elevation such as to flex a portion of the conveyor as it passes thereover in an upward direction to an elevation above the normal plane of travel of said conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
486,746	Wildi	Nov. 22, 1892
500,866	Donally	July 4, 1893
935,506	Heybach	Sept. 28, 1909
1,028,766	Montgomery	June 4, 1912
1,244,471	Cote	Oct. 30, 1917
1,442,405	Hawthorne	Jan. 16, 1923
1,519,153	Mitton	Dec. 16, 1924
1,741,752	Amory	Dec. 31, 1929
1,820,480	O'Neil	Aug. 25, 1931
1,823,574	Rowe	Sept. 15, 1931
1,824,432	Hendry	Sept. 22, 1931
1,826,926	Cundall	Oct. 13, 1931
1,855,767	Neuman	Apr. 26, 1932
2,010,220	Cocks	Aug. 6, 1935
2,149,461	Mundy	Mar. 7, 1939
2,282,474	Howard	May 12, 1942
2,331,540	Dilling	Oct. 12, 1943
2,341,705	Fedorchak et al.	Feb. 15, 1944
2,458,387	Kindseth	Jan. 4, 1949
2,549,281	Armstrong et al.	Apr. 17, 1951
2,574,595	Shaw	Nov. 13, 1951