

March 31, 1964

T. E. BELSHAW

3,127,057

MACHINE AND METHOD FOR DISPENSING MEASURED CHARGES OF CONDIMENT

Filed Dec. 4, 1961

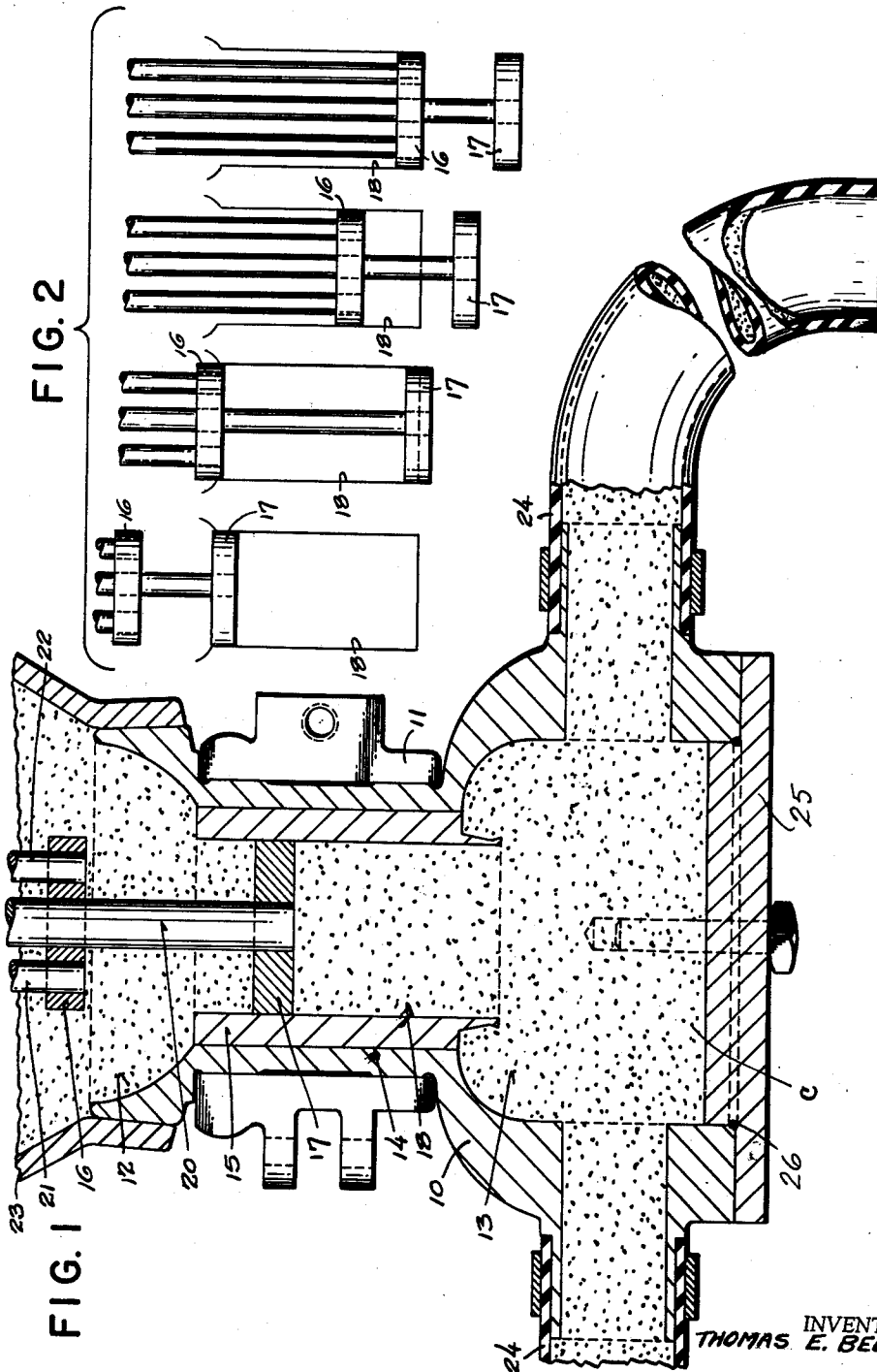


FIG. 2

FIG. 1

INVENTOR  
THOMAS E. BELSHAW  
BY *Barner & Seed*  
ATTORNEYS

1

2

3,127,057

**MACHINE AND METHOD FOR DISPENSING MEASURED CHARGES OF CONDIMENT**

Thomas E. Belshaw, 1772 22nd Ave. S., Seattle, Wash.

Filed Dec. 4, 1961, Ser. No. 156,628

4 Claims. (Cl. 222-1)

This invention relates to a machine and method for dispensing measured charges of a plastic substance such, for example, as a condiment for filled pastry, and for its principal object aims to provide a machine and method in which the charges are dispensed under the pressure influence of a reciprocating pump, one in which the cyclic motion of the pump serves to measure the charges, and in which said measured charges are cut off cleanly at the delivery end of the dispensing nozzle.

Other objects and advantages of the invention will, with the foregoing, appear and be understood in the course of the following description and claims, the invention consisting in the novel method and in the construction, adaptation and combination of parts of a machine for practicing said method, hereinafter described and claimed.

In the accompanying drawing:

FIGURE 1 is a fragmentary vertical sectional view portraying a machine constructed to embody preferred teachings of the present invention; and

FIG. 2 is a view diagrammatically portraying the cyclic travel of a set of two pistons which act in complement to dispense the charges in measured quantities.

Referring to said drawing, the numeral 10 designates a housing supported in any suitable manner, as by a split collar 11, from a wall bracket (not shown) and presenting upper and lower chambers 12 and 13, respectively, communicating by a cylindrical neck 14. Such neck is fitted internally with a liner 15. The liner presents a cylindrical bore 18, and accommodated in this bore are co-axial top and bottom pistons 16 and 17 which co-act to dispense the measured charges for which the present invention is designed. A rod 20 carries the bottom piston 17 and passes upwardly through the top piston 16, the latter piston being in turn mounted on a pair of rods 21 and 22 located at diametrically opposite sides of the rod 20. The single rod 20 and the paired rods 21-22 are individually driven in a reciprocal slide motion. A drive means suitable for this purpose is illustrated and described in my U.S. Pat. No. 3,003,439, dated October 10, 1961, wherein the single rod and the paired rods project upwardly through a hopper 23 which fits over the head end of the housing. The rods have their upper ends engaged by a respective one of two levers which lie approximately at right angles to the rods. The levers are fulcrumed at one end, engage the rods at the opposite free ends, and between said fulcrums and the free ends present laterally extending studs on which rollers are journaled. The rollers work in a respective one of two endless grooves presented by a continuously rotating cam or cams. It is desirable that these cams be subjected to the drag action of a brake band such, for example, as I show in my U.S. Pat. No. 1,952,355, dated Mar. 27, 1934.

Reverting to the lower chamber 13 of the housing, it will be seen that the same constitutes a manifold feeding to one or more flexible dispensing hoses 24. The size of these hoses, or at least the terminal throats which lie at the ejection ends thereof, moderately restricts the flow. A normally closed cover 25 sealed by an O-ring 26 gives access to the manifold for purposes of cleaning.

At its upper limit of travel the top piston 16 rises into the hopper 23 to a level elevated above the head end of the cylindrical bore 18, or magazine as it will be hereinafter termed, and at its lower limit of travel lies flush or approximately flush with the bottom end of such maga-

zine. The bottom piston 17 at its upper limit of travel lies proximate to the upper end of the magazine and at its lower limit moves into the manifold to a level spaced below the lower end of the magazine. These strokes are critical only to the extent that in both directions of reciprocal travel the lead piston must clear the magazine while the trailing piston moves a substantial distance into the magazine. The degree to which the trailing piston travels in either said direction can serve a measuring function.

Referring to the four diagrams of FIG. 2 in describing cyclic movement of the piston, and considering same from left to right, the first diagram represents the two pistons in positions occupied at the upper extreme of travel preparatory to the initiation of their down stroke of reciprocation. Distinguishing the two pistons 17 and 16 by the terms "suction" and "metering," respectively, to reflect the functions performed, the suction piston in such first diagram occupies a position between the top and bottom limits of the magazine while the metering piston has cleared the magazine and entered the hopper proper. The suction piston, as it now commences its down travel, draws condiment *c* by suction from the hopper into the magazine and this suction action continues until the metering piston, also now moving downwardly in trailing relation to the suction piston, enters the magazine as indicated in the second diagram. It is only at this particular stage of travel, and namely while a charge of condiment is confined in the magazine between the two pistons, that the pistons need move in concert. Proceeding downwardly, as shown in the third diagram, when the lead piston 17 clears the lower end of the magazine the trailing piston is given relatively faster travel and pushes the charged contents of the magazine into the manifold, from whence it is forced through the hoses and ejected onto dough squares or the like. At the end limit of travel (diagram 4) the trailing piston reaches a point flush with the outlet end of the magazine.

As the pistons now travel in their return stroke of reciprocation, the two pistons move in concert until the metering piston—now the lead piston—clears the magazine, whereupon the travel of the trailing piston 17 is or may be arrested while the lead piston 16 continues upwardly to the position shown in diagram 1. In such up-stroke travel there is instantly created within the manifold a suction condition causing a portion of the condiment charge to be sucked back from the ejection ends of the hoses and in consequence producing a sharp cut-off action so that the condiment is metered from the machine without drippage. The difference in volume as between the pocket described between the pistons when the two pistons both occupy the magazine during (1) their up-stroke travel and (2) their down-stroke travel determines the volume of condiment dispensed from the manifold. This is perforce divided between the several discharge hoses.

My issued Patent No. 3,003,439 illustrates and describes a suitable means for increasing and decreasing, at will, the effective volume of the charges taken in each cycle of operation of the machine from the upper chamber 12 to the lower chamber 13.

It should be pointed out that the present invention does not lend itself to the dispensing of particulated matter in which voids can be expected to occur between the particles.

It is believed that the invention will have been clearly understood from the foregoing detailed description of my now-preferred illustrated embodiment. Changes in the details of construction may be resorted to without departing from the spirit of the invention and it is accordingly my intention that no limitations be implied and that

3

the hereto annexed claims be given the broadest interpretation to which the employed language fairly admits.

What I claim is:

1. A machine for dispensing measured quantities of a plastic substance, a hopper for said substance, comprising, a dispensing chamber separated from the hopper, a cylindrical magazine extending as a connecting conduit between said hopper and chamber and having a uniform cross section throughout its length less than the cross section of either the hopper or the dispensing chamber at the points of juncture therewith, a suction piston and an expulsion piston both fitting the magazine and each mounted for reciprocal slide motion the former from a position within the dispensing chamber into and out of magazine and the latter from a position within the hopper into and out of the magazine, said pistons being mounted to move with one leading and the other trailing in a spaced relationship, alternately, in oppositely directed strokes of reciprocation so that as the direction of motion is toward the chamber a charge of the plastic substance is first sucked into the magazine and then expelled into the chamber and as the direction of motion is toward the hopper a portion of the expelled charge less than the whole is sucked back into the magazine, the dispensing chamber having an ejection throat of restricted flow capacity exposed to the atmosphere and to which the plastic substance is forcefully delivered from the chamber as the pistons move within the magazine directively toward the dispensing chamber, the dispensing chamber being otherwise closed to atmosphere, the suction pull exerted by the pistons as the same move within the magazine directively from the dispensing chamber causing the plastic substance to reverse its flow within the ejection throat and by the suck-back responsively obtain a sharp cut-off of the delivery to atmosphere.

4

2. Structure according to claim 1, said dispensing chamber serving as a manifold and having a plurality of delivery hoses each of which leads to a respective one of said ejection throats.

3. Structure according to claim 1, said ejection throat being located remote to the dispensing chamber, a flexible hose being provided leading to said throat from the dispensing chamber to interruptedly deliver measured quantities of the plastic substance comprising the difference in volume between the amounts expelled into the chamber and sucked back from the chamber.

4. The pump method of dispensing measured quantities of a plastic substance, comprising establishing a magazine between two reciprocating pistons working in a common cylinder and as said pistons move in one direction of reciprocation charging the plastic substance into said magazine from one end of the cylinder by force of suction created by the lead piston and then expelling said charge from the other end of the cylinder into a connecting chamber formed at its point of juncture with the magazine with a cross section larger than that of the magazine and only exposed to atmosphere by an ejection throat of such choked flow capacity that suction imposed upon plastic substance contained in the throat is sucked back from the outlet end of the throat, and creating the necessary suction as said pistons move in the opposite direction of reciprocation by drawing from the chamber into the cylinder by suction force of the trailing piston a portion of said charge expelled in the previous stroke.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

1,866,061	Schoel	July 5, 1932
2,643,033	Miscione	June 23, 1953

35