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Lanzrath et al.

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(54) **DISPENSING PORTIONER**

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(73) Assignee: **Lowtemp Industries LLC**, Arvada, CO (US)

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This patent is subject to a terminal disclaimer.

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B67D 7/18 (2010.01)
B67D 7/28 (2010.01)
B67D 7/30 (2010.01)

(52) **U.S. Cl.**
CPC ***B67D 7/18*** (2013.01); ***B67D 7/28*** (2013.01); ***B67D 7/302*** (2013.01)

(58) **Field of Classification Search**
CPC B67D 7/18; B67D 7/28; B67D 7/302
See application file for complete search history.

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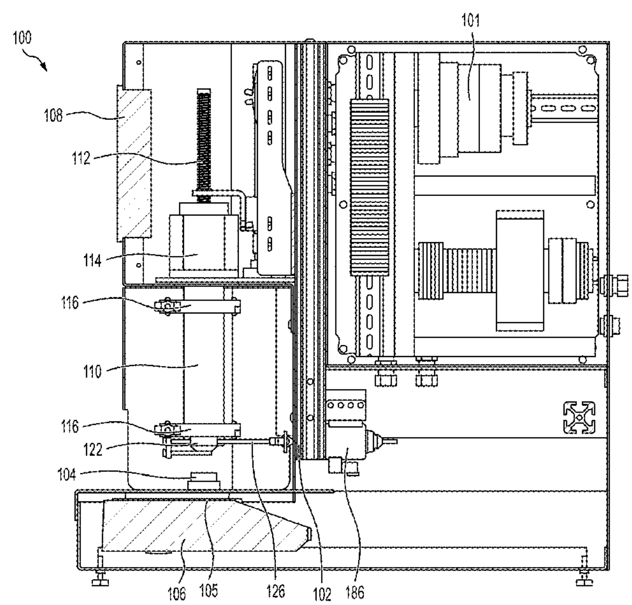
(74) *Attorney, Agent, or Firm* — Avek IP, LLC

(57) **ABSTRACT**

A portion dispensing system including a portioner configured with a controller. The portioner includes a piston configured to move within a container and force product in the container out of a nozzle opening. The controller controls the piston to dispense an input product weight and can detect the weight of dispensed product. The controller can adjust the piston to provide different weights of dispensed product and can provide pullback to substantially provide accurate dosing and eliminate product from oozing out of the nozzle opening.

20 Claims, 18 Drawing Sheets



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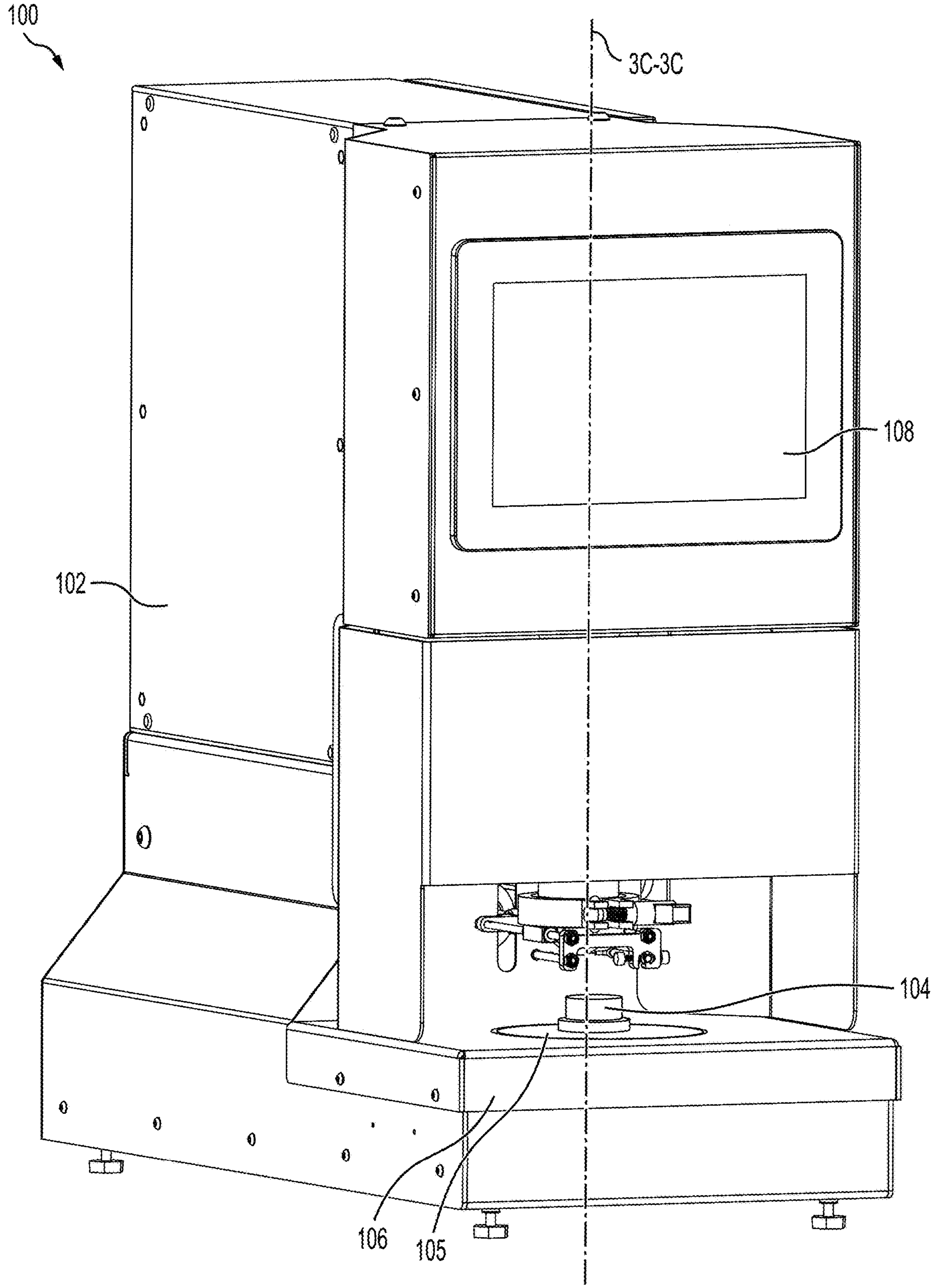

FIG. 1

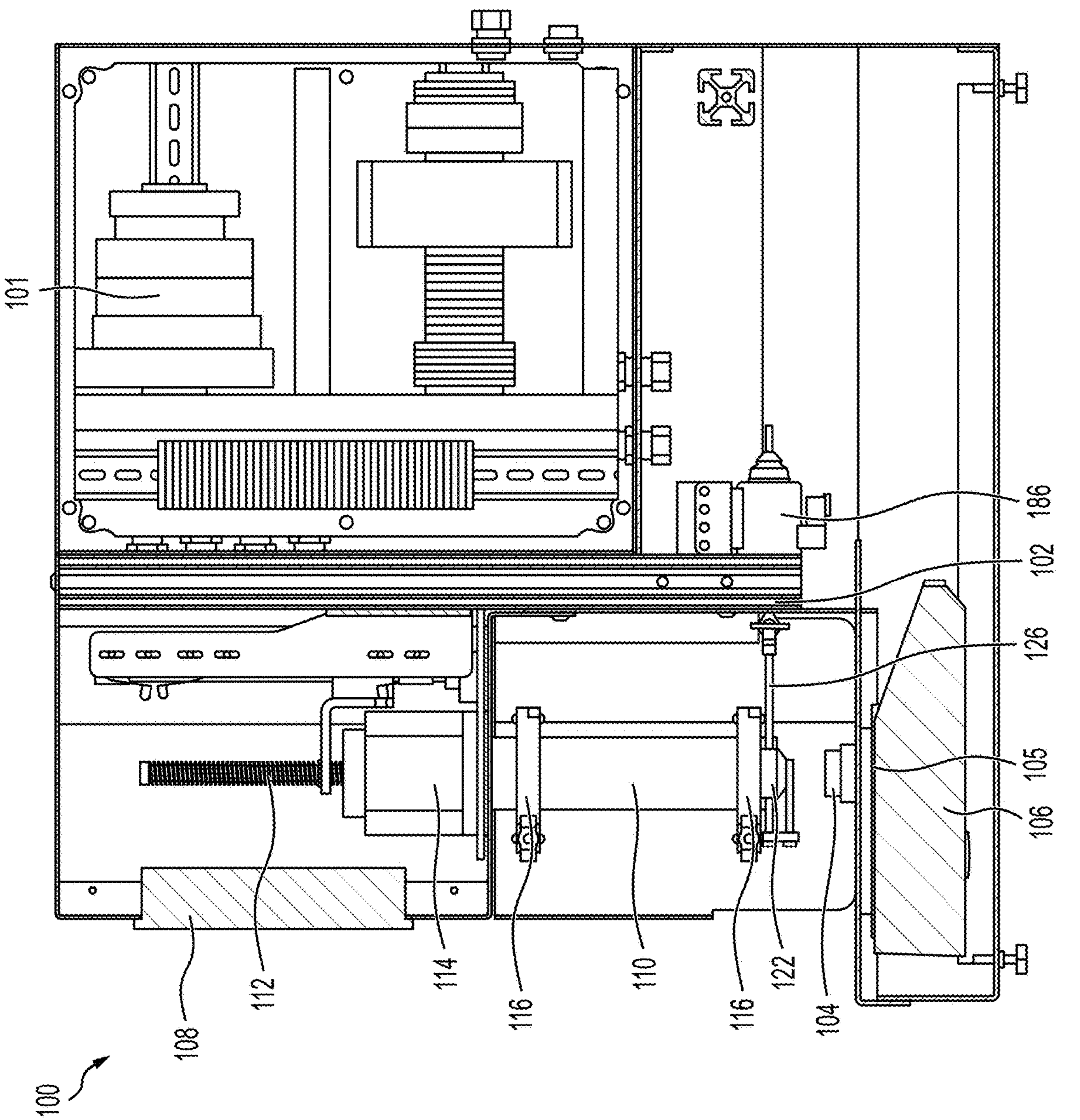

FIG. 2A

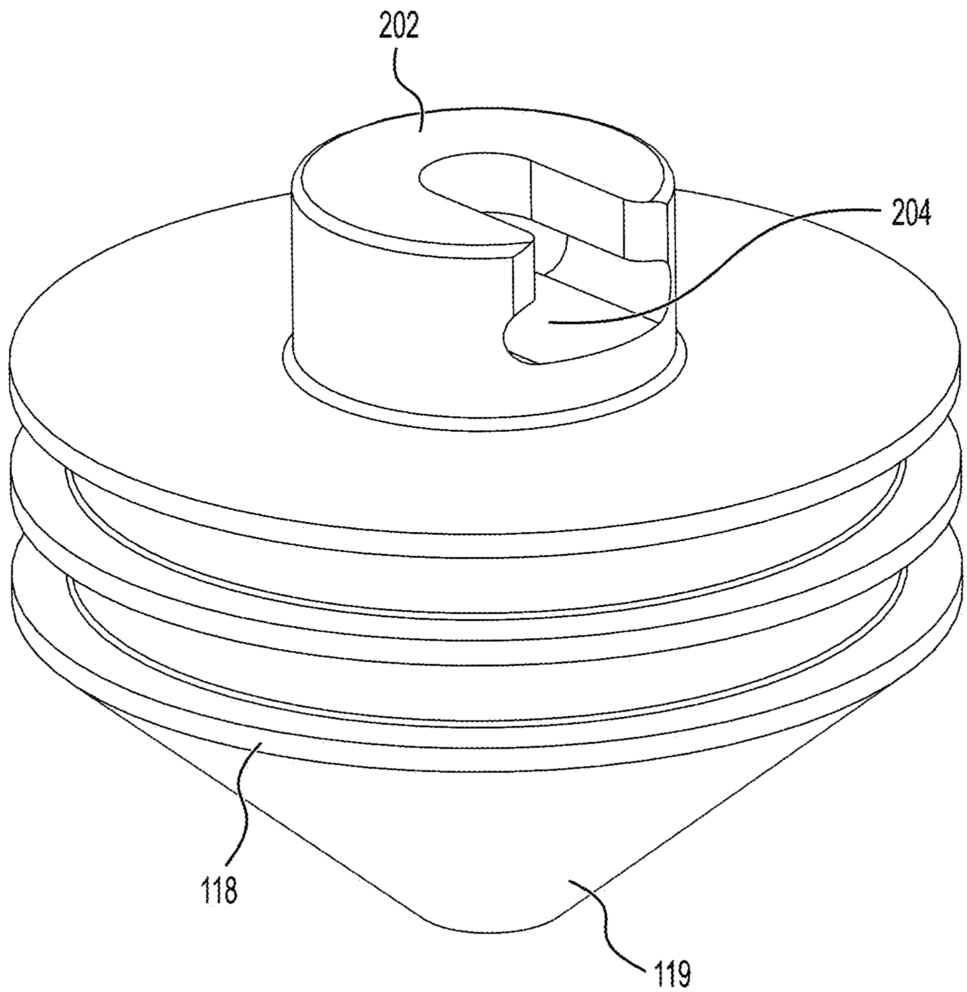

FIG. 2B

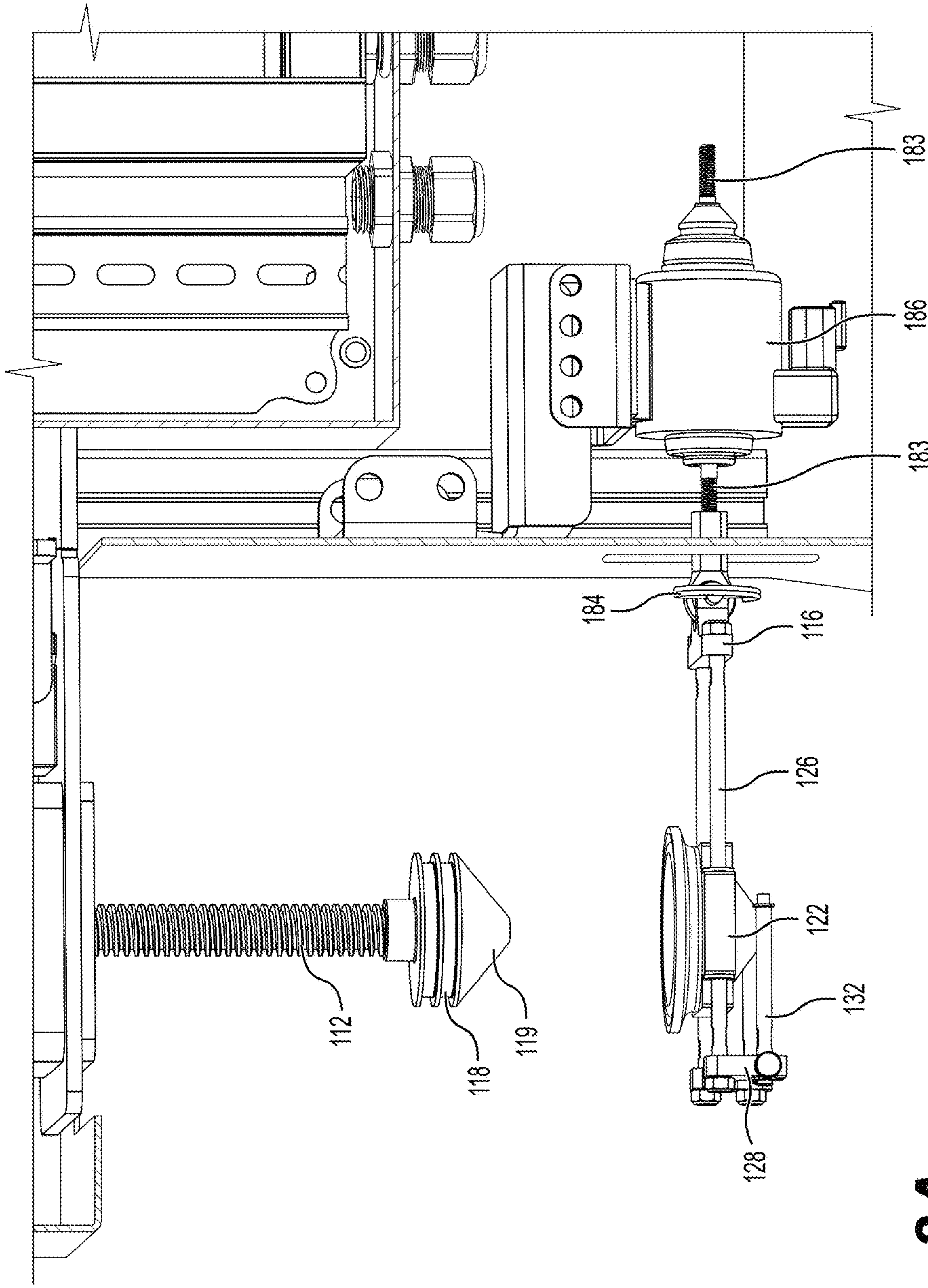

FIG. 3A

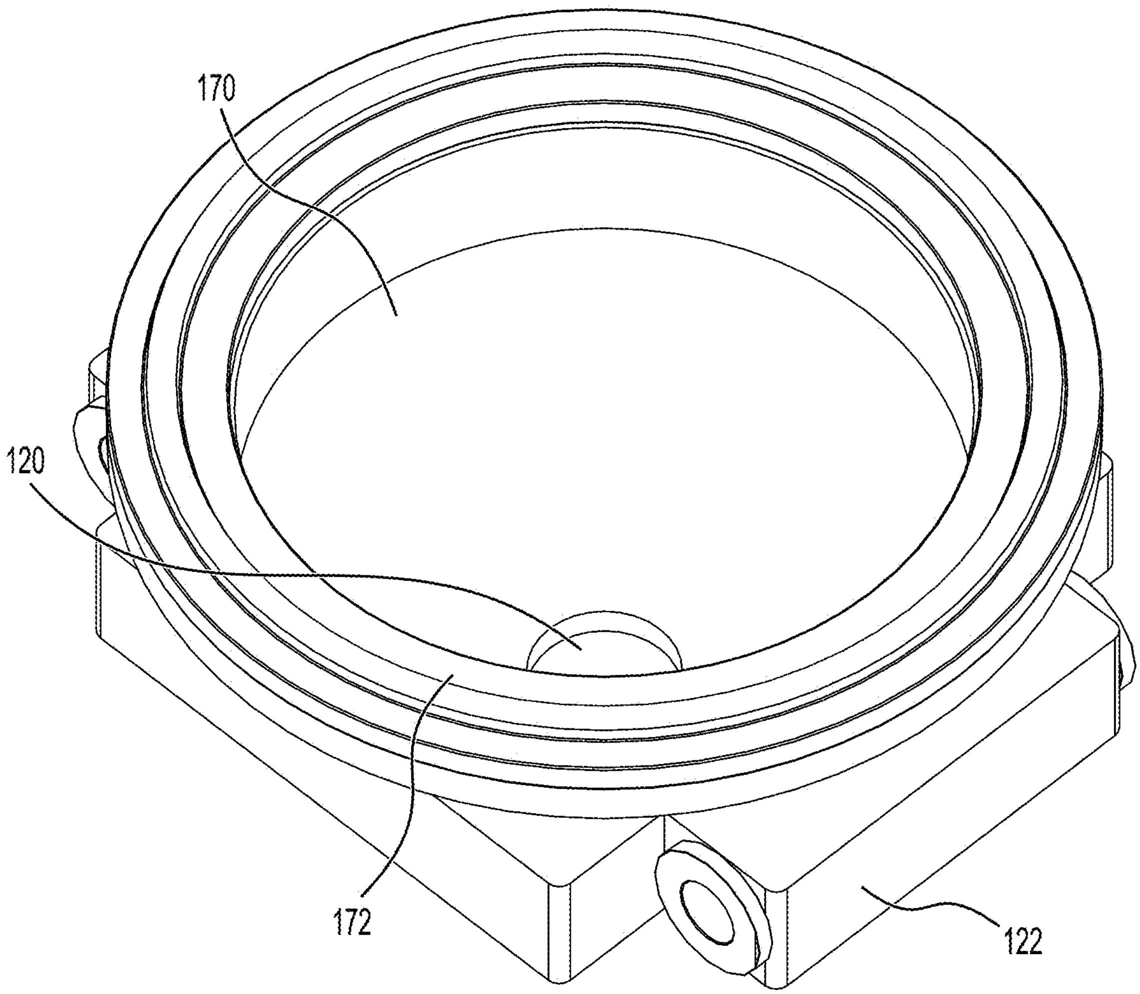

FIG. 3B

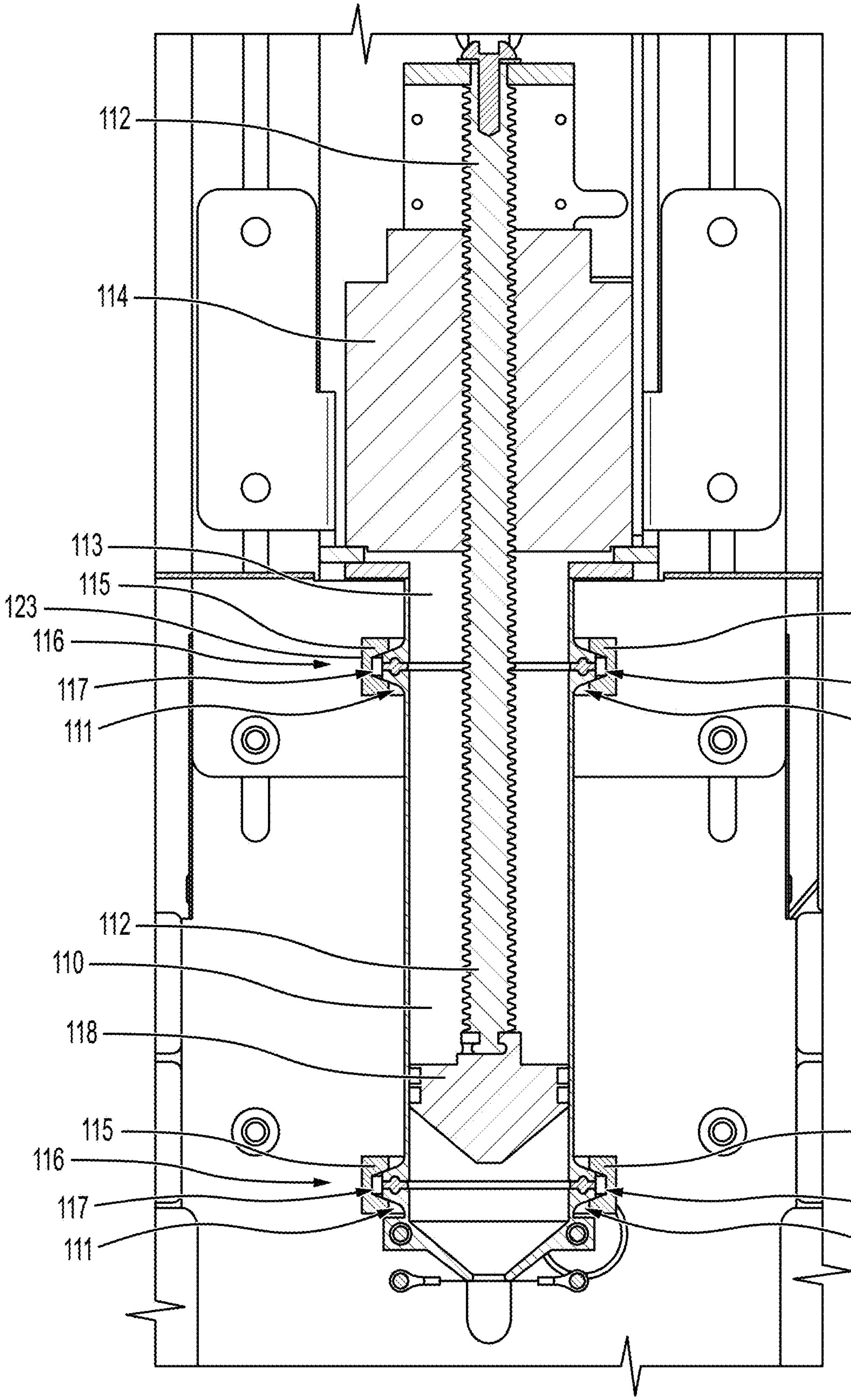
112
114
113
115
123
116
117
111
115
117
111
112
110
118
115
116
117
111
115
117
111

FIG. 3C

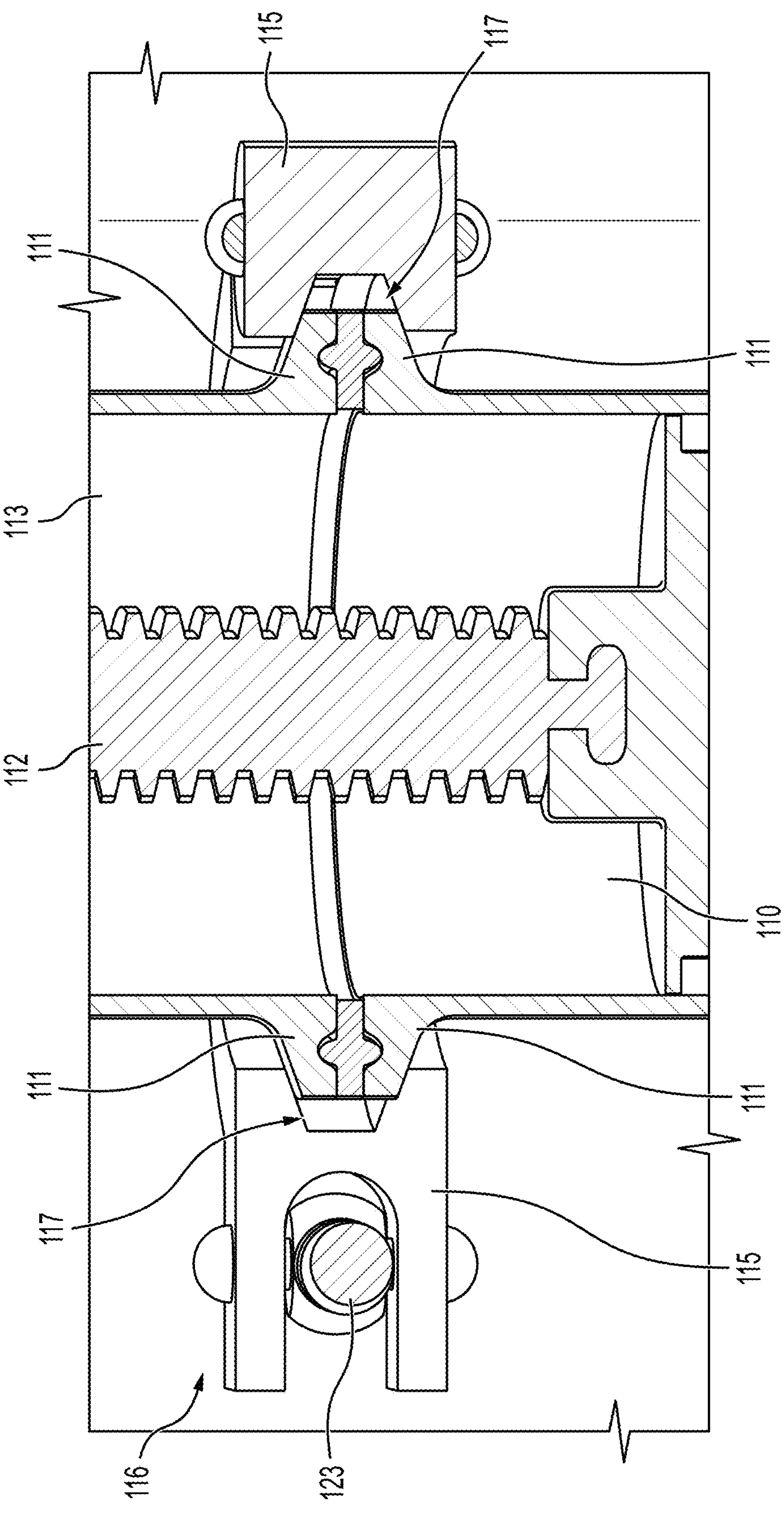

FIG. 3D

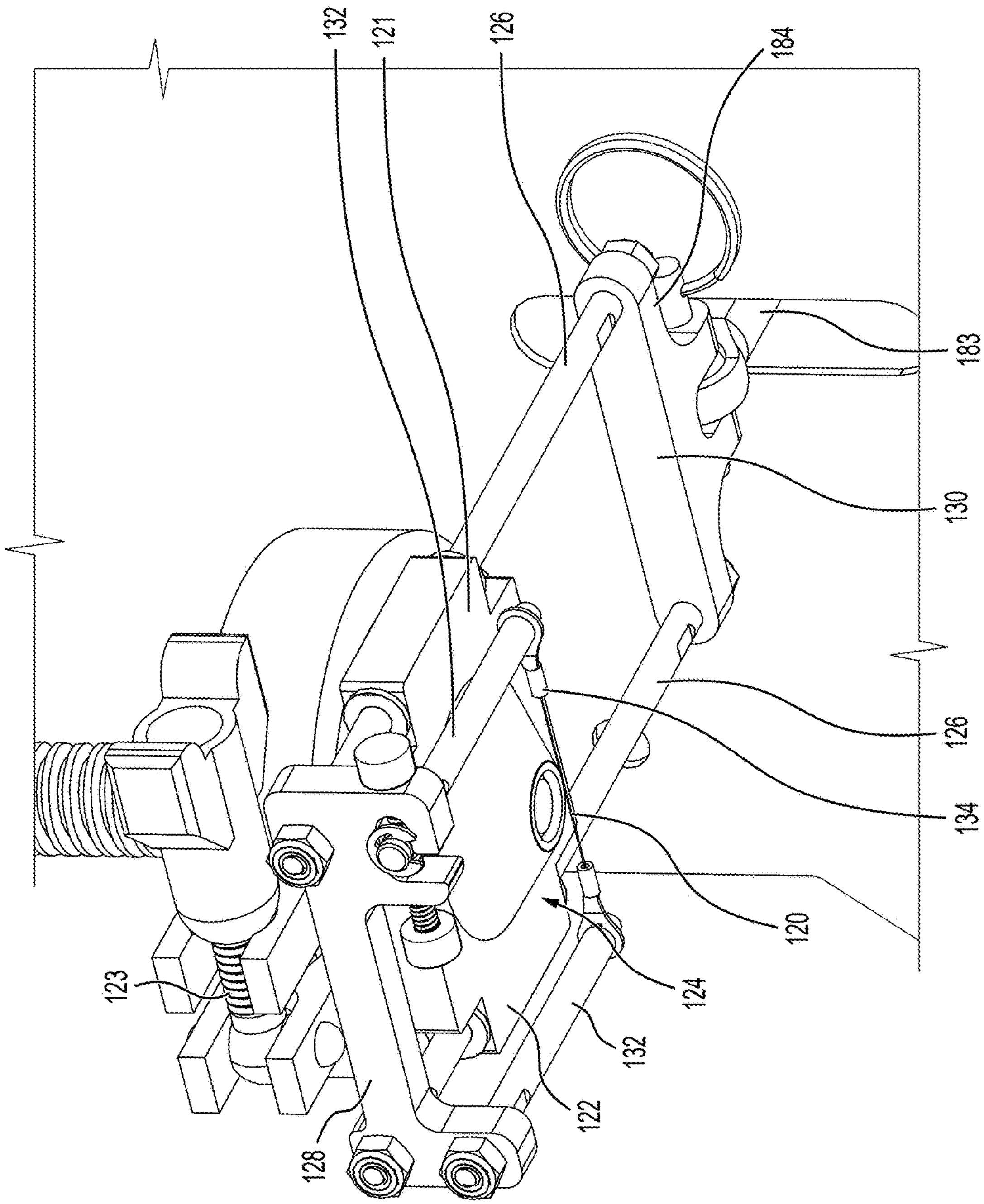

FIG. 4A

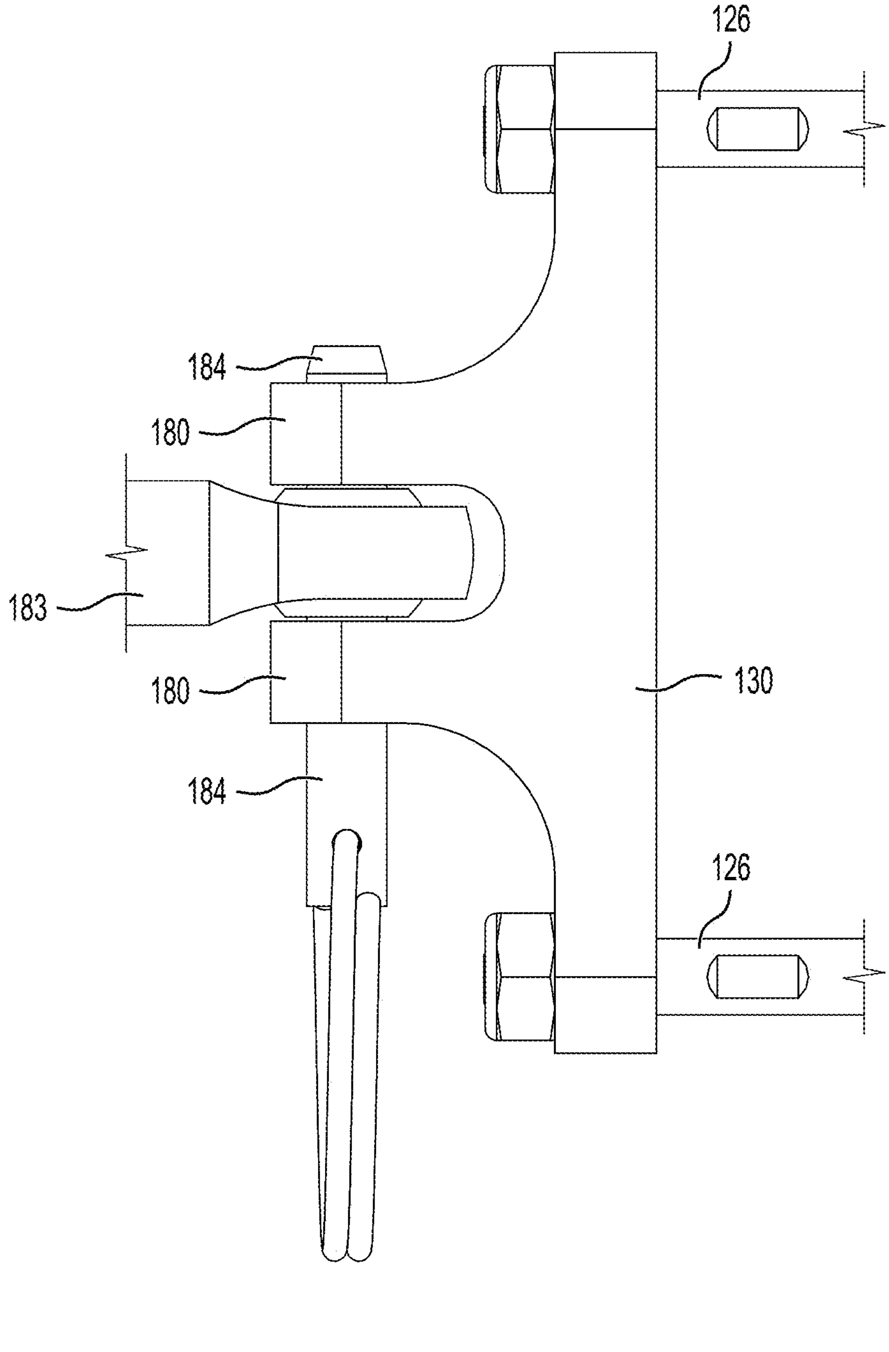

FIG. 4B

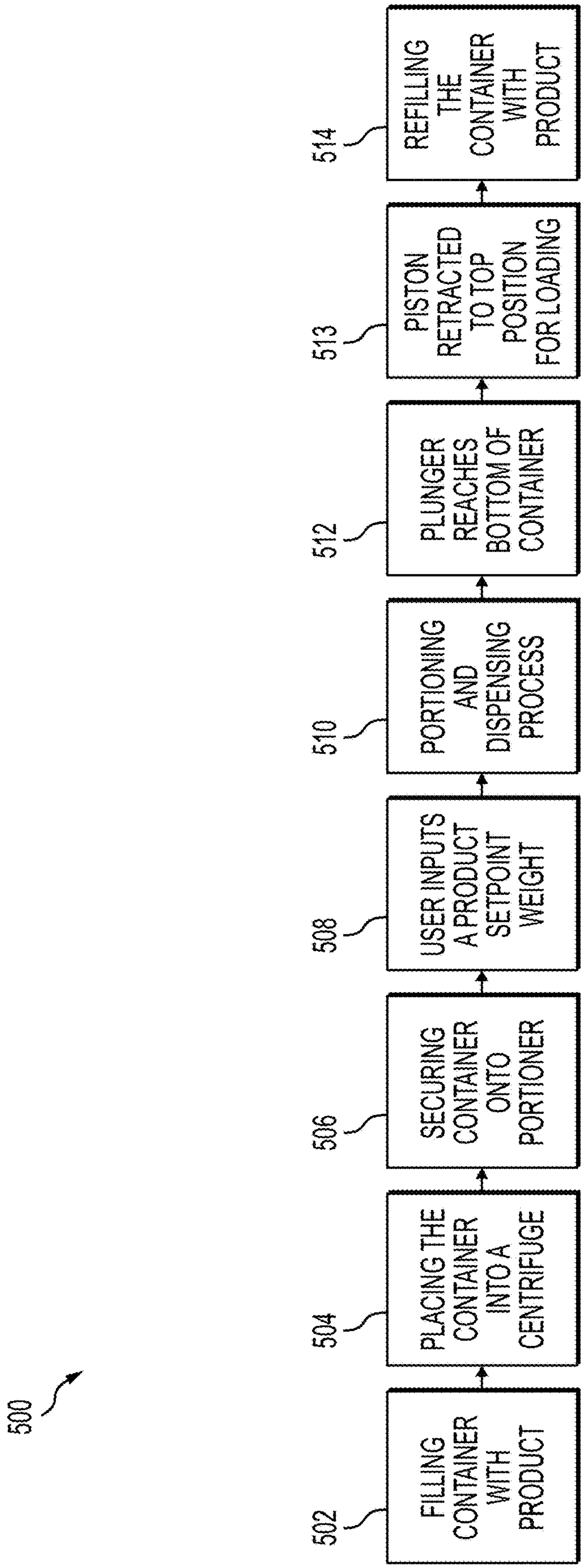
500
502
FILLING CONTAINER WITH PRODUCT
504
PLACING THE CONTAINER INTO A CENTRIFUGE
506
SECURING CONTAINER ONTO PORTIONER
508
USER INPUTS A PRODUCT SETPOINT WEIGHT
510
PORTIONING AND DISPENSING PROCESS
512
PLUNGER REACHES BOTTOM OF CONTAINER
513
PISTON RETRACTED TO TOP POSITION FOR LOADING
514
REFILLING THE CONTAINER WITH PRODUCT

FIG. 5A

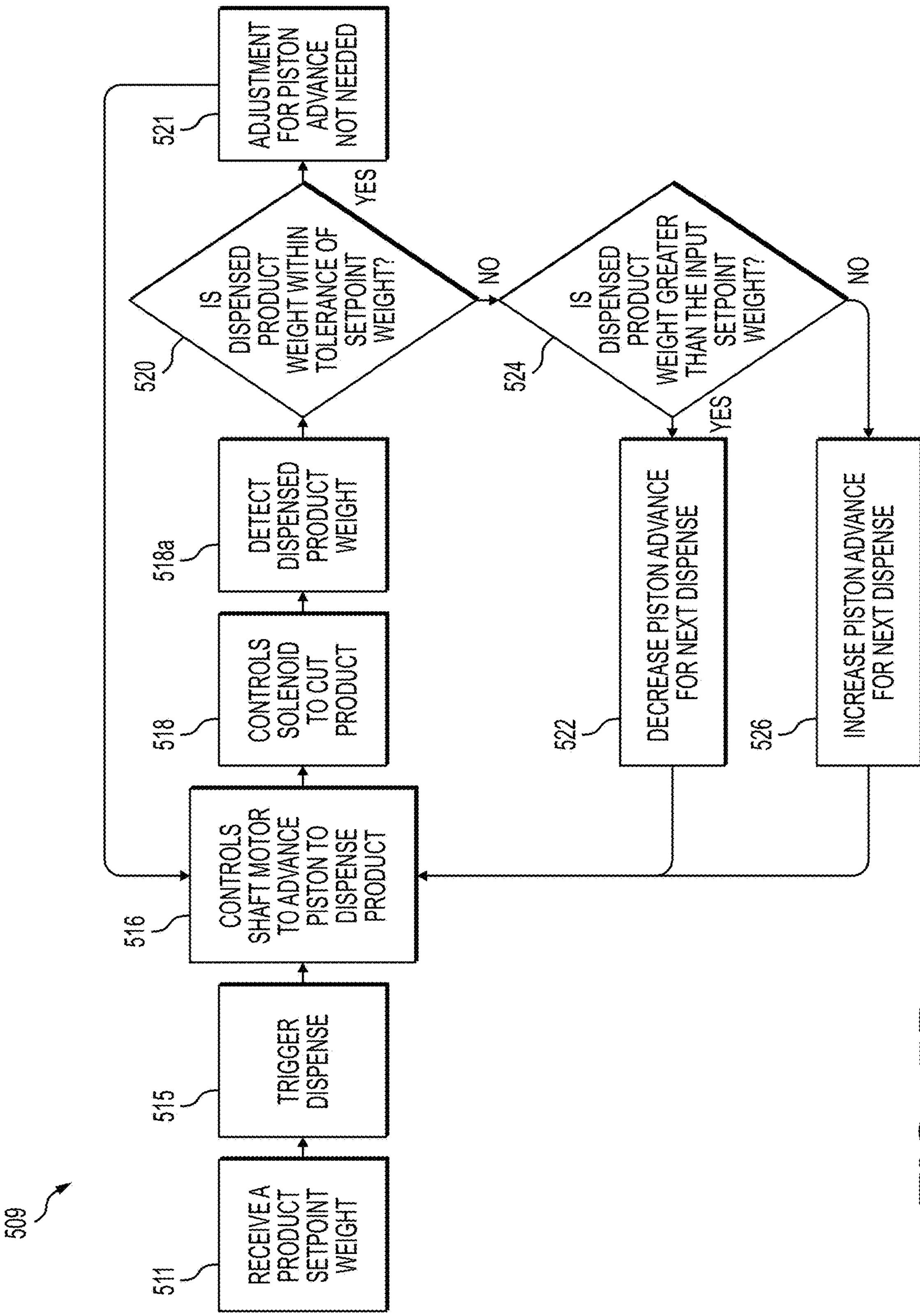
509
511
RECEIVE A PRODUCT SETPOINT WEIGHT
515
TRIGGER DISPENSE
516
CONTROLS SHAFT MOTOR TO ADVANCE PISTON TO DISPENSE PRODUCT
518
CONTROLS SOLENOID TO CUT PRODUCT
518a
DETECT DISPENSED PRODUCT WEIGHT
520
IS DISPENSED PRODUCT WEIGHT WITHIN TOLERANCE OF SETPOINT WEIGHT?
YES
NO
521
ADJUSTMENT FOR PISTON ADVANCE NOT NEEDED
524
IS DISPENSED PRODUCT WEIGHT GREATER THAN THE INPUT SETPOINT WEIGHT?
YES
NO
522
DECREASE PISTON ADVANCE FOR NEXT DISPENSE
526
INCREASE PISTON ADVANCE FOR NEXT DISPENSE

FIG. 5B

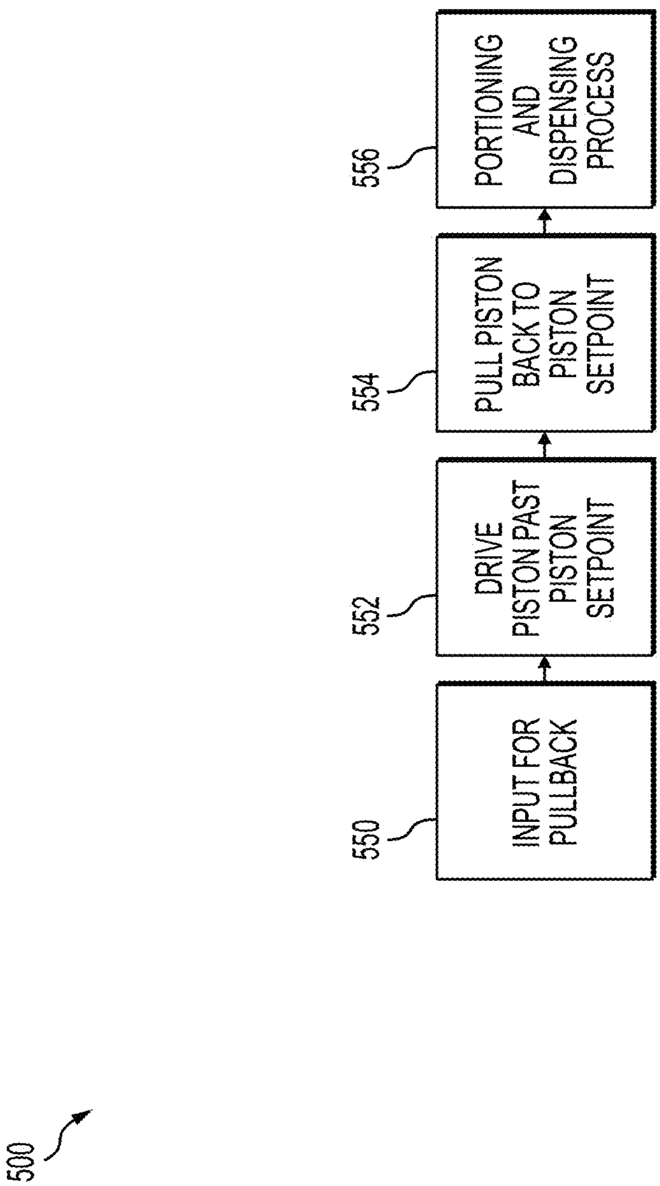
500
550
INPUT FOR PULLBACK
552
DRIVE PISTON PAST PISTON SETPOINT
554
PULL PISTON BACK TO PISTON SETPOINT
556
PORTIONING AND DISPENSING PROCESS

FIG. 5C

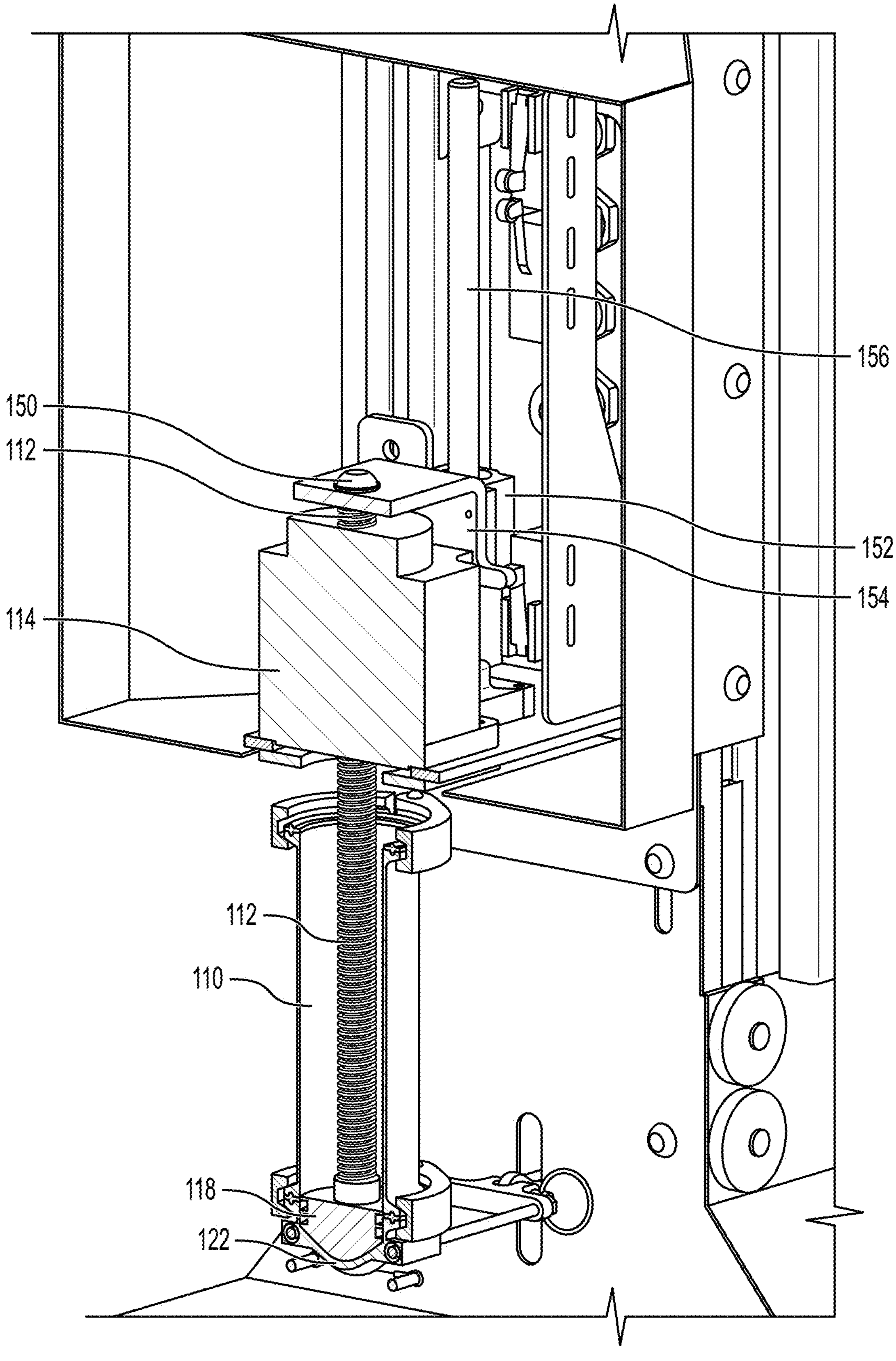

FIG. 6A

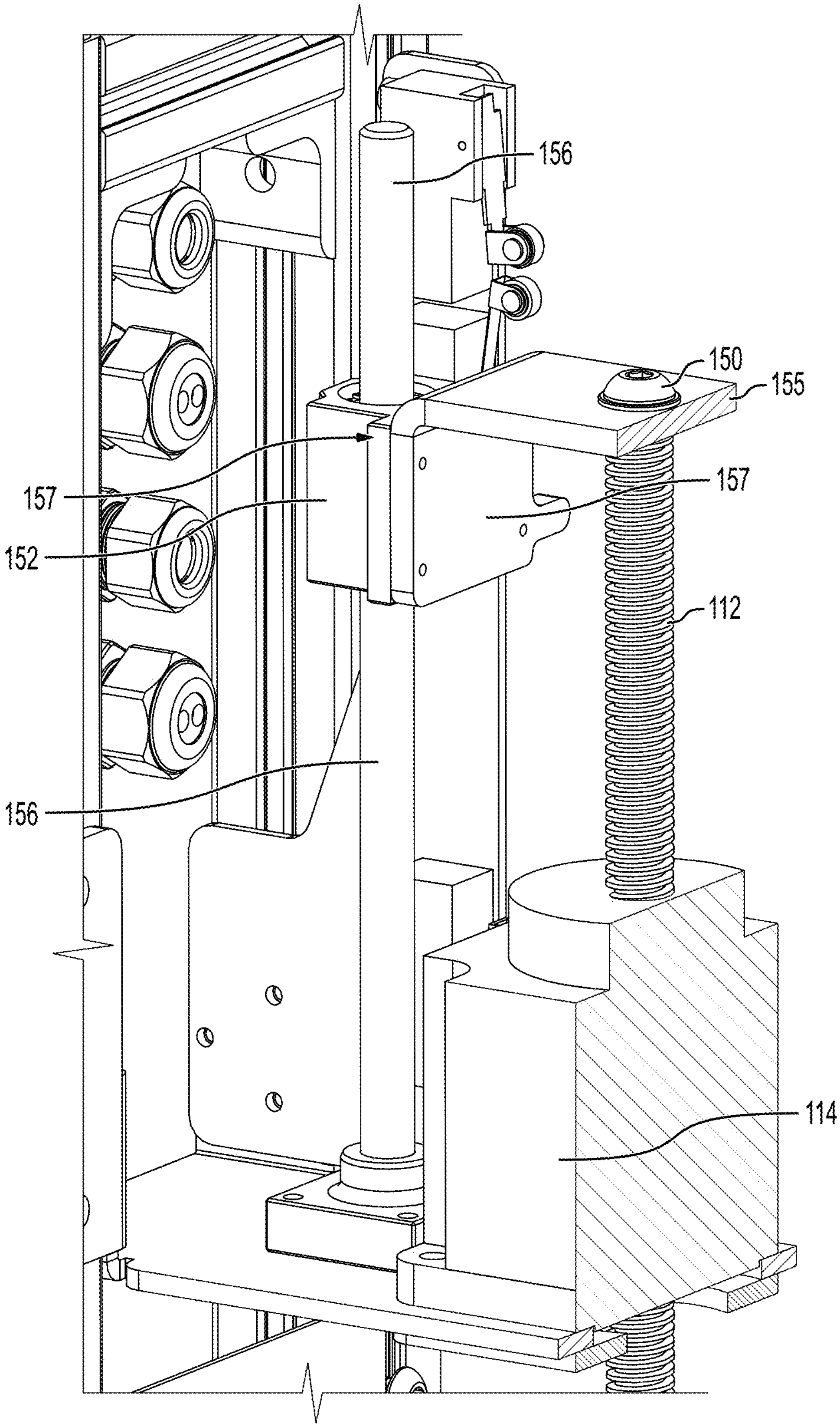

FIG. 6B

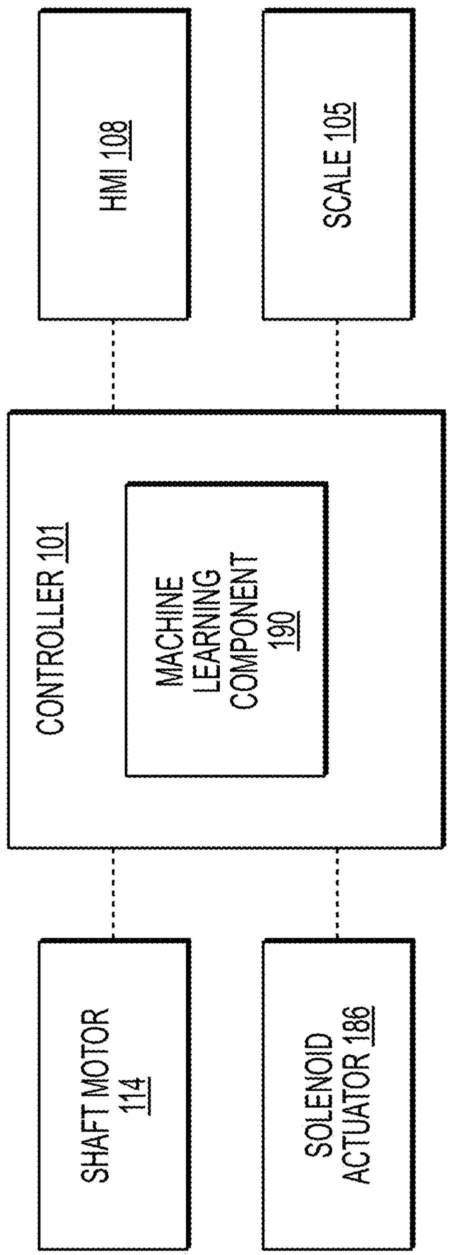
HMI 108
SCALE 105
CONTROLLER 101
MACHINE LEARNING COMPONENT 190
SHAFT MOTOR 114
SOLENOID ACTUATOR 186

FIG. 7

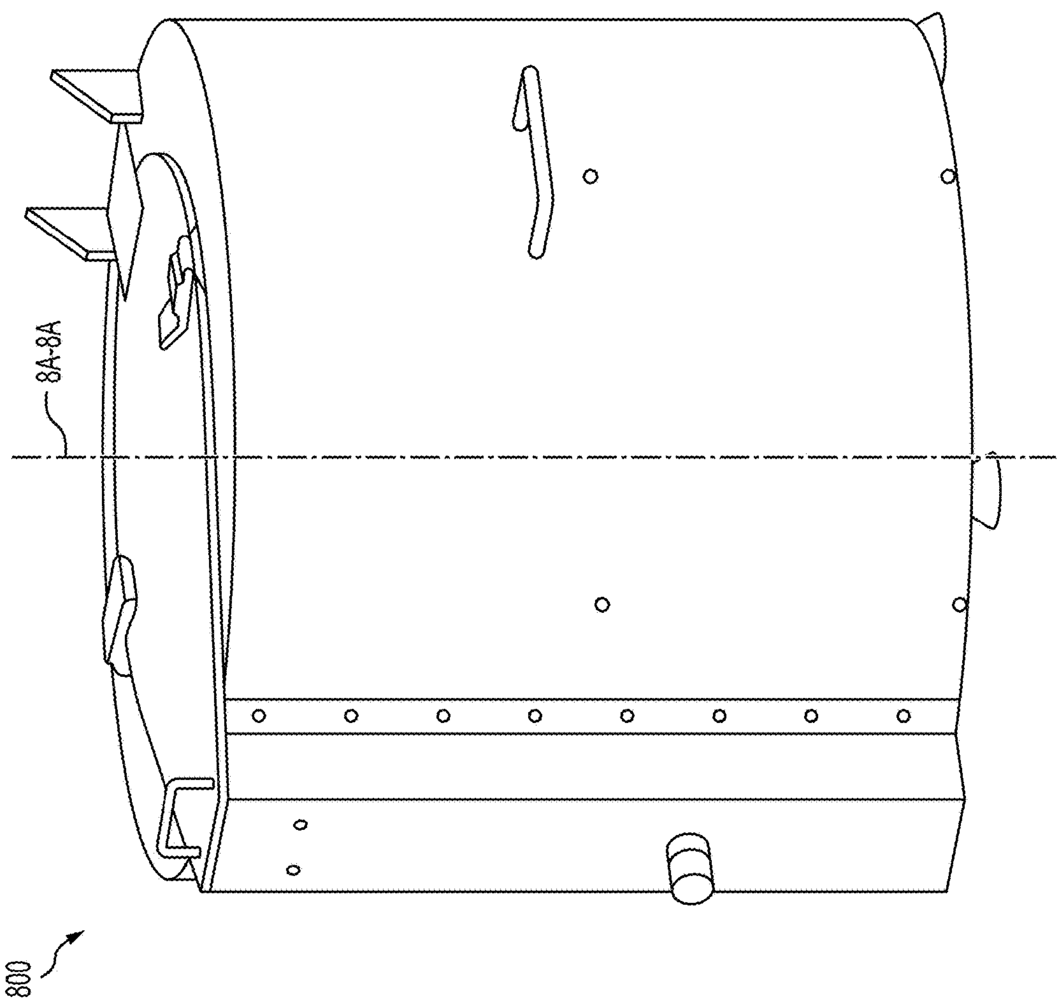

FIG. 8A

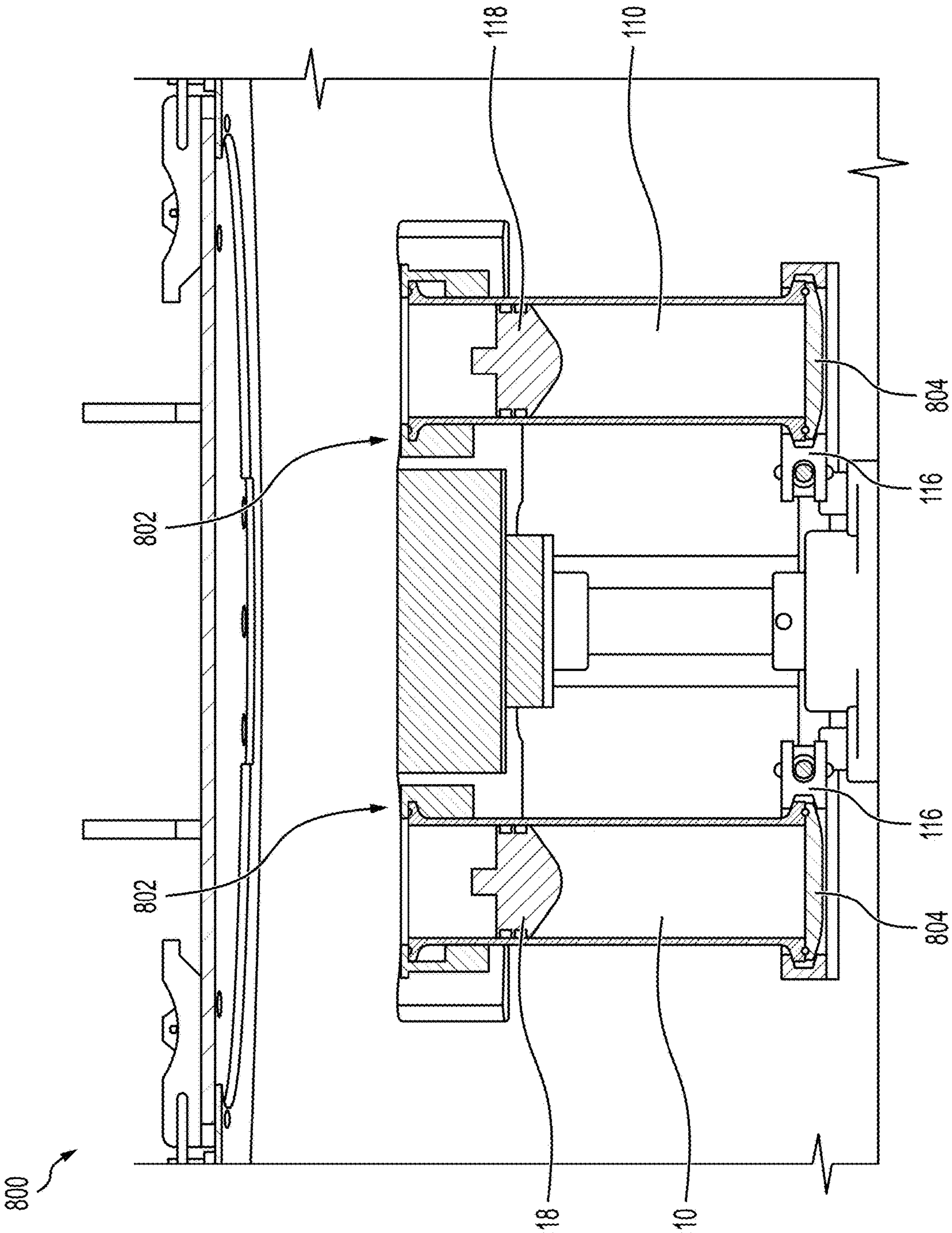

FIG. 8B

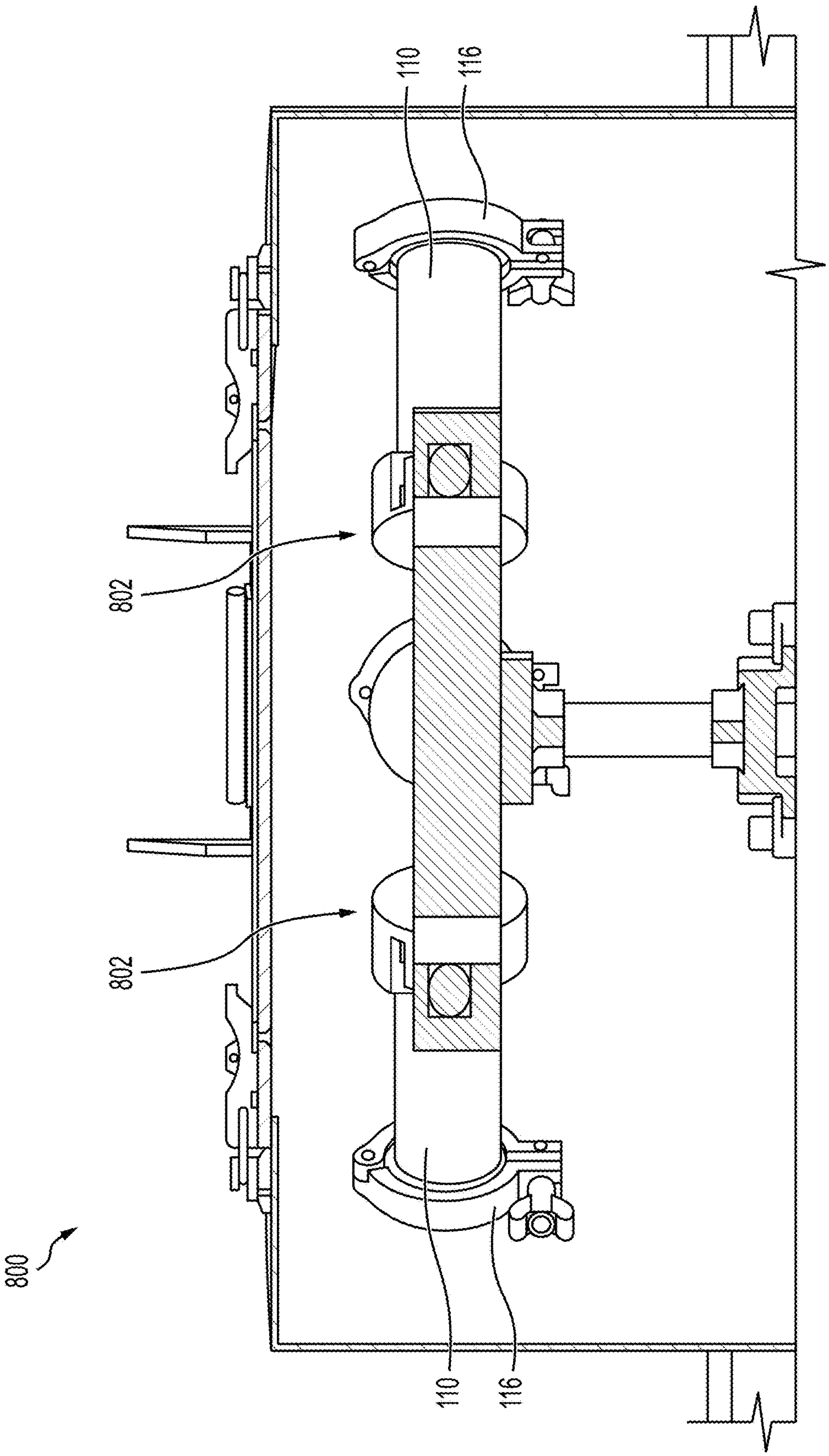

FIG. 8C

DISPENSING PORTIONER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 18/954,024, filed Nov. 20, 2024, which claims the benefit of U.S. Provisional Patent Application No. 63/600,817, filed Nov. 20, 2023, and U.S. Provisional Patent Application No. 63/551,571, filed Feb. 9, 2024, the entire contents thereof are herein incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field

The disclosed embodiments relate generally to the field of product dispensers. More specifically, the disclosed embodiments relate to the field of automatically dispensing a flowable solid.

2. Description of the Related Art

It is known to have a product dispenser which dispenses a flowable solid.

SUMMARY

This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter. Other aspects and advantages will be apparent from the following detailed description of the embodiments and the accompanying drawing figures.

In some embodiments, the techniques described herein relate to a portioner including: a user interface communicatively connected to a controller configured to receive a product setpoint weight; a scale communicatively connected to the controller and configured to detect a dispensed product weight when product is dispensed out of a container; the controller being communicatively and operatively connected to a shaft motor wherein the shaft motor is configured to drive a piston within the container and force the product out of the container; the controller being configured to: receive the product setpoint weight and determine a piston setpoint based on the product setpoint weight; and implement the piston setpoint to the piston and dispense the product out of the container; when the product is dispensed, the controller being configured to receive the dispensed product weight and modify the piston setpoint based on the dispensed product weight.

In some embodiments, the techniques described herein relate to a portioner including a nozzle opening wherein the product in the container is directed out of the nozzle opening when the product is being dispensed.

In some embodiments, the techniques described herein relate to a portioner wherein the piston is mounted to an end of a drive shaft and the shaft motor actuates the drive shaft.

In some embodiments, the techniques described herein relate to a portioner wherein the piston includes a downwardly-extending conical end configured to form a seal against inner walls of the container when the piston is driven in the container.

In some embodiments, the techniques described herein relate to a portioner including a wire positioned beneath the nozzle opening and configured to move across the nozzle opening and cut through the product when the piston forces the product out of the nozzle opening.

In some embodiments, the techniques described herein relate to a portioner including a pair of clamps configured to secure the container to the portioner.

In some embodiments, the techniques described herein relate to a portioner wherein the container includes flanges which extend from the container at either end.

In some embodiments, the techniques described herein relate to a portioner wherein the pair of clamps includes a groove configured to receive the flanges and secure the container to the portioner.

In some embodiments, the techniques described herein relate to a portioner wherein the controller includes a machine learning component including data corresponding to piston setpoints and dispensed product weights, and product setpoint weights.

In some embodiments, the techniques described herein relate to a portioner wherein the machine learning component determines the piston setpoint based on the product setpoint weight.

In some embodiments, the techniques described herein relate to a portioner wherein when the product is dispensed, the machine learning component receives the dispensed product weight and modifies the piston setpoint based on the dispensed product weight.

In some embodiments, the techniques described herein relate to a portioner wherein the controller implements pullback to the piston which causes product hanging from beneath the nozzle opening to be sucked back into the container.

In some embodiments, the techniques described herein relate to a portioner wherein the user interface is a touch-screen interface.

In some embodiments, the techniques described herein relate to a method for dispensing a product with a portioner, the method including: receiving a product setpoint weight from a user interface wherein the product setpoint weight is an amount of product to be dispensed from a container; determining a piston setpoint based upon the product setpoint weight wherein the piston setpoint corresponds to a distance a piston is driven within a container; driving the piston within the container to dispense the product; receiving a dispensed product weight from a scale configured to collect product dispensed from the container; and modifying the piston setpoint based upon the product setpoint weight and the dispensed product weight.

In some embodiments, the techniques described herein relate to a method including centrifuging the container loaded with product in a centrifuge prior to driving the piston within the container.

In some embodiments, the techniques described herein relate to a method including securing the container to the portioner using a pair of clamps prior to driving the piston within the container.

In some embodiments, the techniques described herein relate to a method including modifying the piston setpoint to provide pullback thereby creating a vacuum within the container which can pull product hanging beneath a nozzle opening of the container back into the container.

In some embodiments, the techniques described herein relate to a method wherein the piston is driven by a drive shaft connected to a shaft motor.

In some embodiments, the techniques described herein relate to a method including moving a wire across the nozzle opening and cutting through product hanging beneath the nozzle opening.

In some embodiments, the techniques described herein relate to a portioner including: a piston mounted to a drive shaft configured to drive the piston upwards and downwards in a container; a nozzle opening configured to align with the container and direct a product out of the container when the piston is driven downwards; a wire positioned beneath the nozzle opening and configured to move across the nozzle opening and cut through the product when the piston forces the product out of the nozzle opening.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Illustrative embodiments are described in detail below with reference to the attached drawing figures, which are incorporated by reference herein and wherein:

FIG. **1** is a perspective view of a dispensing portioner of embodiments of the present disclosure;

FIG. **2**A is a side view of the dispensing portioner of FIG. **1** with a side panel removed;

FIG. **2**B is a close-up perspective view of the piston of the dispensing portioner of FIG. **1**;

FIG. **3**A is a side view of the dispensing portioner of FIG. **1** with a container removed to reveal a shaft and a plunger;

FIG. **3**B is a top perspective view of a nozzle platform of the dispensing portioner of FIG. **1**;

FIG. **3**C is a cross-sectional view of the shaft of the dispensing portioner of FIG. **1** taken along the line **3**C-**3**C shown in FIG. **1**;

FIG. **3**D is a close-up cross-sectional view of the shaft of the dispensing portion of FIG. **1** taken along the line **3**C-**3**C shown in FIG. **1**;

FIG. **4**A is an underneath perspective view of the dispensing portioner of FIG. **1**;

FIG. **4**B is a top perspective view of a second rod mount of the dispensing portioner of FIG. **1**;

FIG. **5**A is a high-level method flow diagram executable with the dispensing portioner of FIG. **1**;

FIG. **5**B is a logic flow used by the controller of the dispensing portioner of FIG. **1** in embodiments;

FIG. **5**C is another logic flow executable by the controller of the dispensing portioner of FIG. **1** in embodiments;

FIG. **6**A is a cross-sectional view taken at a perspective along the line **3**C-**3**C shown in FIG. **1** of the dispensing portioner of FIG. **1**;

FIG. **6**B is a close-up view of the shaft and slide mount of the dispensing portioner of FIG. **1**;

FIG. **7** is a system for having the dispensing portioner of FIG. **1**;

FIG. **8**A is a perspective view of a centrifuge of embodiments of the present disclosure;

FIG. **8**B is a cross-sectional view of the centrifuge of FIG. **8**A taken along the line **8**A-**8**A with a container in a vertical position; and

FIG. **8**C is a cross-sectional view of the centrifuge of FIG. **8**A taken along the line **8**A-**8**A with a container in a horizontal position.

The drawing figures do not limit the invention to the specific embodiments disclosed and described herein. The drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the invention.

DETAILED DESCRIPTION

The following detailed description references the accompanying drawings that illustrate specific embodiments in which the invention can be practiced. The embodiments are intended to describe aspects of the invention in sufficient detail to enable those skilled in the art to practice the invention. Other embodiments can be utilized and changes can be made without departing from the scope of the invention. The following detailed description is, therefore, not to be taken in a limiting sense. The scope of the invention is defined only by the appended claims, along with the full scope of equivalents to which such claims are entitled.

In this description, references to "one embodiment," "an embodiment," or "embodiments" mean that the feature or features being referred to are included in at least one embodiment of the technology. Separate references to "one embodiment," "an embodiment," or "embodiments" in this description do not necessarily refer to the same embodiment and are also not mutually exclusive unless so stated and/or except as will be readily apparent to those skilled in the art from the description. For example, a feature, structure, act, etc. described in one embodiment may also be included in other embodiments, but is not necessarily included. Thus, the technology can include a variety of combinations and/or integrations of the embodiments described herein.

Dispensing portioner machines currently used for dispensing a portion of a product may be inaccurate and inefficient. Current arrangements typically heat, melt, and flow the product or concentrate using gravity. Current processes may degrade the product and make it very difficult to maintain weight accuracy when dispensing. In some prior arrangements, gases such as compressed air and pressurized nitrogen can degrade the product and make a substantially less pure product. A system and a method are needed which substantially improve upon current dispensing portioners by providing greater accuracy and efficiency while limiting the exposure of the product to elevated temperatures.

Embodiments disclosed herein provide a system and a method for a substance portioning system. In embodiments, this might be a concentrate or product dosing system, e.g., for rosin or other materials. The portioner includes mechanisms and a control system, which by way of extrusion without adding heat, dispenses portions of product into a dish and weighs the amount of product dispensed. The system portioner uses pressure administered by a motorized plunger or ram to force an unheated desired amount of product out of a removable shell through a nozzle. The portioner includes a cutting wire (which can be optionally heated). The wire is configured to move across the nozzle to cut an appropriate length of product. Because the cut portions of product are not melted and are emitted from the nozzle with a consistent diameter, the accuracy in dispensing can be more exact.

Additionally, the dispensing portioner includes machine learning capabilities such that, as portions, e.g., of solid or substantially solid product, are cut and dropped into a dish resting on a scale, weight feedback is transmitted to a processing component as each portion of product is dropped into the dish. This allows for continual portioner adjustment in the dispensing and cutting processes to either increase or decrease the time between cuts to consequently increase or decrease the weight of the product portions being dispensed. In some embodiments, the flow rate or the rate of product being dispensed may also be increased or decreased to produce a weight of the product portions.

FIG. **1** shows a perspective view of the dispensing portioner **100**. The portioner **100** includes a shell **102** covering the components of and forming the structure for the portioner **100**. In embodiments, the shell **102** may be formed using UL industrial control panels which are manufactured and certified according to the UL 508A standard (i.e., a hazardous area mark). The portioner **100** includes a dish **104** positioned on a platform **106**. In embodiments, the dish **104** is bowl shaped to collect a product dispensed from the portioner **100**, but in other embodiments may be a vial or other container which may be used to collect product. In embodiments, an electronic scale **105** is built into the platform **106** and located immediately underneath the dish **104**. The scale **105** is configured to detect the weight of a portion of product (concentrate) that is received into the dish **104**. To do this, the weight of the dish **104** can be calibrated prior to the dish **104** receiving a portion of product. The scale **105** can be communicatively connected to a controller **101** (see FIG. **2**A and FIG. **7**) via wire or wireless connection.

FIG. **2**A shows a side perspective view of the portioner **100** with a side panel of the shell **102** removed. The portioner **100** includes a container **110** which is configured to be coupled to a shaft **112**. In embodiments, and shown in FIG. **2**B, a piston **118** includes an extension **202** with a slot **204** which allows the piston **118** to be removable from shaft **112**. The extension **202** extends away from the piston **118** such that the slot **204** engages with the shaft **112**. The shaft **112** is driven by shaft motor **114** which may be a step motor. The container **110** is cylindrically shaped in embodiments and is removably securable around the shaft **112** using a pair of removable clamps **116**. Clamps **116** include adjustable screws that enable the container **110** to be secured at upper and lower portions around the shaft **112**. Additionally, the clamps **116** can be a tri-clamp that includes a screw adjustment enabling the clamping diameter to be adjusted to accommodate the container size or to fine tune the clamping action. Thus, a lever action is used to remove each clamp at each location. Clamps **116** can be attached and removed to make the container **110** removable from, and reinstallable onto the portioner **100**.

FIG. **3**C shows a cross-sectional view taken along the line **3**C-**3**C shown in FIG. **1** of the shaft **112** extending through the container **110** secured using clamps **116**. FIG. **3**D shows a close-up view of the upper edge of container **110** connected to the container extension **113** using a clamp **116**. The container **110** includes flanges **111** which form an extended or outcropped edge at the upper and lower ends of the container **110**. The container **110** at its upper end is connected to a container extension **113** extending from the upper clamp **116** to abut the shaft motor **114** from underneath. At its lower end, the container **110** is connected to an upper edge **172** (see FIG. **3**B) of a nozzle platform **122**. The container extension **113** and the container extension **113** each include flanges **111**. The clamps **116** each include a groove **117** recessed into a clamping arm **115**. The groove **117** recessed into the clamping arms **115** allow for the flanges **111** on each end of the container **110**, the container extension **113**, and the upper edge **172** to insert and be secured by the clamping arms **115**. In embodiments, the groove **117** of the upper clamp **116** allows for the flanges **111** of the upper end of the container **110** and the container extension **113** to be secured while the groove **117** of the lower clamp **116** allows for the flanges **111** of the lower end of the container **110** and the upper edge **172** to be secured. The clamping arms **115** are adjustable using a screw **123** (see FIG. **3**D) which increases or decreases the diameter of the clamping arms **115** such that the flanges **111** of the container **110** may be removed or secured by the clamping arms **115** of the clamps **116**.

The shaft **112** is configured to translate upwards and downwards within the container **110** as it is driven by the shaft motor **114**. In embodiments, the shaft motor **114** may be a stepper motor or a servo motor configured to drive the shaft **112** upwards and downwards in alignment with a vertical direction. FIG. **2**A shows the shaft **112** at a lowered position.

FIG. **3**A shows a close-up side perspective view of the portioner **100** with the container **110** removed to reveal the portion of the shaft **112** extending through the container **110** and the mounted piston **118** configured on an end of the shaft **112**. In embodiments, the container **110** may be removed by loosening the clamps **116** which in embodiments is accomplished by loosening screw **123** adjusting the diameter of each clamp **116** to force the clamp **116** to constrict against the flanges **111** of the container **110**. The shaft **112** at its lower end is attached to the piston **118**. In embodiments, the piston **118** is configured with extension **202** and slot **204** so that it is detachable from the shaft **112**. Removal of the piston head **118** from the shaft **112** (in embodiments) may be necessary to allow for the container **110** to be removed separately from piston **118**, or for the piston **118** to be removed with container **110**. In embodiments, the piston **118** has a cylindrical outer surface making a precise clearance fit within the cylindrical internal surfaces of the container. Thus, the piston **118** slides vertically within the container **110** so the outer edges of the piston **118** substantially form a seal against the inner walls of the container **110**. The piston **118** includes a downwardly-extending conical end **119** such that when the piston **118** translates downwards in the container **110** due to force generated by the shaft motor **114**, product is forced out through a nozzle opening **120** (FIGS. **3**B and **4**A) configured on the nozzle platform **122**.

The nozzle platform **122** is positioned directly below the lower of the clamps **116** when clamp **116** secures the container **110**. The upper edge **172** (see FIGS. **3**B and **3**C) of the nozzle platform **122** abuts and inserts into the groove **117** of the clamp **116**. The nozzle platform **122** is configured and aligned with the container **110**, such that the conical end **119** of the piston **118** aligns with a conically shaped chamber **170** (FIG. **3**B) within the nozzle platform **122**. Thus, driving the conical piston head **118** downward forces product from the container **110** to engage the internal surfaces in the chamber **170** and then out the aperture **120** below the nozzle platform **122**.

FIG. **6**A shows a cross-sectional view of the portioner **100** revealing the shaft **112** extending up into the driving motor **114**. In FIG. **6**A, container extension **113** is removed, but can be seen in FIG. **3**C. Both figures show the container **110** with the lower end of the shaft **112** mounted to the piston **118**.

FIG. **6**B shows the upper end of the drive shaft **112** is fixed to a forwardly-extending portion **155** of the bracket **154** by a bolt (threaded portion of bolt not shown but is received into reciprocating threads existing in the top end of drive shaft **112**.) The forwardly extending portion **155** is secured onto the top of the shaft **112** by a bolt head **150**.

In embodiments, the bracket **154** has an inverted L shape such that a downwardly extending back portion **157** of the L includes a vertical collar **152** which is configured to slidingly receive a vertical guide rod **156**. Collar **152** is configured to vertically slide along guide rod **156**. The lateral stability provided by the guide rod **156** being constrained by the collar **152** allows the shaft **112** to remain vertically aligned when moving upwards and downwards when actuated by the shaft motor **114**.

FIG. **6**B shows a close-up perspective view of the upper end of the shaft **112** which extends upwards from the shaft motor **114** and includes the bolt head **150**, collar **152**, and the bracket **154** from another perspective. As can be seen in FIG. **6**B, the connected bracket **154** and shaft **112** have moved upward relative to the position shown in FIG. **6**A. Again, it can be seen that the collar **152** tracks the bracket **154** along the guide rod **156**. The guide rod **156** is vertically aligned and slides through the collar **152** which slides upwards and downwards as the shaft motor **114** drives the shaft **112** upwards or downwards. The guide rod **156** substantially keeps the collar **152** aligned and consequently as the shaft **112** is driven, the collar **152** and bracket **154** keeps the shaft **112** aligned with the shaft motor **114** and container **110**.

Referring back to FIG. **3**B, a close-up perspective view of the nozzle platform **122** reveals some specifics regarding the configuration of the part. More specifically, the nozzle platform **122**, in embodiments, includes an outcropped, circular, upper edge **172** extended away from the nozzle platform **122**. The upper edge **172** forms a top edge of the recessed conical chamber **170**. The upper edge **172** and the recessed conical chamber **170** are sized such that the conical end **119** of the piston **118** is received therein when the shaft **112** is moved downwards. Initially, a cylinder loaded with product to be dispensed will be compacted downward by the conical end **119** of the piston **118** dispensing product down through the nozzle opening **120**. At a lowest extension of a product dispensing, the conical piston end **119** will mate with the complementary conical shape defined by the internal surfaces of the chamber **170** in the platform **122**. As the piston reaches a bottom-most extent, the matching shapes allow substantially all the product to be forced out of the nozzle opening **120**.

FIG. **4**A shows a perspective view of portioner **100** revealing the lower facing surface **121** of the nozzle platform **122**. In embodiments, the nozzle opening **120** is positioned onto a downwardly-outcropped portion **124** of the lower facing surface **121**. Again, the nozzle opening **120** is configured to allow the product to dispense from the conical aperture **170** of the nozzle platform **122** when the shaft **112** and the piston **118** are forced downwards forcing product into the conical shaped aperture **170** of the nozzle platform **122**. In some embodiments, the diameter of the nozzle opening **120** may be interchangeable to accommodate different types or amounts of product and possibly to allow for different flow rates when dispensing product.

The dispensing of product from the nozzle opening **120** allows the product to collect in the dish **104** (FIG. **1** and FIG. **2**A), which, in embodiments, is positioned on the scale **105**. The nozzle platform **122** is mounted onto platform rods **126** which each pass through an extruded hole in the nozzle platform **122** on opposite sides. One end of each rod **126** is mounted and secured to a first rod mount **128** and the other end of each rod **126** is mounted and secured to a second rod mount **130**. The rods **126** are sized to slide freely within the nozzle platform **122** when the second rod mount **130** is driven by a solenoid actuator **186** (see FIG. **2**A).

FIG. **4**B shows a top perspective view of the second rod mount **130** with respect to FIG. **4**A. The second rod mount **130** includes two flanges **180** which each extend away from the plate of the second rod mount **130**. Flanges **180** are spaced apart so a solenoid actuator rod **183** extending away from the shell **102** fits in between the two flanges **180**. The flanges **180** and the solenoid actuator rod **183** are aligned so a pin connection **184** inserts through both of the two flanges **180** and the solenoid actuator rod **183**. The pin connection **184** substantially supports the second rod mount **130** when inserted as shown and couples the second rod mount **130** to the solenoid actuator rod **183**. The pin connection **184** may be slid out by a user to allow the second rod mount **130** and the attached nozzle platform **122** to be detached and removed from the portioner **100**. The nozzle platform **122** may be removed each time the container **110** is removed from portioner **100**.

Returning to FIG. **3**A, the solenoid actuator rod **183** extends through the shell **102** to a solenoid actuator **186** configured within the shell **102**. The solenoid actuator **186** is configured to rotate and drive the solenoid actuator rod **183** to extend or retract controlling the movement of the second rod mount **130** and the first rod mount **128** in a longitudinal horizontal direction perpendicular to the operating vertical axis of the piston **118**. The rods **126** are configured to slide back and forth within the holes of the nozzle platform **122** so when the solenoid actuator rod **183** is driven by the solenoid actuator **186**, the second rod mount **130** and the first rod mount **128** move perpendicularly across the dispensing direction of product. The nozzle platform **122** acts as a guide to aid in aligning the rods **126** when the solenoid actuator rod **183** is driven.

Returning to FIG. **4**A, the first rod mount **128** secures an end of each rod **126** and an end of each wire rod **132**. The wire rods **132** are positioned opposite one another on each side of the nozzle platform **122** and underneath the rods **126**. One end of each wire rod **132** is mounted and secured into the first rod mount **128** with the other end of each wire rod **132** being an unattached free end. A wire **134** (see also FIG. **4**A) extends laterally between the opposing wire rods **132** and is secured onto the free end of each wire rod **132**. In embodiments, the wire **134** may be heated to facilitate cutting in instances when a particular product is more difficult to cut at lower temperatures. Other, more easily cut concentrate products may require little or no heat to be introduced into the wire **134**. In embodiments, the wire **134** may be comprised of metal offering electrical resistance for the purpose of heat generation. In embodiments, wire **134** may be formed from nichrome or another similar material able to withstand elevated temperatures. In some embodiments, wire **134** may not be configured to have its temperature controlled.

The wire **134**, physically, spans laterally between the opposing wire rods **132** beneath the nozzle platform **122**. The solenoid actuator rod **183** is driven by the solenoid actuator **186** to extend or retract the second rod mount **130** and the attached rods **126**, first rod mount **128**, wire rods **132**, and wire **134** while the nozzle platform **122** remains stationary. The longitudinal movement of the wire **134** which extends laterally beneath the nozzle platform **122** allows the wire **134** to move across the stationary nozzle opening **120**.

Cuts are portioned by a control system which will be described in more detail hereinafter. Typically, the wire **134** will move crosswise across the opening **120** and back for each cut, and a run made for a full container of product will involve numerous independent cut actions each action resulting in a particular product amount.

When the dispensing of product from the nozzle opening **120** is stopped after a run of a full container, often drips or oozing may develop from the nozzle opening **120** and fall into the dish **104**, which is suboptimal for measuring and dispensing precise amounts of product into the dish **104**. The wire **134** is configured to be driven by the solenoid actuator rod **183** and physically moved across the nozzle opening **120** to substantially eliminate unwanted dripping by cutting through any concentrate product oozing out from the nozzle opening **120** after the product dispensing has stopped.

The wire **134** substantially controls and prevents oozing or dripping product from the nozzle opening **120** and cuts through the product dispensed from the nozzle opening **120** at the same vertical position relative the nozzle opening **120** making a clean cut. The physical movement of the wire **134** across the nozzle opening **120** cuts through the product at the same position, which adds an additional level of control of the portioning and dispensing process. The wire **134** substantially increases the precision and accuracy of the portioner **100** by adding additional control when dispensing and collecting controlled amounts of product.

Returning to FIG. **2**A the dish **104** is positioned on an electronic scale **105** configured with the platform **106** beneath the container **110** and aligned with the nozzle opening **120**. In embodiments, the platform **106** is configured with the weight detection scale **105** to detect the weight of the product dispensed into the dish **104**. The scale **105** is communicatively connected to the controller **101** of the portioner **100**.

The controller **101** controls the shaft motor **114** and the solenoid actuator **186** to control the dispensing and portioning of product and the movement of the wire **134**. A user may input a product setpoint weight into the controller **101** using a human machine interface (HMI) **108**. The controller **101** is configured to control mechanisms and is communicatively connected to the scale **105** to receive a weight reading and determine if more product is needed to meet the desired weight input by a user.

The portioner **100** includes a HMI **108** (see FIGS. **1** and **7**) which allows a user to interface with the controller **101** in FIG. **2**A (see FIG. **7**). The controller **101** can be a programmable logic controller configured to control mechanisms allowing a user to control the portioner **100**. Processes are executed on the controller **101** which includes methods (FIG. **5**A, **5**B, and **5**C) allowing the portioner **100** to adjust and control the amount of product dispensed by weight. The HMI **108** allows a user to control the machine by making inputs. For example, the user can initiate and terminate a product portioning process. In embodiments the HMI **108** may allow for a user to select from different types of concentrates or products to be portioned, so that a preset starting point can be known by the controller **101**. In embodiments, concentrates or products such as rosin, live resin, fresh press, cold cure, or badder may be portioned by the portioner **100**. Given a selection being made of a particular type of product, the portioner **100** can accurately dispense a desired amount of product with respect to different densities, consistencies, and properties associated with different types of products. The HMI **108**, in embodiments, may have a display screen and can be a touchscreen allowing a user to input information and substantially control the portioner **100**.

FIG. **7** shows a block diagram for having a portioner **100**. The portioner **100** includes the controller **101** communicatively connected to the HMI **108**, scale **105**, shaft motor **114**, and solenoid actuator **186**. The controller **101** is configured to receive inputs from the HMI **108** and detections from the scale **105** to substantially control the amount of product dispensed from container **110** into dish **104**. For instance, the controller **101** can determine a weight of product to dispense based upon a product weight setpoint input to the HMI **108**. The controller **101** controls dispensing of the product by actuating the shaft **112** and piston **118** by controlling shaft motor **114**. The controller **101** can determine when to actuate the solenoid actuator **186** to move the wire **134** and cut through product beneath the nozzle opening **120** and control the weight of the product which falls into dish **104**. Controller **101** includes a machine learning component **190** which can include algorithms, programming, and a neural network.

The machine learning component **190** can receive product weight readings from scale **105** and a setpoint weight from the HMI **108**. The machine learning component **190** can also receive information regarding the piston setpoint (i.e., piston rate or number of piston steps made by the piston **118**) and when the solenoid actuator **186** moves the wire **134** to cut through dispensed product. Based on this information, the machine learning component **190** can determine a piston setpoint and wire actuations (i.e., time between when the wire **134** is moved across nozzle opening **120**) which correspond to dispensed product weight. The machine learning component **190** can use machine learning techniques to determine a piston setpoint and wire actuations for setpoint weights input into HMI **108**. For instance, a user can input a setpoint weight into HMI **108** and the controller **101** can control the shaft motor **114** and solenoid actuator **186** to dispense a product weight corresponding to the product setpoint weight into the dish **104**. The scale **105** can detect the weight of the dispensed product and the machine learning component **190** can determine if the dispensed product weight is equal to the setpoint weight. If the dispensed product weight is not equal to the setpoint weight the machine learning component **190** can make adjustments to the shaft motor **114** and solenoid actuator **186** which may be modifying a piston setpoint and modifying a wire setpoint such that the dispensed product weight is equal to the setpoint weight input into HMI **108**. In this way, the machine learning component **190** makes modifications to recognize motor settings such as piston setpoints and wire actuations that correspond to different dispensed product weights.

In some embodiments, controller **101** can control the shaft motor **114** to provide pullback to substantially reduce the risk of buildup and inconsistent product dosing. Since the product being dispensed can have a variety of internal air pockets, viscosity, and consistency, oozing can occur from nozzle opening **120** in between product doses. Some products which are wet and viscous can be more likely to ooze than drier and less viscous products. Oozing can impact and decrease the accuracy of dispensing a correct product weight. To remedy this, pullback can be provided to substantially "suck" some of the remaining product back into the nozzle opening **120** and prevent the product from oozing out of nozzle opening **120**. In some embodiments, the controller **101** can provide pullback when a pullback setpoint input is received by the HMI **108**.

Pullback as used in embodiments (see FIG. **5**C) is a process which uses a piston to first increase pressure in a container and then immediately "pulls back" to decrease the pressure and create a vacuum effect in the container. In embodiments, the momentary increase and the immediate decrease in air pressure within the container **110** allows for the product to be dispensed and then immediately sucked up into the container **110**, which prevents oozing from nozzle opening **120**. Pullback, in embodiments, corresponds to first driving the shaft **112** and piston **118** downwards in container **110** simultaneously decreasing the volume of the container **110** beneath the piston **118** compressing air and the product. Then, second, moving the shaft **112** and piston **118** upwards simultaneously increases the volume of the container beneath the piston **118**, decompressing the air and product in container **110** and creating a vacuum or sucking effect.

Doing this allows for the product to be first dispensed from nozzle opening **120** and then withdrawn back into the container **110**. This substantially prevents the product from oozing out of nozzle opening **120** in between product doses when product is not being dispensed.

For instance, a setpoint weight of one gram of product and a pullback setpoint of fifty may be input into the HMI **108**. The setpoint weight of one gram can have a corresponding piston setpoint (possibly determined by controller **101** or a user) of one hundred steps (i.e., a step being an increment the piston **118** is driven within container **110**). The controller **101** can receive the input and adjust the piston setpoint to one-hundred fifty steps downwards followed by moving the piston upwards fifty steps (i.e., the fifty steps upward is the pullback) such that the piston setpoint is one hundred steps. In embodiments, the amount of pullback may be related to the consistency and density of the product. For example, a product with a stiff consistency may require a greater amount of pullback than a product with a looser consistency. In some embodiments, a user or operator can determine the amount of pullback and in other embodiments the machine learning component **190** can determine an amount of pullback based upon a setpoint weight and a type of product.

FIG. **5**A shows a high-level method flow diagram **500** for using a dispensing portioner **100**.

In a step **502**, the container **110** is filled with a product. In embodiments, the product may be a type of rosin and can have a variety of different densities and consistencies. In some embodiments, the container **110** may be able to hold approximately two-hundred twenty grams of product and can be manually filled by a user or operator.

In a step **504**, the container **110** is placed into a centrifuge. In embodiments, centrifuge **800** is shown in FIGS. **8**A, **8**B, and **8**C. The centrifuge **800** rapidly spins (i.e., centrifuges) the container **110** and the centripetal force substantially forces any air pockets or air bubbles out of the product within the container **110**. In the cross section taken along the line **8**A-**8**A shown in FIG. **8**B, the container **110**, **118**, and clamps **116** are positioned vertically within centrifuge **800**. The container **110** pivotally attaches at one end to hinges **802**. The pivotal attachment of container **110** to hinges **802** allows for the container **110** to swing outwards horizontally when the centrifuge **800** spins (see FIG. **8**C). When the container **110** swings outward the piston **118** moves towards the end of container **110** and substantially compresses product within container **110** and substantially removes air within the product. The removal of air creates a more solid and less porous product or concentrate which makes it fully dense and more accurate to dispense. The centripetal force created from centrifuging the container **110** within the centrifuge **800** forces the product to an end of the container **110**. After centrifuging, the container **110** can be removed from centrifuge **800** with or without clamps **116** and piston **118**. In some embodiments, caps **804** can be placed on ends of the container **110** and keep product from exiting the container **110**.

In a step **506**, the container **110** is secured onto the portioner **100**. The container **110** is secured using a pair of removable clamps **116** each configured to slide over and wrap around upper and lower portions of the container **110**. The flanges **111** of the container **110** insert into the grooves **117** of the clamping arms **115**. The container **110** is configured such that the piston head **118** attached to the shaft **112** may be driven along the interior walls of the container **110**. The dish **104** may also be aligned under the nozzle opening **120** and positioned onto the weight scale **105** configured with the platform **106**.

In a step **508**, a user uses the HMI **108** to input a setpoint weight of product to be dispensed into the dish **104**. The product setpoint weight is then received by the controller **101** which then transmits a signal to the motor **114** to drive the shaft **112** downward to an extent which is predetermined to dispense the proper product dose weight.

In a step **510**, the product setpoint weight is dispensed into the dish **104**. The product is dispensed when the controller **101** commands the shaft motor **114** to drive the shaft **112** downwards. When the shaft **112** is driven downwards, the piston **118** is driven downwards within the container **110** such that the outer edges of the piston **118** and the inner walls of the container **110** directly contact one another. The product along the inner walls and bottom of the container **110** is forced downwards in the container **110** by the piston **118**. As the piston **118** moves downwards, the product is pressed downward through the chamber **170** and out the nozzle opening **120**. The commands received by the motor **114** from the controller **101** drive the piston head **118** downward to an extent that delivers the proper metered amount of product through the nozzle opening **120** such that a cut can be made and the product dose dropped into the dish **104**.

In embodiments, the controller **101** uses machine learning component **190** of FIG. **7** and outlined in the logic flow of FIG. **5**B to have increased accuracy dispensing and portioning the input product setpoint weight into the dish **104**. The step **510** may be repeated numerous times before the method **500** advances to step **512**.

In a step **512**, the piston **118** reaches the bottom of the container **110** which is detected by the controller **101**. This detection can occur due to a known piston reference position, back force detection process, or some other method. This occurs when substantially all of the product has been portioned and dispensed from the container **110** and the container **110** is substantially empty. The controller **101** then controls the shaft motor **114** to stop driving the shaft **112** downwards which ceases the dispense of product.

In a step **513**, the piston **118** is retracted to its uppermost position so that the container **110** may be removed for loading of product.

In a step **514**, the container **110** is removed and refilled with product. When empty, the container **110** may be removed by loosening the clamps **116** and then refilled with product. The container **110**, clamps **116**, and piston **118** may then be placed into the centrifuge and the method **500** repeated.

The container **110** in embodiments is not required to be removed each time an input product setpoint weight is dispensed and is only required to be removed when the refillable container empty and all the product has been dispensed. The dish **104** may be replaced each time after a setpoint weight has been dispensed by the portioner **100**.

FIG. **5**B shows a diagram showing a logic flow **509** carried out by the controller **101** in the step **510** of the method **500**.

In a step **511**, in the FIG. **5**B process, the controller **101** receives the user input made in step **508** from FIG. **5**A flow diagram **500**. In this step the controller **101** receives the product setpoint weight input. The product setpoint weight input in embodiments is a product weight to be dispensed by portioner **100**. The product setpoint weight may be input by a user or operator using the HMI **108**. In some embodiments, the user may specify a product or product type and a number of iterations for the product setpoint weight to be dispensed.

In a step **515**, the controller **101**, upon receiving the product setpoint weight, triggers dispensing of a product portion. The dispense of product may be triggered using the HMI **108** or by a foot pedal connected to the controller **101** controlling the dispense of product or by some other user interface means. In some embodiments, the dispense of product may be triggered when a dish **104** is placed on the scale **105** and the scale **105** detects the weight of the dish **104**. Any of the triggers described above may be used in combination or separately to trigger dispense of product.

In a step **516**, the controller **101** controls the shaft motor **114** to physically drive shaft **112** (thus advancing the piston **118**) downwards in the container **110** a set distance. This translation forces product out from the nozzle opening **120** to produce a product weight. The motor **114** then, once the desired translation has been executed, stops driving the shaft **112**. This leaves a desired portion suspended out from and below opening **120**, setting up a cut, the dispensed product will be collected into the dish **104** positioned on the scale **105** and aligned under the nozzle opening **120**. In some embodiments, controller **101** can make a determination of a motor setting, which will be required to translate the drive shaft **112** to a particular translation distance, which results in dispensing the input product setpoint weight. In embodiments, the controller **101** can use machine learning techniques and data (i.e., machine learning component **190**), which can include product setpoint weights and corresponding dispensed product weights to determine piston setpoints to drive shaft **112**. In this way, the controller can learn which piston setpoints correspond to dispensed product weights so that the dispensed product weight is substantially equal to the product setpoint weight. In embodiments, the amount of product dispensed may be from approximately half a gram to five grams.

In terms of the actual cut being made, in a step **518**, the controller **101** commands the solenoid actuator **186** to drive the solenoid actuator rod **183** forward to drive the wire **134** towards the suspended dispensed product. Thus, in response to the commands from the controller **101** the solenoid actuator **186** shifts the wire **134** across the nozzle opening **120** so that the wire **134** cuts through any product protruding from the nozzle opening **120**. Any product cut off using the wire **134** will collect into the dish **104** as a dispensed product weight. The weight of product portions can be increased or decreased between cuts if the user changes the setpoint weight (see step **508** FIG. 5A) at any time. Once dropped below into the dish **104** after a cut, the weight of the portion of product is detected by the scale **105** as seen in step **518*a***. This detected weight is then recorded by the controller **101**.

In a step **520**, the controller **101** uses machine learning component **190** to communicate with the scale **105** to determine if the product dispensed into the dish **104** (i.e., dispensed product weight) is within the tolerance of the product setpoint weight input to the HMI in step **508**. Those skilled in the art will recognize that machine learning components typically use algorithms and or programming processes to dynamically execute tasks. More specifically, they output models containing data and use established guidelines to use that data to predict results. Here, the recorded setpoint weights and resulting dispensed product weights are recorded over time, and the machine learning processes on the controller **101** are used to change piston setpoint values in response to real world weight portioning results to improve the accuracy of subsequent results. If the dispensed product weight is within the input product setpoint weight, the process proceeds to step **521**. In step **521**, no adjustment affecting the distance of the piston **118** advance within the container **110** is needed and the process loops back to step **516**. If the weighed product is not within the input at step **508**, then the process proceeds to step **524**.

In step **524**, the controller **101** receives weight readings from the scale **105** to determine if the dispensed product weight in the dish **104** is greater than the product setpoint weight input in step **508**. If the dispensed product weight is greater than the product setpoint weight at step **508**, the controller **101** uses a machine learning feedback path **522** (using machine learning component **190** which can utilize stored data based on past dosing results), which loops back to step **516**, controlling the amount of product dispensed. The machine learning component **190** may communicate with controller **101** to decrease the piston setpoint (i.e., piston step increments) the piston **118** is advanced in the container **110** before the wire **134** cuts through the dispensed product. The machine learning component **190** may communicate with controller **101** to decrease the flow rate of product dispensed by slowing the piston **118** advance within the container **110** to decrease the flow rate of product dispensed. The decrease of flow rate or the decrease of piston **118** advance may occur separately or together to substantially decrease the rate and weight of the portion of product dispensed. Alternatively, the machine learning component **190** could be operated based on current and past translation differences, or any other parameter reflective of a resulting portion weight either together with, or independently relative to flow rate data.

If the product weight is less than the specified setpoint weight in the input product setpoint weight at step **508**, the controller **101** uses a machine learning feedback path **526** (i.e., machine learning component **190**), which loops back to the step **516**. The feedback path **526** may provide the weight of the product to the controller **101** such that the controller **101** is able to use machine learning component **190** to increase the piston setpoint the piston **118** is advanced in the container **110** before the wire **134** cuts through the dispensed product. The machine learning component **190** may communicate with controller **101** to increase the flow rate of product dispensed by increasing the rate the piston **118** advances within the container **110**.

The increase of flow rate or the increase of advance of piston **118** may occur separately or together to substantially increase the weight and rate of the portion of product dispensed. The machine learning component **190** uses feedback paths **522** and **526** to provide controller **101** with feedback based upon the amount of product dispensed into the dish **104** after the wire **134** has cut through any product oozing from the nozzle opening **120** which may impact the weight of the product in the dish **104**. The machine learning component **190** is used by the controller **101** to more accurately control the dispensed amount of product in step **516**. In embodiments, the controller **101** will substantially improve its accuracy when dispensing amounts of product using the machine learning component **190** which collects feedback using paths **522** and **526**. The feedback paths **522** and **526** provide information for the machine learning component **190** to learn and adjust such that as the controller **101** dispenses portions numerous times, the controller **101** will become more accurate at dispensing the input product setpoint weight. In some embodiments, the controller **101** may be able to flag overweight and underweight portions dispensed into the dish **104** as the method **500** is repeated.

FIG. **5**C shows a logic flow carried out by the controller **101** in the step **510** of the method **500**. The logic flow of FIG. **5**C allows for pullback which can substantially increase the accuracy of dispensing product portions and reduce oozing of product when product dispense is not triggered. The logic flow of FIG. **5**C can be used in combination with or in place of the logic flow disclosed in FIG. **5**B.

In a step **550**, an input can be received by controller **101** which corresponds to pullback. For instance, the HMI **108** can receive an input from a user or operator which requests for the controller **101** to dispense a product setpoint weight using pullback.

In a step **552**, the controller **101** controls shaft motor **114** to drive the piston **118** downwards in the shaft past a piston setpoint. The piston setpoint may be determined by controller **101** and machine learning component **190** and corresponds to a number of steps (i.e., a distance) the piston **118** is driven downwards for dispensing a product setpoint weight. For instance, the controller **101** and/or machine learning component **190** may determine that an input product setpoint weight of two grams of product corresponds to a piston setpoint of one-hundred steps downwards of piston **118**. At step **552**, the controller **101** may move the piston one-hundred-fifty steps downward past the piston setpoint of one-hundred steps. When the piston **118** is driven downwards, the air and product beneath the **118** in container **110** is compressed and product can be forced out of nozzle opening **120**.

In a step **554**, the controller **101** pulls back piston **118** to the piston setpoint. When the piston **118** is pulled back (i.e., moved upwards) to the piston setpoint, a vacuum effect can be created in the container **110** which sucks the product into the container **110**. For instance, if product is hanging below nozzle opening **120** the pull back of piston **118** can substantially pull any downwardly extending product remaining after the cut back into the container **110**. In this way, oozing can be prevented such that accurate weights of product can be dispensed. Continuing in the example from above at step **552**, if the piston **118** is moved past the piston setpoint by fifty steps, at step **554** the piston **118** can be pulled back and moved upwards fifty steps to meet the piston setpoint of **110** steps. In some embodiments, a user or operator can set the piston setpoint and a pullback for the controller. In other embodiments, a user or operator can opt for pullback and the controller **101** and/or machine learning component **190** can select the piston setpoint and an amount of pullback. In some embodiments, products with viscous or wet consistency may require pullback to prevent oozing and products which are stiffer may require a greater amount of pullback than products with very viscous or wet consistency.

At step **556**, the product is dispensed into dish **104** and steps **550**-**556** can be repeated. In embodiments, the steps of **550** through **556** in FIG. **5**C can be executed by the controller after every cut although not shown in either of FIG. **5**A or **5**B. In alternative embodiments, the pull-back subprocesses can be selectively or singly executed.

Many different arrangements of the various components depicted, as well as components not shown, are possible without departing from the spirit and scope of what is claimed herein. Embodiments have been described with the intent to be illustrative rather than restrictive. Alternative embodiments will become apparent to those skilled in the art that do not depart from what is disclosed. A skilled artisan may develop alternative means of implementing the aforementioned improvements without departing from what is claimed.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations and are contemplated within the scope of the claims. Not all steps listed in the various figures need be carried out in the specific order described.

What is claimed is:

1. A portioner comprising:

a user interface communicatively connected to a controller configured to receive a product setpoint weight;

a scale communicatively connected to the controller and configured to detect a dispensed product weight when product is dispensed out of a container;

the controller being communicatively and operatively connected to a shaft motor wherein the shaft motor is configured to drive a piston within the container and force the product out of the container;

the controller being configured to:

receive the product setpoint weight and determine a piston setpoint based on the product setpoint weight; and

implement the piston setpoint to the piston and dispense the product out of the container;

when the product is dispensed, the controller being configured to receive the dispensed product weight and modify the piston setpoint based on the dispensed product weight.

2. The portioner of claim **1**, comprising a nozzle opening wherein the product in the container is directed out of the nozzle opening when the product is being dispensed.

3. The portioner of claim **1**, wherein the piston is mounted to an end of a drive shaft and the shaft motor actuates the drive shaft.

4. The portioner of claim **1**, wherein the piston includes a downwardly-extending conical end configured to form a seal against inner walls of the container when the piston is driven in the container.

5. The portioner of claim **2**, comprising a wire positioned beneath the nozzle opening and configured to move across the nozzle opening and cut through the product when the piston forces the product out of the nozzle opening.

6. The portioner of claim **1**, comprising a pair of clamps configured to secure the container to the portioner.

7. The portioner of claim **1**, wherein the container comprises flanges which extend from the container at either end.

8. The portioner of claim **7**, wherein the pair of clamps includes a groove configured to receive the flanges and secure the container to the portioner.

9. The portioner of claim **1**, wherein the controller includes a machine learning component comprising data corresponding to piston setpoints and dispensed product weights, and product setpoint weights.

10. The portioner of claim **9**, wherein the machine learning component determines the piston setpoint based on the product setpoint weight.

11. The portioner of claim **9**, wherein when the product is dispensed, the machine learning component receives the dispensed product weight and modifies the piston setpoint based on the dispensed product weight.

12. The portioner of claim **1**, wherein the controller implements pullback to the piston which causes product hanging from beneath the nozzle opening to be sucked back into the container.

13. The portioner of claim **1**, wherein the user interface is a touchscreen interface.

14. A method for dispensing a product with a portioner, the method comprising:

receiving a product setpoint weight from a user interface wherein the product setpoint weight is an amount of product to be dispensed from a container;

determining a piston setpoint based upon the product setpoint weight wherein the piston setpoint corresponds to a distance a piston is driven within the container;

driving the piston within the container to dispense the product;

receiving a dispensed product weight from a scale configured to collect product dispensed from the container; and

modifying the piston setpoint based upon the product setpoint weight and the dispensed product weight.

15. The method of claim **14**, comprising centrifuging the container loaded with product in a centrifuge prior to driving the piston within the container.

16. The method of claim **14**, comprising securing the container to the portioner using a pair of clamps prior to driving the piston within the container.

17. The method of claim **14**, comprising modifying the piston setpoint to provide pullback thereby creating a vacuum within the container which can pull product hanging beneath a nozzle opening of the container back into the container.

18. The method of claim **14**, wherein the piston is driven by a drive shaft connected to a shaft motor.

19. The method of claim **17**, comprising moving a wire across the nozzle opening and cutting through the product hanging beneath the nozzle opening.

20. A portioner comprising:

a piston mounted to a drive shaft configured to drive the piston upwards and downwards in a container;

a nozzle opening configured to align with the container and direct a product out of the container when the piston is driven downwards;

a wire positioned beneath the nozzle opening and configured to move across the nozzle opening and cut through the product when the piston forces the product out of the nozzle opening; and

a controller configured to receive a product selection and determine at least one piston setting which corresponds to the product selection, wherein the at least one piston setting corresponds to directing the product out of the container, and pulling product suspended beneath the nozzle opening back into the container.

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