July 21, 1953 B. T. HENSGEN ET AL 2,646,190

MARGARINE COLOR INJECTOR

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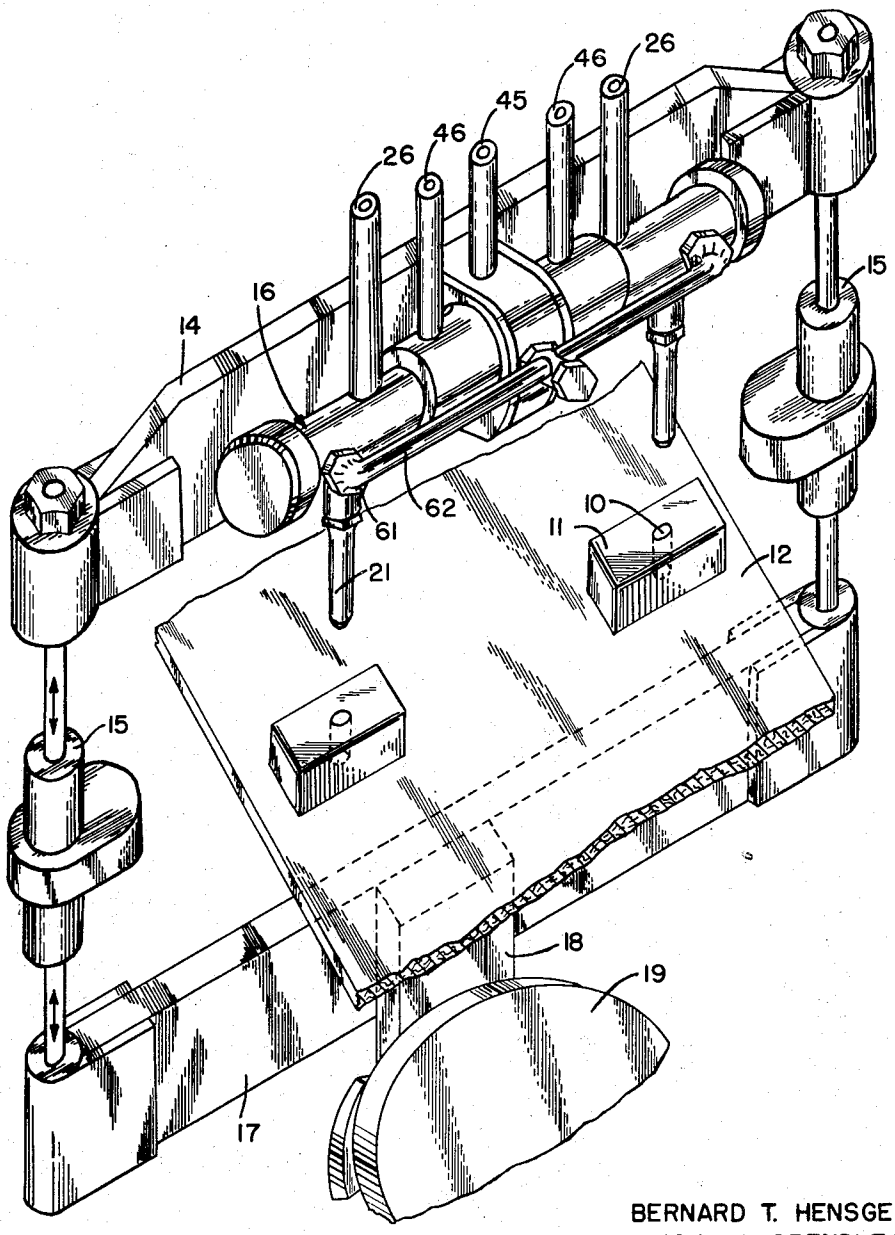


FIG. 1

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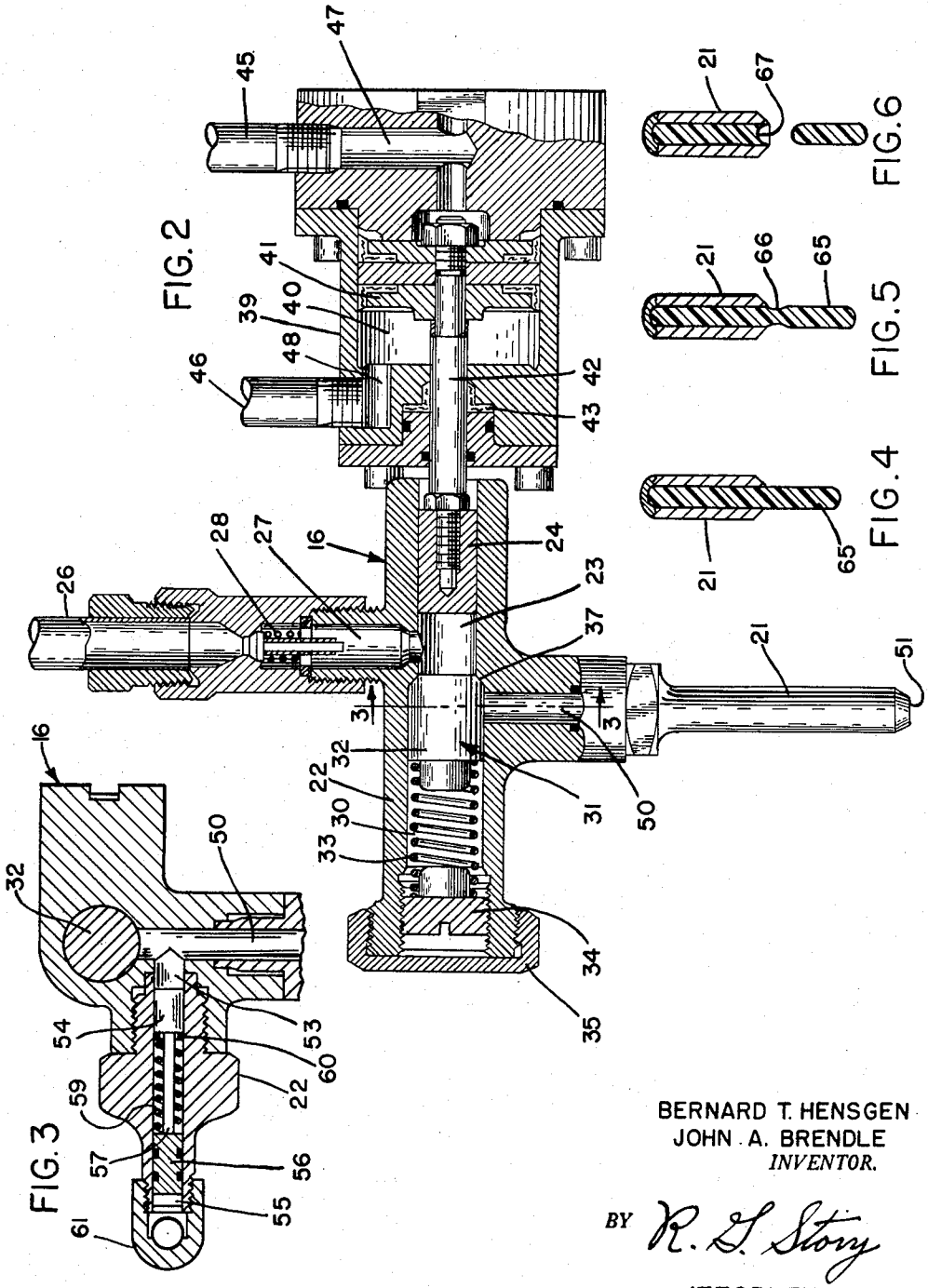
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MARGARINE COLOR INJECTOR

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2 Claims. (Cl. 222—109)

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The present invention relates to a method and apparatus for dispensing a lentous fluent material, particularly in measured quantities, without dripping or smearing after the desired quantity has been discharged.

In many applications, such a material is dispensed under conditions where a drip from the nozzle may contaminate or cause an undesirable deposit on other objects. Such material may have an abrasive or other deleterious action on machinery used in conjunction with the dispenser. These actions are particularly pronounced where the dispenser is a part of automatic or semi-automatic machinery.

In many instances, the mere existence of a bead of material on the end of the dispensing nozzle is objectionable, whether or not the bead becomes sufficiently large to fall from the nozzle. The position or movement of the nozzle with respect to adjacent objects may be such that a bead would rub off on those objects.

An example of an operation where there must not be a bead on or drop from a nozzle is in the inserting of paste color into blocks of uncolored margarine. Here, a block of margarine is drilled, the paste color inserted into the center of the block, and the hole closed. For all practical purposes, the block is uncolored margarine, but, by kneading or stirring, the color may be dispensed throughout the block to produce colored margarine.

For uniformity, the quantity of coloring deposited should be precisely measured, and no additional coloring should be left at the nozzle opening where it might rub off on the sides of the opening or top of the block to produce a coloration of the margarine, or would drop off on the block or the associated machinery. The principal object of the present invention is to supply a method and apparatus which will dispense uniform quantities of a lentous fluent material such as the margarine coloring paste without any after-drip and without leaving any material about the nozzle.

A further object of the present invention is to provide an apparatus which not only will constantly duplicate the same amounts of ejected material, but one wherein the quantity to be deposited may be varied to meet the different requirements that may be necessary.

Additional objects and advantages will become apparent from the following description taken in conjunction with the drawings, in which

Fig. 1 is a perspective view of an illustrative embodiment of the present invention;

Fig. 2 is an elevation of the embodiment of Fig. 1 with the various parts broken away to illustrate the operation of the device;

Fig. 3 is a section taken at line 3—3 of Fig. 2; and

Figs. 4, 5, and 6 are sectional views of the

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nozzle of Fig. 2 showing the action of the dispenser.

Fig. 1 illustrates a portion of a device for injecting a given amount of coloring paste into an opening 10 in a block of uncolored margarine 11 carried along upon an intermittent conveyor 12. A yoke 14, reciprocally mounted in a pair of guides 15 secured to a suitable frame, not shown, supports the dispensing device, generally 16. Cross bar 17 at the base of yoke 14 has a downwardly projecting portion 18 which rides upon a suitable cam 19. The rotation of the cam pushes the yoke 14 upwardly and a lowering of the cam face allows the yoke 14 and dispenser 16 to descend to insert the nozzle 21 of the dispenser 16 into opening 10 in block of margarine 11.

Referring to Fig. 2, the dispenser 16 includes a body 22 housing the measuring and fluid retraction mechanism. A bore within the body 22 forms a first cylinder 23 within which is mounted a piston 24. A feed line 26 communicates with cylinder 23 through a passage 27 within which is mounted a check valve 28.

Co-axial with cylinder 23 is an opening 30 in body 22 to receive the check and feed control valve, generally 31. Valve 31 includes a piston-like member 32 backed by a compression spring 33 seated against a plug 34 threaded into body 22. For the sake of appearance and cleanliness, a cap 35 covers the end of opening 30.

At the area of juncture between opening 30 and cylinder 23, the body 22 forms a tapered seat 37. The nose of member 32 is tapered to a similar angle to provide a good seal when member 32 is pressed against seat 37.

The fluid-powered actuating means for piston 24 includes a casing 39 forming an inner cylinder 40 within which is a piston 41. A connecting rod 42 is secured to both piston 24 and piston 41 so that the former will move in response to movements of the latter. In a manner well known in the art, a gland 43 prevents fluid leakage about connecting rod 42.

The fluid lines 45 and 46 communicate, through passages 47 and 48 respectively, with either end of cylinder 40 at opposite sides of piston 41.

The portion of the apparatus thus far described serves the function of injecting a measured quantity of lentous fluent material into an opening 50 in body 22, which opening communicates with the bore of nozzle 21. Fig. 3 illustrates the vacuum means for withdrawing an amount of said material from opening 50 so as to prevent any dripping or smearing of the fluent material at the end 51 of nozzle 21. The vacuum means includes a second cylinder 53 formed within body 22, within which cylinder is a piston 54. Cylinder 53 communicates directly with opening 50.

The mechanism for actuating the vacuum piston 54 includes a cylinder and piston, 55 and 56 respectively, with the latter piston and piston

54 being connected by means of rod 57. A compression spring 59 is mounted between piston 56 and an annular projection 60 at the rear of cylinder 53 and piston 54. A hollow cap 61 over the end of cylinder 55 communicates with passage 47 and fluid line 45 through an interconnecting pipe 62 (Fig. 1).

It is believed that the method of operation will be apparent from the foregoing description of the apparatus; however, a brief summary of the operation may be of some aid. The lentous fluent material is introduced into pipe 26 from a suitable source of supply. Fluid pressure applied to pipe 46 and released from pipe 45 causes piston 41 to move to the right, moving piston 24 to the right also (Fig. 2), and filling cylinder 23. Since the interior of cap 61 over cylinder 55 also communicates with pipe 45, the release of fluid in this line allows spring 59 to move pistons 56 and 54 to the left (Fig. 3). A reversal of the fluid pressure in lines 45 and 46 moves interconnecting pistons 41 and 24 to the left, forcing a predetermined quantity of fluid material from the cylinder into opening 50. At the same time, the pressure from pipe 45 being applied to the end of cylinder 55 forces pistons 54 and 56 to the right.

Assuming the system to be full of the fluent material and starting from the position shown in Figs. 2 and 3, the application of fluid pressure to pipe 45 forces a measured quantity of fluent material from cylinder 23 into opening 50 and, at the same time, forces material from cylinder 53 into passage 50. These movements of the two pistons 24 and 54 eject a quantity of the fluent material 65 from the end of nozzle 21 as illustrated in Fig. 4. Because of its own weight, this material 65 may start to separate from the nozzle 21, forming a neck 66 in the material as illustrated in Fig. 5.

The release of fluid pressure from pipe 45 coincident with the application of fluid pressure to pipe 46 forces interconnecting pistons 41 and 24 to the right, immediately allowing check valve 31 to close. As a matter of fact, check valve 31 may previously have started to close, depending upon the setting of the valve, as hereinafter described, and the consistency of the material. At the same time, spring 59 forces interconnecting pistons 54 and 56 to the left in Fig. 3, producing a vacuum adjacent the upper end of passage 50. This vacuum draws the fluent material within passage 50 and nozzle 21 upwardly, breaking off the quantity of material at the end of the nozzle and producing a concavity 67 at the lower end of nozzle 21 as illustrated in Fig. 6. The amount of material that is withdrawn into cylinder 53 by piston 54 is again ejected into passage 50 upon the next impulse stroke so that the volume of the material ejected into the passage is constant, insuring that the predetermined quantity of material is always discharged from nozzle 21.

The amount of material to be discharged from the nozzle may be varied by adjusting the tension on spring 33 of the check and feed control valve 31. Movement of threaded plug 34 to the right or left in Fig. 2 increases or decreases the compression of spring 33, thus decreasing or increasing respectively the quantity of material that will be ejected into opening 50. Of course, if any large changes in the discharged volume are required, it will be necessary to change the stroke of piston 24 or the cross-sectional area of cylinder 23.

The foregoing description of a specific embodiment is for the purpose of complying with section 4888 of the Revised Statutes and should not be construed as imposing any unnecessary limitations upon the appended claims. From the foregoing description of a specific embodiment, those skilled in the art will appreciate the many possible variations, and other applications to different types of apparatus.

We claim:

1. A dispensing device for a lentous fluent material including a dispensing nozzle having a passage therein through which said material may be withdrawn from a source of supply and dispensed, a pair of check valves spaced in said passage and defining a first portion of said passage, each of said check valves being positioned to permit flow of material only in the direction of said nozzle from said source of supply, a first piston and cylinder communicating with said first portion of said passage, fluid-actuated means connected to said first piston to move said piston in said cylinder, a second piston and cylinder communicating with the portion of said passage between said first portion thereof and said nozzle, a second fluid-actuated means connected to said second piston to move said second piston in its cylinder, a common fluid supply means in direct communication with each of said two fluid-actuated means through which changes in fluid pressure may be applied simultaneously to move said fluid-actuated means and their respective pistons in the direction of reducing the size of the portions of the cylinders communicating with said passage whereby material from each of the cylinders is forced into said passage, and means to subsequently move said pistons in the opposite direction.

2. A dispensing device for a lentous fluent material including a dispensing nozzle having a passage therein through which said material may be withdrawn from a source of supply and dispensed, a pair of check valves spaced in said passage and defining a first portion of said passage, each of said check valves being positioned to permit flow of material only in the direction of said nozzle from said source of supply, a first piston and cylinder communicating with said first portion of said passage, fluid-actuated means connected to said first piston to move said piston in said cylinder, a second piston and cylinder communicating with the portion of said passage between said first portion thereof and said nozzle, a second fluid-actuated means connected to said second piston to move said second piston in its cylinder, each of said means being movable in one direction to move their respective pistons in the direction of pushing the material in the respective cylinders to said passage, resilient means urging said second means and second piston in the reverse of said one direction, means for moving said first fluid-actuated means and said first piston in the reverse of said one direction, and a common fluid supply means in direct communication with each of said two fluid-actuated means through which changes in fluid pressure may be applied simultaneously to move said fluid-actuated means and their respective pistons in said one direction.

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