Jan. 9, 1951 R. D. DELAMERE 2,537,333

POWDER FILLING MACHINE

Filed March 19, 1946 2 Sheets-Sheet 1

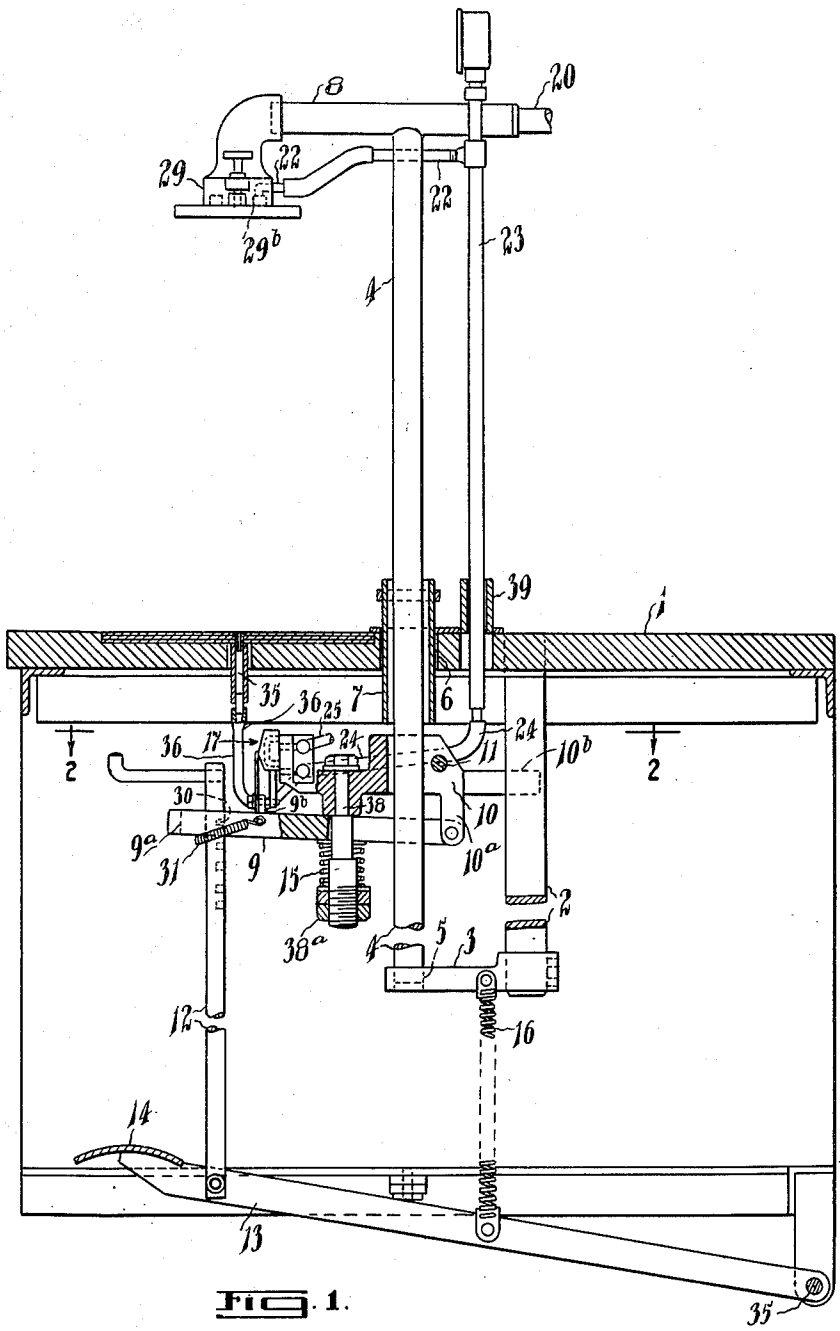


Fig. 1.

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Filed March 19, 1946 2 Sheets-Sheet 2

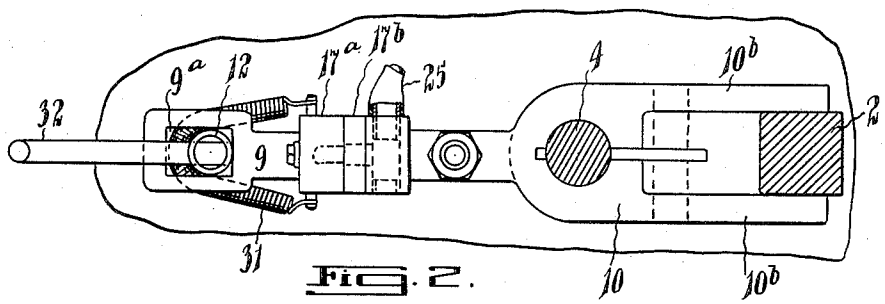


Fig. 2.

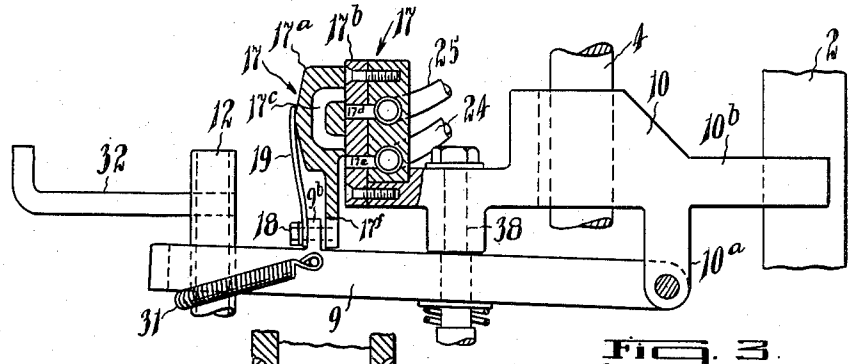


Fig. 3.

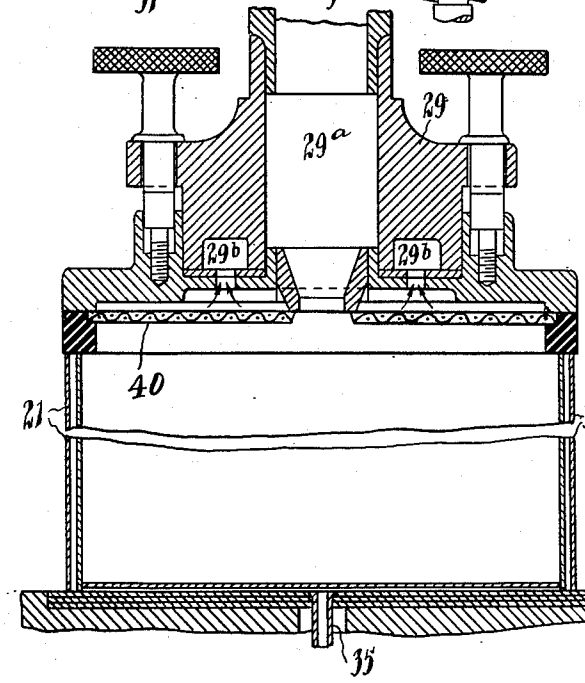


Fig. 4.

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Patented Jan. 9, 1951 2,537,333

UNITED STATES PATENT OFFICE

2,537,333

POWDER FILLING MACHINE

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Application March 19, 1946, Serial No. 655,467

11 Claims. (Cl. 226—116)

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This invention relates to filling machines for containers, particularly adapted for filling containers with a powdered material.

The object of the invention is to provide simple and effective filling mechanism which will operate quickly and efficiently with a minimum of effort on the operator's part and which is quickly and readily adjustable to different sized containers.

The objects of the invention are attained by means of the constructions which are hereinafter described and illustrated by way of example, in the accompanying drawings in which

Fig. 1 is a vertical section partly broken away showing some parts in side elevation;

Fig. 2 is a horizontal section on the line 2—2 in Fig. 1;

Fig. 3 is a vertical section through the valve and the clip for holding the valve in position; and

Fig. 4 is a vertical section on an enlarged scale through the filling head showing the head engaging a container surrounded by a casing or shroud.

In the drawings corresponding numerals refer to corresponding parts in the different views.

Referring to Fig. 1 the device is mounted on a table 1. Secured to the underside of the table is a vertical supporting bar 2 having a transverse bracket 3 secured on the lower end thereof. The vertical rod 4 passes through a hole 5 in the end of the bracket 3 and through a hole 6 in the table and is vertically slidable therein. A suitable bearing 7 is secured to the table for receiving the vertically slidable rod 4. Connected to the top of the rod 4 by means of a hollow arm 8 is the filling head 29.

Means is provided for supporting the filling head and bringing it down over the top of the container 21 which is to be filled with powder and which is placed on the table 1, said means comprising a lever 9 pivotally connected to a bracket 10 which is clamped to the supporting rod 4 by means of a bolt 11. It will be observed that the bracket or clamping member 10 is split or bifurcated to pass around the rod 4 and has a depending leg 10^a to which the lever 9 is pivotally connected, and at the rear is provided with projecting members 10^b which slidably embrace the member 2 preventing twisting or turning of the rod 4.

The lever 9 is provided with a slot 9^a in its outer end through which passes the rod 12 which is pivotally connected to and forms a link with the lever 13 having a foot pedal 14, the lever 13

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being pivoted at 35 to a suitable part of the frame of the table. A pin 30 projects into the slot and engages one of a plurality of holes in the inner side of the rod 12 as hereafter described.

Spring 16 is connected to bracket 3 tending to retain lever 13 in raised position shown in the drawing. By pressing down on the foot pedal against the pressure of spring 16, the rod 12 is pulled down. The rod 12 is connected through lever 9 to vertical rod 4 on which head 29 is mounted. When the rod 12 is pulled down head 29 will be brought down until it engages the top of container 21 as shown in Fig. 4. Further pressure on the pedal after the downward movement of the head is stopped by engagement with the head of the container will cause lever 9 to pivot on depending leg 10^a of bracket 10 against pressure of spring 15 mounted on bolt 38 which passes through an opening in the underside of the head, the lever 9 and is secured to the bracket 10. An adjustable nut 38^a on the bolt 38 acts as a stop to limit the downward movement of the lever.

The movement of the lever 9 against the pressure of spring 15 actuates a slide valve 17 to open the air pressure line and create a vacuum in the container as hereafter described. It will be observed that spring 15 could be omitted inasmuch as head 29 will drop by gravity when the pedal is pressed down. However, owing to friction or inertia the head might not drop sufficiently quickly to engage the top of the container before the valve is opened, if gravity alone was relied on. The spring 15 provides a positive downward pressure on the down stroke of the head.

The slide valve 17 comprises a movable part 17^a mounted on arm 9 and a fixed part 17^b mounted on bracket 10. The movable part of the slide valve is provided with an internal passage 17^c adapted to bridge the passages 17^d and 17^e in the fixed part as shown in Fig. 3. The movable part 17^a is provided with a downward projection 17^f having a bifurcation at its lower end through which projects bolt 18 secured to lug 9^b on arm 9. A leaf spring 19 also secured to lug 9^b by the bolt 18 bears against the outer part of the movable part 17^a of the slide valve causing it to bear against the fixed part. It will be observed that the movable part 17^a of the slide valve may be readily removed by grasping it and pulling it outwardly and upwardly.

The feed means for the powder is as follows: A pipe 20 from a material hopper (not shown) is connected to hollow arm 8 which communicates with central aperture 29^a in the head 29 and the

interior of the container 21. As hereafter explained a vacuum is formed in the container 21 which sucks the powder into the container by means of a vacuum pump (not shown). Air is sucked from the top of the container through passageway 29b and airline 22 which is connected to passageway 29b. The screen 40 beneath the head 29 prevents the powder from being sucked up into the vacuum line. The airline 22 communicates with the vertical pipe 23. The air line 22 includes a flexible tube connecting a nipple on the head 29 and a pipe which extends through rod 4 and is connected by a suitable union to pipe 23, whereby pipe 23 is supported by rod 4 and moves vertically with it. The pipe 23 passes through a hole in table 1 and is slidable in sleeve 39. Pipe 23 is connected at its lower end to flexible tube 24 which is connected to the lower part of the fixed part 17b of the slide valve 17. Connected to the upper part of the fixed part 17b of the slide valve is a flexible tube 25 which runs to the vacuum pump through a filter not shown.

It will be seen that by depressing the pedal 14 down the head 29 will be pulled down into engagement with the top of the container. Upon further depressing the pedal the slide valve will be moved to open the vacuum line and cause air to be sucked through the head, this suction causing the powder to be sucked into the container by reason of the vacuum formed therein.

When the pedal is released spring 16 will lift the movable part of the valve to break the airline and cut off the vacuum. At the same time the lower port 17e is opened to the atmosphere. This results in an inrush of air through pipe 23 and head 29 owing to the vacuum therein, thus clearing screen 40 of any powder that may stick to it. Spring 16 will later lift the head from the container.

The location of the head 29 can be varied for different sizes of container. As already explained the rod 12 which supports the head is provided with a series of holes in the inner side thereof which are engaged by the pin 30 in the end of the lever 9. A coil spring 31 keeps the rod 12 normally in engagement with the pin, but the rod 12 can be pulled out by the handle 32 or by merely grasping the rod and pulling it out so as to move it out of engagement with the pin 30. The arm 9 can then be slid down and connected by inserting the pin 30 in another hole in the rod 12. Moving the arm 9 down moves the whole head and valve assembly downward with it.

Some containers are fragile and might collapse or leak under the vacuum which is applied thereto for the insertion of the powder. In such case a shroud or casing 37 may be placed around the container resting on the table 1 at one open end and on the head 2 at the other open end and surrounding the container as shown in Fig. 4. If a vacuum is formed inside the shroud and outside of the container, the pressure will be equalized. To form such a vacuum an opening 35 is formed through the table beneath the head 29 having a flexible tube 36 connected to the lower part of the fixed portion of the slide valve so that when the slide valve is open the vacuum pump will suck air through said hole 35 and tube 36 forming a vacuum within the shroud and outside of the container. The shroud 37 may be secured to the head and moved down over the container when the head moves down or may be placed over the container and pushed beneath the head along with the container.

It is obvious that various modifications may be made without departing from the spirit of my invention.

What I claim as my invention is:

1. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a relatively movable part, a vertically slidable support on which the head and the fixed part of the valve are mounted, an operating member mounted on the vertically slidable support and to which the movable part of the valve is connected, spring means normally holding said operating member in engagement with the slidable support and the movable part of the valve in valve closing position relative to the fixed part of the valve, and means for raising the operating member and the slidable support therewith to lift the head out of contact with the container to be filled and for lowering the said slidable support into engagement with such container, the said spring means being adapted to be tensioned by further movement of the operating member after engagement of the head with the container to permit movement of the operating member relative to the slidable support and hence movement of the movable part of the valve relative to the fixed part of the valve to open the valve.

2. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a relatively movable part, and means for moving the slidable support to bring the head into and out of engagement with container over the filling opening therein and open and close the valve, said means comprising an operating lever, a bracket secured to the slidable support and on which the fixed part of the valve is mounted, a valve and head actuating lever pivoted to the bracket and on which the movable part of the valve is mounted, and a link between the operating lever and the valve and head actuating lever whereby movement of the operating lever will cause vertical movement of slidable support thus raising or lowering the head, and will also cause movement of the valve and head actuating lever relative to the bracket to move the movable part of the valve relative to the fixed part of the valve to open and close the vacuum line.

3. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a relatively movable part, and means for moving the slidable support to bring the head into and out of engagement with the container over the filling opening therein and open and close the vacuum line, said means comprising an operating lever, a bracket secured to the slidable support and on which the fixed part of the valve is mounted, a valve and head actuating lever

pivoted to the bracket and on which the movable part of the valve is mounted, a link between the operating lever and the valve and head actuating lever whereby movement of the operating lever will cause vertical movement of slidable support thus raising or lowering the head, and will also cause movement of the valve and head actuating lever relative to the fixed part of the valve to open and close the vacuum line and means for adjusting the vertical position of the head and valve assembly.

4. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a relatively movable part, and means for moving the slidable support to bring the head into and out of engagement with the container over the filling opening therein and open and close the vacuum line, said means comprising an operating lever, a bracket secured to the slidable support and on which the fixed part of the valve is mounted, a valve and head actuating lever pivoted to said bracket and on which the movable part of the valve is mounted, a link between the operating lever and the valve and head actuating lever whereby movement of the operating lever will cause vertical movement of said slidable support thus raising and lowering the head, and will also cause movement of the valve and head actuating lever relative to the bracket to move the movable part of the valve relative to the fixed part of the valve to open and close the vacuum line, and means for adjusting the vertical position of the head and valve assembly, said means comprising means for varying the operating distance between the point at which the operating lever is connected to link and the point at which the valve and head actuating lever is connected to the link.

5. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a movable part, and means for moving the slidable support to bring the head into and out of engagement with the container over the filling opening therein and open and close the valve, said means comprising an operating lever, a bracket secured to the slidable support and on which the fixed part of the valve is mounted, a valve and head actuating lever pivoted to the bracket and on which the movable part of the valve is mounted, a link between the operating lever and the valve and head actuating lever whereby movement of the operating lever will cause vertical movement of said slidable support thus raising and lowering the head, and will also cause movement of the valve and head actuating lever relative to the bracket to move the movable part of the valve relative to the fixed part of the valve to open and close said vacuum line, and means for adjusting the vertical position of the head and valve assembly, said means comprising means for varying the operating distance between the point at which the operating lever is connected to link and the point at which the valve and head actuating lever is connected to the link, said varying means comprising a plurality of engaging means arranged longitudinally of the link and means on the valve and head actuating lever to selectively engage said engaging means on the link.

6. Means for filling containers having a filling opening therein, including a frame, a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a support for the head vertically slidable in the frame, an operating lever pivoted at one end to the frame, spring means normally retaining the operating lever in an elevated position, a bracket on the support, a vacuum line connected to the air opening in the head, a valve in the vacuum line having a fixed part and a relatively movable part, the fixed part being mounted on the bracket, a valve and head actuating lever pivoted to the bracket and having the movable part of the valve mounted therein whereby pivotal movement of the lever relative to the bracket will open or close the valve, and a rod secured to the valve and head actuating lever and pivoted to the operating lever at a point spaced from its fulcrum point, whereby when the operating lever is pressed down against action of the spring means the valve and head actuating lever will be moved to lower the support to bring the head down over the container and then open the valve and when the operating lever is released and is raised by the spring a reverse operation will take place.

7. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a bracket on the vertically slidable support, a valve in the vacuum line comprising a fixed part and a movable part, the fixed part being mounted on the bracket, a lever pivoted to said bracket to which the movable part of the valve is secured, and stop means on the bracket limiting the swinging movement of the lever, said stop means comprising a stop and a coil spring between the stop and the lever.

8. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a bracket on the vertically slidable support, a valve in the vacuum line comprising a fixed part and a relatively movable part, the fixed part being mounted on the bracket, a vertically swingable lever pivoted to said bracket and engaging said bracket in its raised position, the movable part of the valve being secured to said lever, and stop means on the bracket limiting the downward swinging movement of the lever, means normally holding the lever in its raised position in engagement with the bracket, means for depressing the lever to permit the bracket and slidable support to move downwardly to bring the head into engagement with the container and subsequently to swing the lever downwardly to move the movable part of the valve to open the vacuum line, and for raising the lever to obtain a reverse result.

9. Means for filling containers having a filling

opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a vertically slidable support for the head, a base for supporting the container, a vacuum line connected with the air opening in the head, a bracket on the vertically slidable support, a valve in the vacuum line comprising a fixed part and a relatively movable part, the fixed part being mounted on the bracket, a vertically swingable lever pivoted to said bracket and engaging said bracket in its raised position, the movable part of the valve being secured to said lever and stop means on the bracket limiting the downward swinging movement of the lever, a spring between the lever and the stop means tending to maintain the lever in raised position in engagement with the bracket, means normally holding the lever in its raised position in engagement with the bracket, means for depressing the lever to permit the bracket and slidable support to move downwardly to bring the head into engagement with the container and subsequently to swing the lever downwardly against the compression of the spring to move the movable part of the valve to open the vacuum line, and for raising the lever to obtain a reverse result.

10. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a relatively movable part, said fixed part of the valve having two ports therein, one of said ports communicating with a source of vacuum and the other of said ports communicating with the filling head, and said movable part having two ports formed therein connected by a U-shaped aperture adapted to bridge said ports, the ports on the respective parts of the valve being adapted to be moved into and out of register with one another, and means for causing the head to engage the container over the filling opening thereof and open the valve in the vacuum line to withdraw air from the container and admit material to the container, said means comprising a vertically slidable support on which the head and the fixed part of the valve is mounted and operating means for raising and lowering the slidable support and the movable part of the valve.

11. Means for filling containers having a filling opening therein, including a filling head having an inlet opening for the material with which the container is to be filled and an air opening, a base for supporting the container, a vacuum line connected with the air opening in the head, a valve in the vacuum line, said valve comprising a fixed part and a relatively movable part, said fixed part of the valve having two ports therein, one of said ports communicating with a source of vacuum and the other of said ports communicating with the filling head, and said movable part having two ports formed therein connected by a U-shaped aperture adapted to bridge said ports, the ports on the respective parts of the valve being adapted to be moved into and out of register with one another, and one of the ports in the fixed part being adapted to communicate with the atmosphere when the ports are out of register, and means for causing the head to engage the container over the filling opening thereof and open the valve in the vacuum line to withdraw air from the container and admit material to the container, said means comprising a vertically slidable support on which the head and the fixed part of the valve is mounted and operating means for raising and lowering the slidable support and the movable part of the valve.

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Certificate of Correction

Patent No. 2,537,333 **January 9, 1951**

RUDOLF D. DELAMERE

It is hereby certified that the above numbered patent was erroneously issued to "Delamere & Williams Company", as assignee by direct and mesne assignments, whereas said patent should have been issued to *Delamere & Williams Company, Limited, as assignee by mesne assignments*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of March, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.