

1

2,889,856

APPARATUS AND METHODS OF FILLING MEASURED AMOUNTS OF VISCOUS LIQUIDS OR FINELY DIVIDED SOLIDS

Roy M. Magnuson, deceased, late of Saratoga, Calif., by
Genevieve I. Magnuson, executrix, Saratoga, Calif.

Application April 12, 1957, Serial No. 652,417

6 Claims. (Cl. 141—5)

The present invention relates to fluent materials such as viscous liquids or flowable finely divided solids, and is concerned more particularly with the provision of methods and apparatus for placing accurately measured amounts of such material into a container.

It is the general object of the invention to provide for placing a measured amount of material into a desired location such as a container, where the material is of a character to render it difficult to start and stop a flow with exactness.

Another object of the invention is to provide a means for starting or interrupting a flow of material through space which comprises a gaseous jet.

A further object of the invention is to provide for the attainment of the above objects when the material is a viscous liquid or a flowable finely divided solid.

The above and other objects of the invention will be apparent from the following description of a preferred method for carrying out this invention and a preferred apparatus embodying the invention, as illustrated in the accompanying drawings, in which:

Figure 1 is a side elevational view partially in section of a portion of the apparatus.

Figure 2 is a view similar to Figure 1 illustrating another condition of the operation.

Figure 3 illustrates a modified form of the invention but is in general similar to Figures 1 and 2.

Figure 4 is a schematic view illustrating the entire apparatus and process.

Referring first to Figure 4, the apparatus of the invention includes a tank or sump 10 providing a source of material from which the material is removed by suitable means such as a rotary pump 11 and carried through a path of flow provided by conduit indicated schematically at 12, and eventually terminating in a conduit 13 (Figures 1 and 4) which is threaded into the upper end of a casting 14 having a branch 16 directed vertically downward and a second branch 17 leading off from one side of the branch 16. Opposite to the opening of the branch 17 there is provided a gas nozzle 18 which receives a suitable gas such as air from a pipe 19. The upper portion of the casting 14 provides a space immediately below the nozzle end of the conduit 13 and extending past the gas nozzle 18 and the opening into the conduit 17, and in this space the stream 21 of material is traveling in unconfined fashion so that it can be readily subjected to the gas jet to be diverted into the opening of the conduit 17 as opposed to continuing downwardly through the conduit 16. In the modification shown in Figures 1 and 2 the vertical branch 16 provides a path of discharge for the stream of material 21 during filling operations, and the return branch 17 provides an alternative path of flow for the material when the air jet is turned on. In the form shown in Figure 4 this second or alternative path of flow 17 leads to the tank 10.

A suitable container such as a tin can 26 (Figure 1) supported on a conventional belt type conveyor 27 is

2

provided in operative relation to the downwardly directed path portion 16.

Referring to Figure 4, the gas or air flowing through the pipe 19 is controlled by means of a rotary valve 28 from a suitable blower 29, the valve having a control arm 31 which is connected to an armature 32 of a solenoid 33. The time interval of energization of the solenoid 33 determines the length of time the air jet is on, this energization being controlled by a timing circuit 34, an on and off switch 36 and a container actuated switch 37 from a source of electric power 38. The timer 34, after being initiated in operation by container 26 through the switch 37, serves to control the time the liquid stream 21 is diverted from its downwardly moving path and directed into the return path or conduit 17. This period can be accurately controlled so that an exact measured amount of liquid or solids from the vertically downwardly moving stream of constant volume in cross section and of constant velocity is fed into each container. In this form of the invention the air jet is normally in an "on" condition as shown in Figure 2, and it is the time it is "off" that governs the amount of material fed.

In the Figure 3 modification there is shown a form of the invention where it may be desirable to not only place a measured amount of material in a container but also to treat this material with a gaseous medium. In this form of the invention the path of flow provided by the conduit 17 leads to the container 26 for a filling operation, and the downwardly directed stream through the conduit 16 is normally effective to return material to the source of supply.

It will be seen that with the form of the invention illustrated in Figure 3 the material to be filled in the container may be aerated if desired, dried if the gas supply is a drying medium such as hot dry air, or perhaps treated in some other fashion.

In either form of the invention the use of an air "knife" or gaseous jet provides effective means for instantaneously stopping or instantaneously starting a flow of material with respect to a given path. Such an air knife or gaseous jet is especially useful with viscous liquids or finely divided solids.

While certain preferred methods and apparatus for carrying out the invention have been shown and described, it is apparent that the invention is capable of variation and modification from the form shown and described so that the scope thereof should be limited only by the scope of the claims appended hereto.

What is claimed is:

1. The method of feeding a measured amount of a fluent material such as viscous liquids or flowable finely divided solids into a container which comprises establishing a stream of the material of constant volume in cross section and moving vertically downward at a constant rate through a first path of flow including a space where the flow is relatively unconfined, providing a second alternate path of flow for the material at an angle to said vertically moving downward stream and leading from said space, providing a gas jet directed across said downward moving vertical stream and directed toward said second path, and utilizing the gas jet to control a flow of material for a given period of time to feed a given quantity of the material along one of said paths.

2. The method as recited in claim 1 in which the container is placed to receive the material from said first path, and in which the gas jet is employed to start and stop the flow along said vertically downward path.

3. The method as recited in claim 1 in which the container is placed in said second path and in which the gas jet is utilized to remove the measured amount of material from the vertically downward moving stream and to treat the material as it is being fed into the container.

3

4. The method of feeding a measured amount of a fluent material, such as viscous liquids or flowable finely divided solids, which comprises establishing a stream of the material of constant volume in cross section and moving at a constant rate toward a discharge path, providing a gas jet directed toward said stream and also directed toward a second alternate path, and utilizing the gas jet for a given period of time to feed a given quantity of the material along one of said paths.

5. In an apparatus for providing measured amounts of fluent material such as viscous liquids or flowable finely divided solids, means providing source of supply of the material, means for causing said material from said source to flow, in at least one portion of its path, as a stream of constant volume in cross section and at a constant rate, means for providing a gas jet directed across said stream, and means providing a second alternate path for receiving material directed thereto by said gas jet.

6. In an apparatus for providing measured amounts of fluent material such as viscous liquids or flowable finely

4

divided solids, means providing source of supply of the material, means for causing said material from said source to flow in at least one portion of its path, as a downwardly moving stream of constant volume in cross section and at a constant rate, means for providing a gas jet directed across said downwardly moving stream at a location where said stream is relatively unconfined, and means providing a second alternate path for receiving material directed thereto by said gas jet, and means for controlling said jet providing means to cause discharge of measured amounts of material from the stream along one of said paths, and for directing other amounts in the stream into the other of said paths.

References Cited in the file of this patent

FOREIGN PATENTS

586,313	Great Britain	Mar. 14, 1947
981,775	France	May 30, 1951