Oct. 25, 1960 C. B. HARKER 2,957,284

PACKAGING MECHANISM

Filed Nov. 12, 1957 7 Sheets-Sheet 1

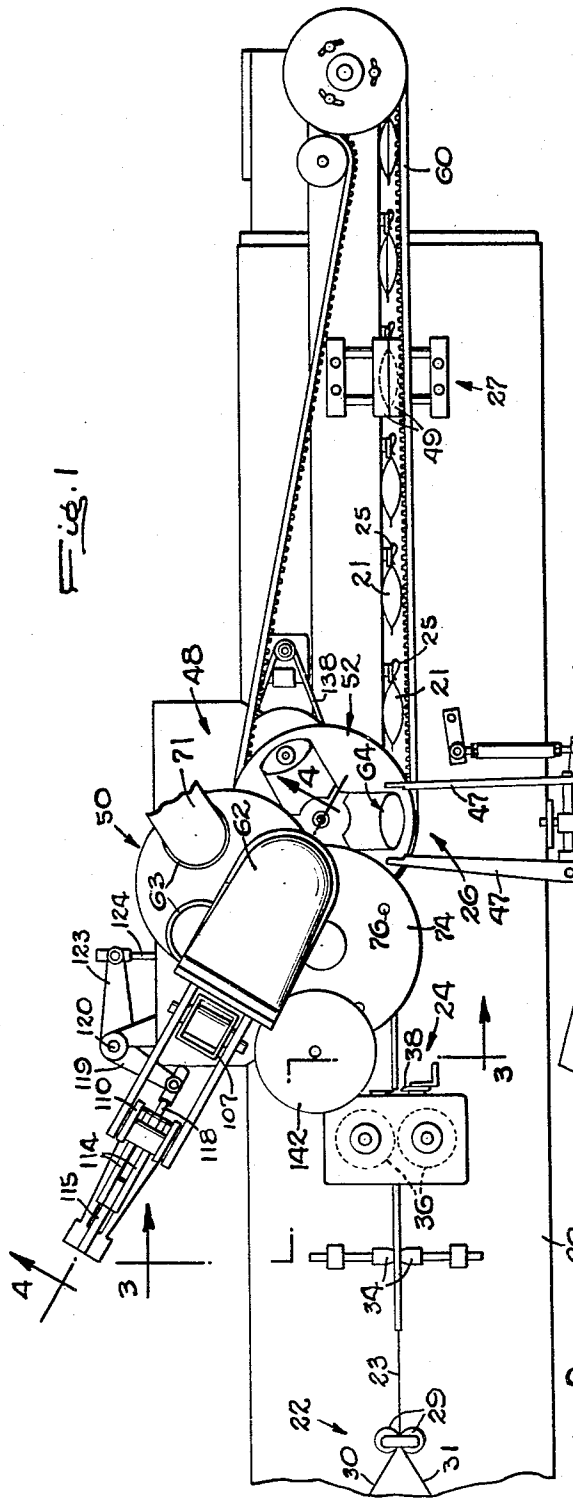

Fig. 1

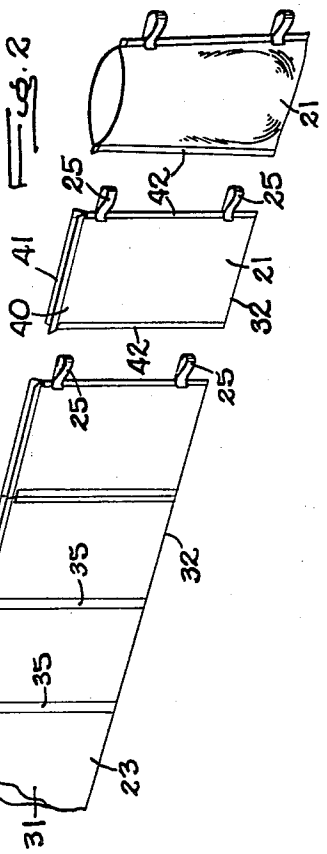

Fig. 2

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Oct. 25, 1960 C. B. HARKER 2,957,284

PACKAGING MECHANISM

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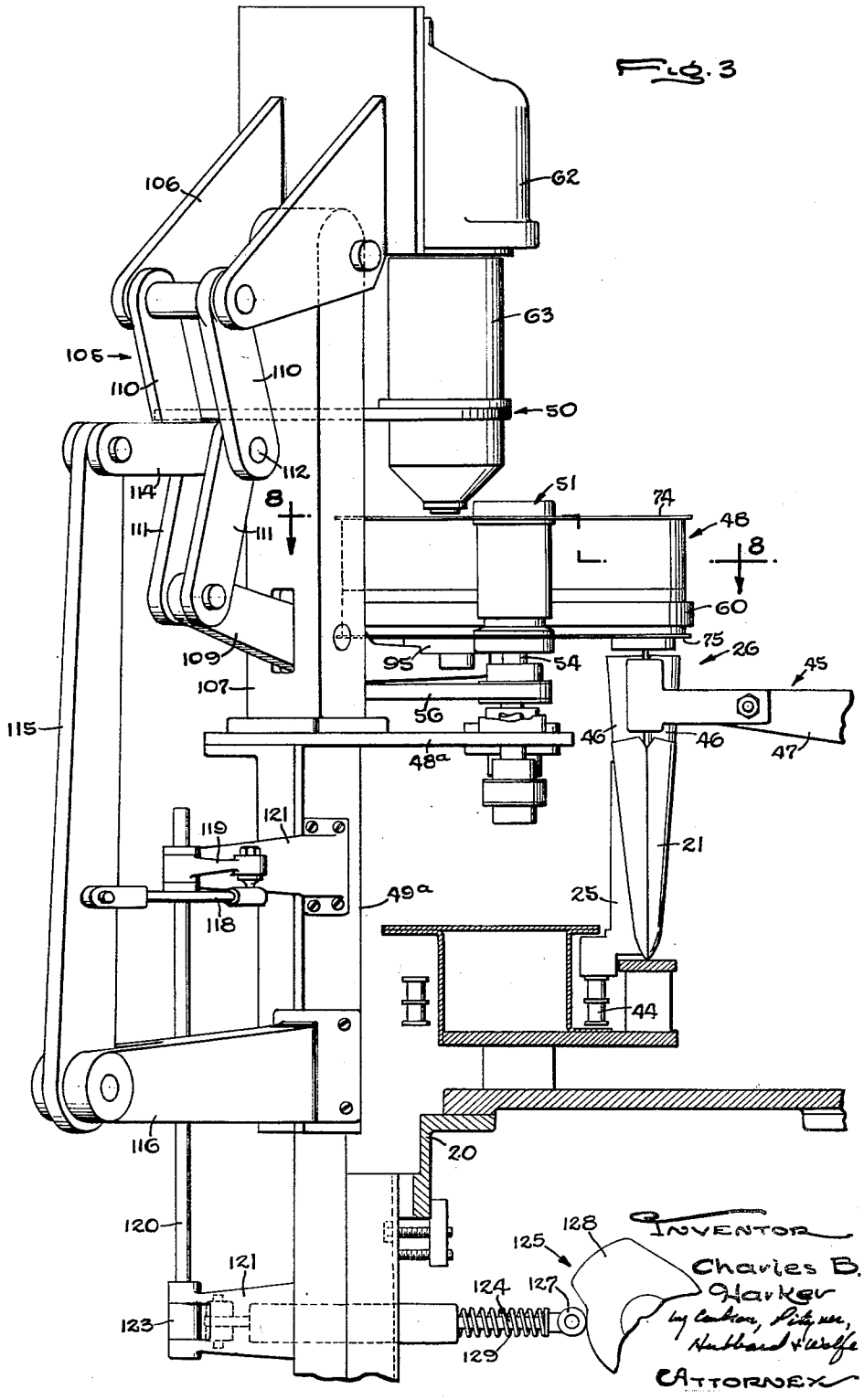
Fig. 3



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PACKAGING MECHANISM

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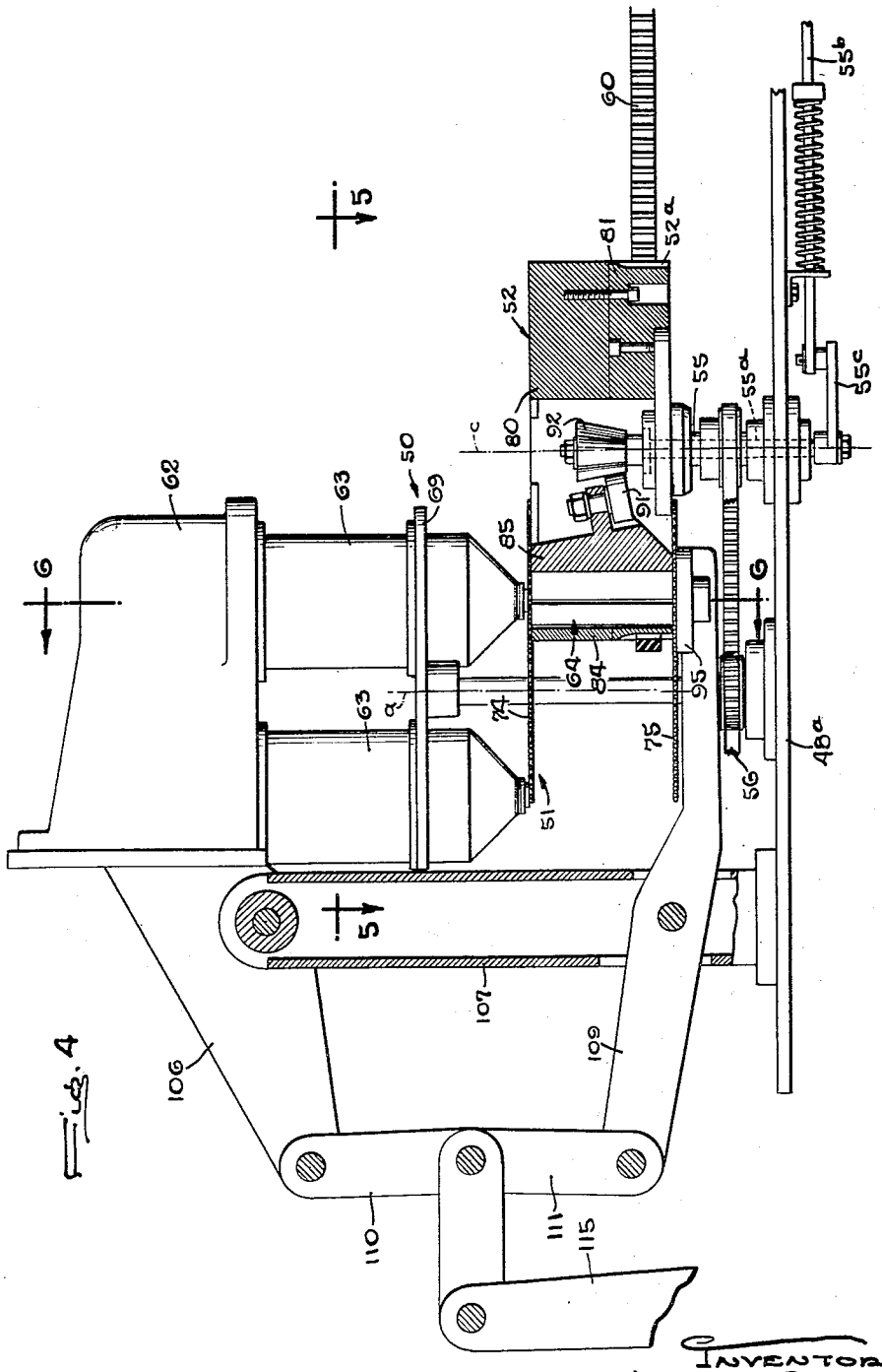

Fig. 4

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PACKAGING MECHANISM

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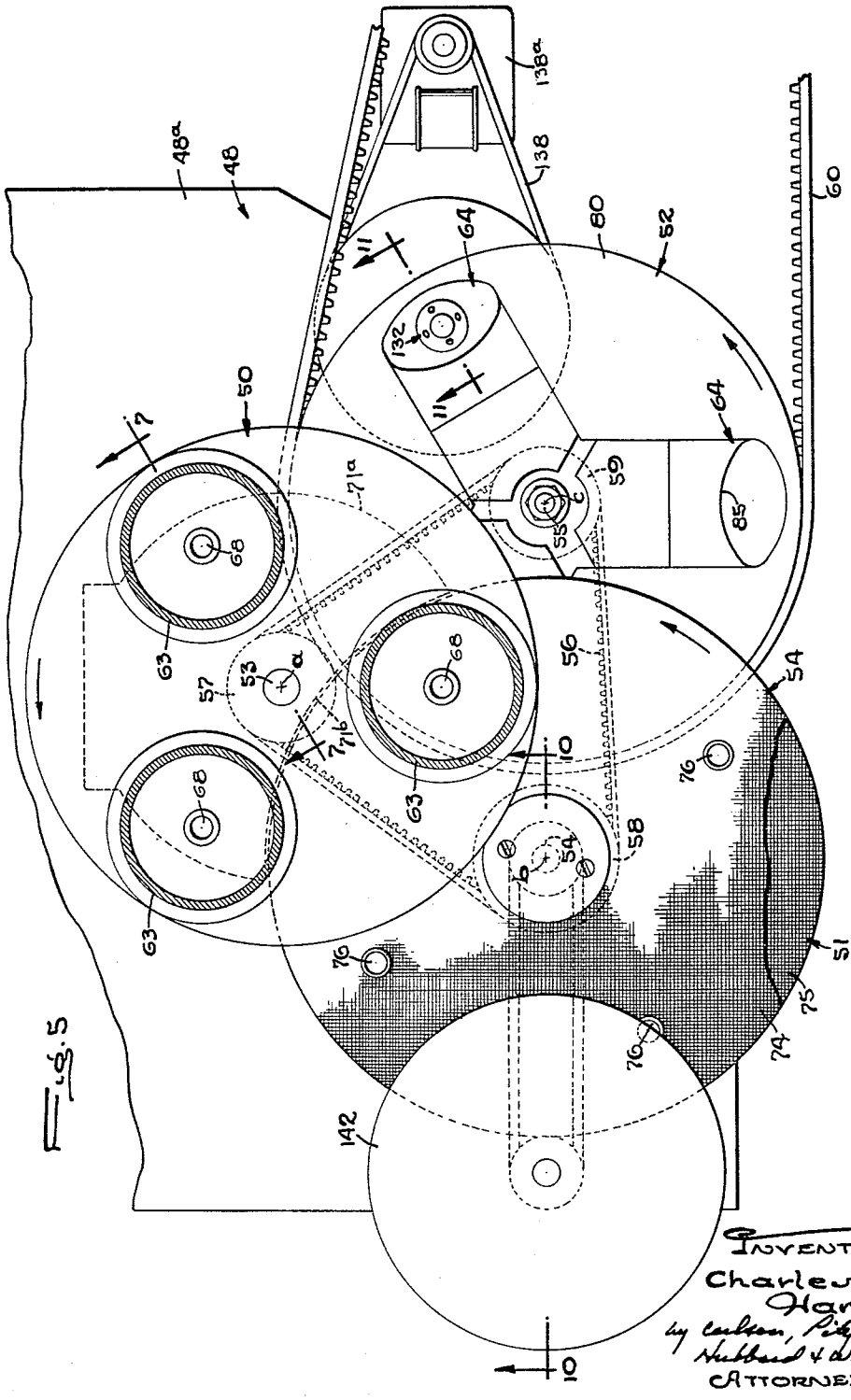

FIG. 5

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PACKAGING MECHANISM

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Fig. 6

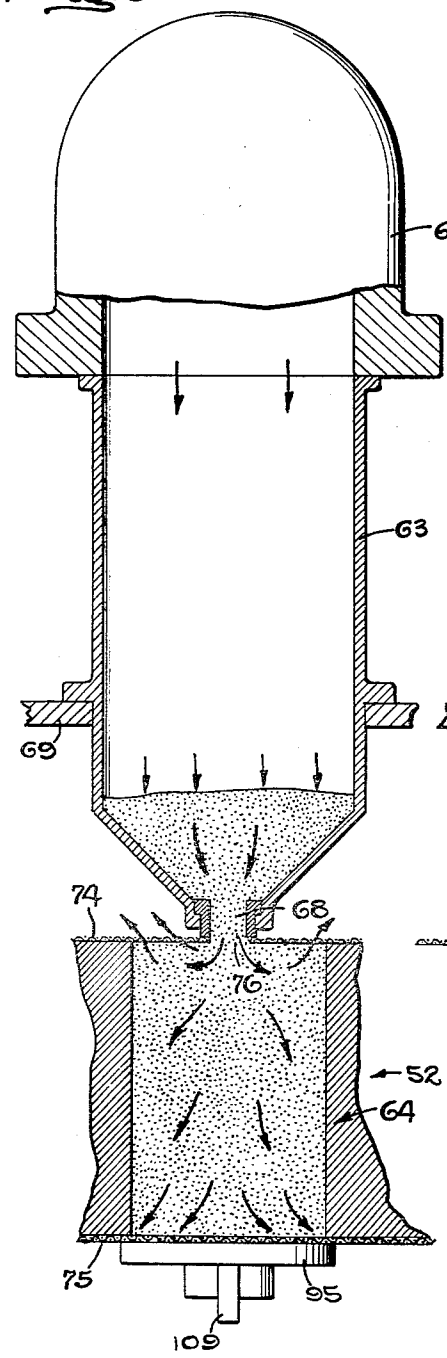
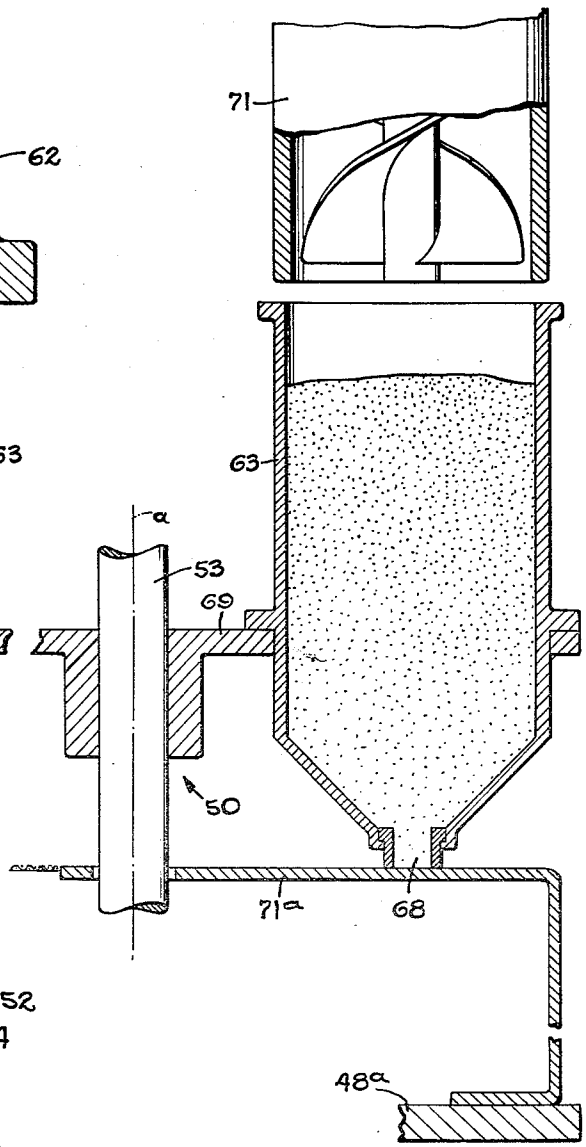


Fig. 7



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PACKAGING MECHANISM

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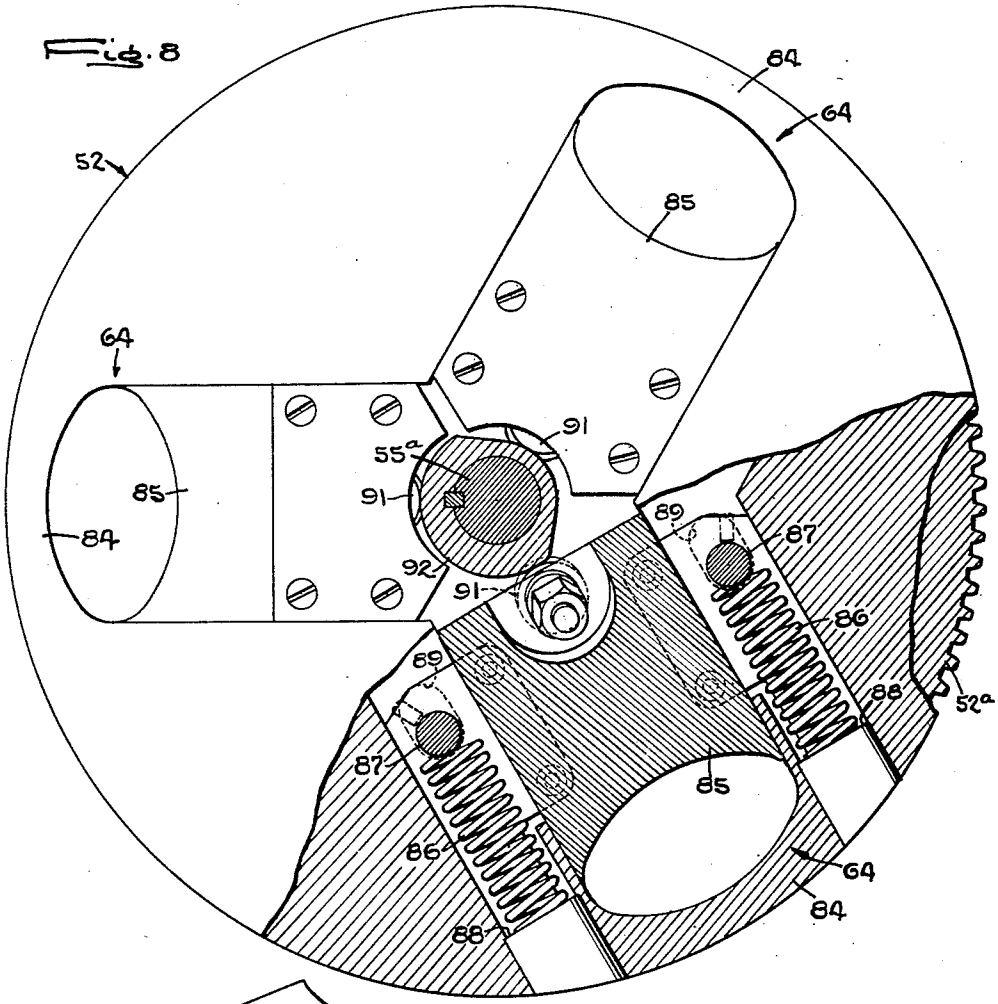
Fig. 8



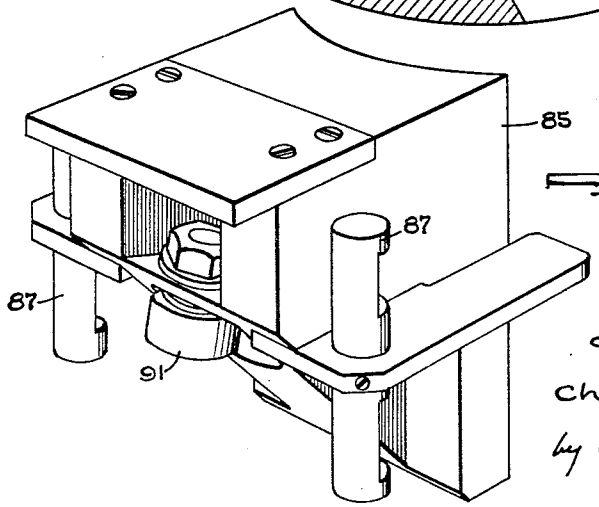


Fig. 9

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Fig. 10

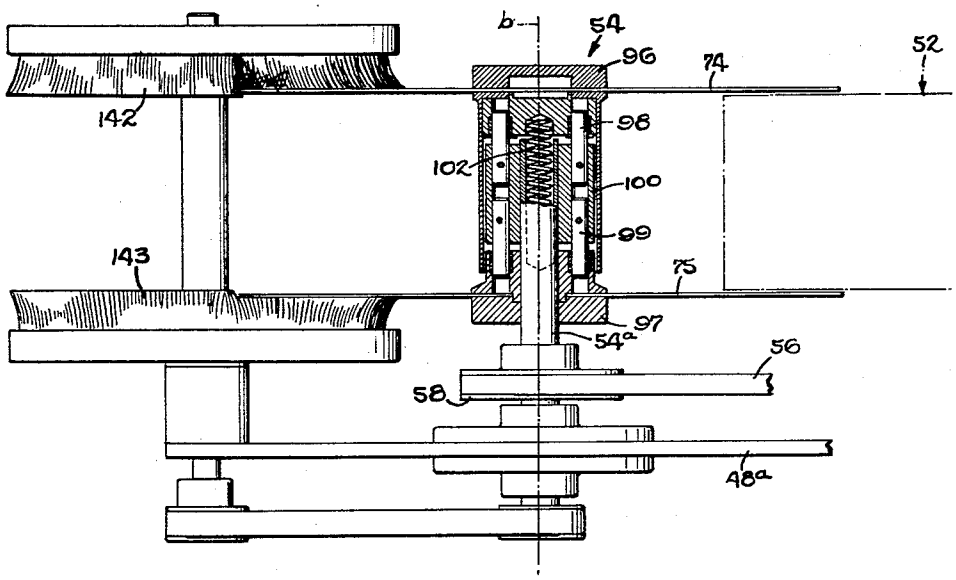
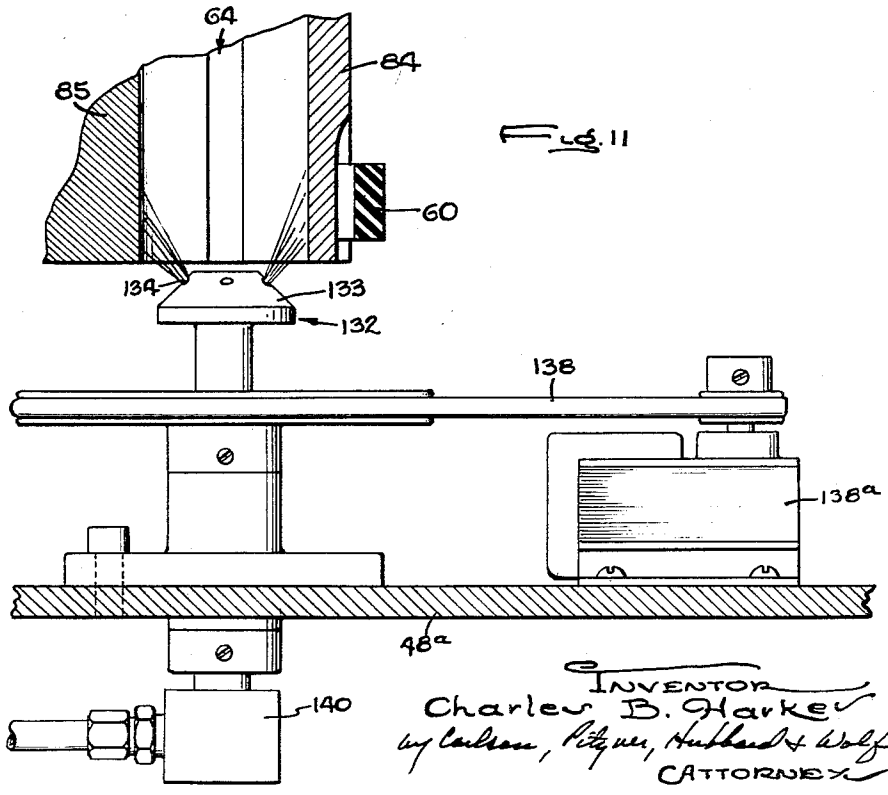


Fig. 11



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United States Patent Office 2,957,284 Patented Oct. 25, 1960

2,957,284

PACKAGING MECHANISM

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Filed Nov. 12, 1957, Ser. No. 695,905

21 Claims. (Cl. 53—24)

This invention relates to automatic measuring and packaging equipment, and more particularly, to a machine for measuring and packaging granular substances which are sticky, compactable, and generally non-free-flowing, such as brown sugar.

The general object of the invention is to provide a new and improved machine of the above character which operates automatically and at high speeds without clogging and sticking, and which is accurate in measuring granular substances of the above type.

Another object of the invention is to provide a machine of the foregoing characters which will operate continuously for long periods of time and in which the parts are arrayed in a novel manner so that the measuring unit may be cleaned after each measurement.

A further object of the invention is to provide a new and improved mechanism for forming a measured amount of the substance to be packaged into a mass having the approximate shape of the ultimate package and for releasing the shaped mass preparatory to the packing thereof in a container.

Still another object of the present invention is to provide a new and improved mechanism for forcibly filling a forming and measuring device of the above type thereby to fill successive containers with uniform amounts of a sticky granular substance.

Still another object of the invention is to provide a new and improved mechanism for cleaning the measuring device to remove residual adherent particles therefrom before a subsequent measurement is performed.

Still a further object is to provide a plurality of measuring devices of the above character thereby enabling one device to be measured while another is being cleaned.

Other objects and advantages of the present invention will become apparent as the following description proceeds, taken in connection with the accompanying drawings wherein:

Figure 1 is a plan view of a packaging mechanism embodying the present invention.

Fig. 2 is a schematic representation of bags to be filled by the mechanism of the present invention.

Fig. 3 is an enlarged elevation end view of a dispensing mechanism embodying the present invention taken along the lines 3—3 of Figure 1.

Fig. 4 is a sectional view of the dispensing mechanism taken along the line 4—4 of Figure 1.

Fig. 5 is a horizontal sectional view of the turret mechanism taken substantially in the plane of line 5—5 of Figure 4.

Fig. 6 is an enlarged detailed view of the forming and measuring die taken substantially in the plane of line 6—6 of Figure 4.

Fig. 7 is an enlarged detailed view of one portion of the measuring die in the plane of line 7—7 of Figure 5.

Fig. 8 is a section taken substantially in the plane of line 8—8 of Figure 3.

Fig. 9 is a perspective view of a movable die member.

Fig. 10 is a section taken along the line 10—10 of Figure 5 and showing the brushes for cleaning the device.

Fig. 11 is a section taken on the line 11—11 of Figure 5 and showing a washing mechanism.

General

While an illustrative measuring and packaging mechanism has been shown in the drawings and will be described below in detail, it is to be understood that there is no intention to limit the invention to the specific form disclosed. On the contrary, the intention is to cover all modifications, alternative constructions, equivalents and uses falling within the spirit and scope of the invention as expressed in the appended claims.

Referring to the drawings, the invention is there exemplified in a packaging machine mounted upon an elongated frame 20 (Figure 1) for the successive operations of forming, filling, and closing a succession of bags 21. The bags are constructed from a flexible strip 23 of bag material such as metal foil or paper coated on one side with a heat sealable thermoplastic material. The material 23 is drawn from a supply roll (not shown) and is passed through rollers 29 at a bag forming station 22 where it is folded to form opposed strips 30 and 31 joined at their bottom edges by a fold or crease 32 and with the heat sealable material on the inside of the bag in face to face relation. Upon the application of heat and pressure, at spaced intervals with sealing irons 34, vertical cross seals 35 are formed which provide the leading edge seal of one bag and the trailing edge seal of the preceding bag. The sealed strip of the bag blanks is pulled by feed rollers 36 to a severing station 24 where a knife 38 cuts the bags apart along the vertical seals 35 leaving individual bags 21. The bags thus formed have front and rear panels 40, 41 joined at their bottom edges by the fold 32 and at their side edges by seals 42 formed from the cross seals 35 and are open at their top for receiving brown sugar or other material.

As the bags 21 are severed from the strips by the knife 38, they are grasped by grippers 25 carried on an endless conveyor chain 44 (Figure 3) and thus conveyed through the opening and filling station 26 and thence through the closing and sealing station 27. At the station 26, the bag mouths are opened by a suitable opening mechanism 45 comprising a pair of thin flexible sheet metal plates 46, which, when inserted into the bag mouth, are bowed outwardly to form a spout holding the bag mouth open. The plates, which are normally flat, are supported at their side edges between a pair of arms 47. By moving the arms together, one side edge of each plate is moved toward the other edge and the plates bow outwardly to form an oval spout. Such a mechanism is described in my copending U.S. application Serial No. 682,476, filed September 6, 1957, now Patent No. 2,899,786, to which reference should be made for a more detailed description. A measured amount of brown sugar then is dropped into the bag through the spout and the open bag mount from a measuring and filling mechanism 48.

When the bag is filled, it is carried by the gripper 25 on conveyor 44 to the closing station 27 where horizontal sealing irons 49 engage the upper edges of the bag panels 40 and 41 and seal them together. All of the operations of the machine are synchronized by means of suitable cam and gear mechanisms (not shown). An illustrative mechanism for this purpose is described in U.S. Patent No. 2,649,674.

The measuring and filling mechanism

The present invention contemplates the provision of a new and improved mechanism for accurately dispensing

a measured amount of sticky, compactable, non-freeflowing granular material and for filling an open container with that measured quantity. This means comprises a measuring die which is filled with the granular material by forcibly ejecting that material from a supply source and into the die where it is shaped to the approximate configuration of the ultimate package. The measuring die is moved from under the supply to a position over an open container and the measured and formed quantity of the material then is discharged into the open package. The measuring mechanism then is indexed to a position where it is cleaned of residual adhering granules in preparation for the next filling and measuring operation.

For carrying out the objects of the invention, the illustrative filling mechanism **48**, which is supported on a plate **48***a* on the upper end of a post **49***a* upstanding from the base **20**, embodies three synchronized turrets, namely a hopper turret **50** serving as a supply source of material, a screen turret **51**, and a measuring and forming die turret **52**, the turrets being journaled respectively on suitable shafts **53**, **54**, **55** for rotation about three parallel vertical axes *a*, *b* and *c* respectively. The turrets are synchronously indexed by the use of an index drive chain **56** drivingly connected to each turret **50**, **51**, **52** by means of sprockets **57**, **58**, **59** respectively. Herein, the turret **52** is driven by a chain **60** which extends around a tooth disk (not shown) on the output of the Geneva mechanism for indexing the conveyor **44** and around a tooth plate **52***a* (Figure 8) rigid with the turret **52**, the turrets **50** and **51** turning in synchronism with the turret **52** through the medium of the belt **56**. In one index position, sugar is blown by a blower head **62**, to be described, from a supply hopper **63** on the hopper turret **50** into a measuring die **64** located beneath that hopper on the die turret **52**. The filled measuring die is then indexed to the next position where the brown sugar from the die **64** is discharged into an open bar or other container **21** located beneath the die **64**. In a third position, the measuring and forming die is washed and prepared for a succeeding operation.

In order to provide a supply source of brown sugar small enough for a blowing operation, the sugar is supplied to the measuring dies **64** from the hoppers **63** carried on the hopper turret. Two or more hoppers are preferably employed, one being filled while the other is supplying sugar to a die. The hoppers comprise a generally cylindrical housing having a downwardly opening nozzle **68** through which the sugar is discharged. The hoppers are mounted on a support plate **69** journaled on the hopper turret shaft **53**. The hopper turret **50** is indexed to bring each hopper **63** into use periodically and the supply of sugar in each hopper is continually replenished through a nozzle **71** leading from the supply source (Figure 7) as the hoppers **63** are turned by the turret **50**, their nozzles **68** ride on a horizontal plate **71***a* secured to the plate **48***a* to keep the material in the hopper. The plate **71***a* is cut away under the blowing head **62** as indicated at **71***b* in Figure 5. Along this portion, the screen **74** is beneath the nozzle and keeps the material in the hopper except during the blowing operation.

To allow air to escape from the die while sugar is being packed therein without carrying loose sugar with it, upper and lower screens **74**, **75**, carried on the screen turret **51**, are interposed between the hopper **63** and the die **64** and at the open lower end of the die respectively. The screens are formed in the shape of large discs and are journaled on the screen turret shaft **54**, as shown in Figure 10, for rotation about axis *b*. When sugar is being blown from the hopper **63** into a die **64**, it passes through a suitable aperture **76** in the upper screen corresponding approximately in size to the outlet **68** at the lower end of the hopper **63**. The screen turret is indexed with the hopper and die turrets so as to present a clean screen area to each die to be filled. This allows a free passage of air for each measurement and assists in making uniform measurements.

The die turret **52** comprises a cylindrical housing **80** (Figures 4 and 8) secured to a circular plate **81** journaled on the shaft **55** for rotation about axis *c*. The shaped forming dies **64**, which may be elliptical, for example, are circumferentially spaced on this turret and are formed of an outer stationary member **84**, which is a rigid part of the turret **52**, and an inner movable member **85** slidably mounted on the housing **80**. The inner die member **85** is urged away from the stationary die member **84** by a set of springs **86** acting against vertical pins **87** on the inner member **85** and against abutments **88** on the housing **80**. The limit of travel of the inner member **85** away from the outer member is determined by suitable slot **89** in the plate **81** and the housing **80**, which engage the pins **87** against which the springs act.

During the filling operation, the inner member **85** is held against the outer member **84** to form the die **64** by means of a cam roller **91** on the inner member acting against a cam **92** fixed to a shaft **55***a* journaled inside of the shaft **55** on which the die turret **52** is journaled (see Figures 4 and 8). The shaft **55***a* is turned by the main camshaft of the packaging machine through a rod **55***b* and a crank **55***c* fast on the lower end of the shaft. In other words, the shaft **55***a* is oscillated to cause the cam **92** to produce the desired movements of the inner die member **85**. Thus, each die is closed as it is being filled and remains closed as it is turned to the discharge position above the open mouth of the bag **21**. While the filled die is dwelling above the bag, a fall on the cam **92** engages the follower **91** so that the springs **86** force the inner die member **85** away from the outer die member **84** thereby releasing the packed sugar in the die. Once the sugar has been discharged, the die remains in the open position during the cleaning operation and, just before the die **64** approaches the filling position, the cam follower rides onto a rise on the cam edge to close the die by moving the inner member towards the outer member and against the action of the springs **86**.

Sugar is forced through the hopper nozzle **68** into a die **64** located beneath the hopper by the blower head **62** which applies a blast of air to the upper surface of sugar in the hopper (Figure 3). When the hopper, screen and die turrets **50**, **51**, **52** respectively, have been indexed to align a clean die **64** and screens **74** and **75** with a hopper **63**, the die, screens, and hopper are clamped tightly together to prevent the escape of sugar from between them during the blow. To this end, the blower head **62** is lowered against the hopper **63** and a clamp table **95** is raised against the screen **75** at the bottom of the die **64**. The mounting of the hopper and screen turrets allows for an axial movement sufficient to accommodate them to this clamping action. For example, the screens are mounted for relative axial movement, as shown in Figure 10, by securing the upper and lower screens to flanges **96** and **97** slidably engaged with projecting pins **98** and **99** fixed on a member **100** mounted on the screen turret shaft **54**. The upper screen **74** is urged upwardly and apart from the lower screen **75** by a spiral spring **102**.

For moving the blower head and clamp table up and down to hold the hopper screens **74** and **75** and die **64** together, a suitable cam operated toggle linkage mechanism **105** is provided (Figure 3). This mechanism **105** comprises an arm **106** pivoted on a post **107** secured to the plate **88***a* and fixed at one end to the blower head **62**. A second arm **109** also pivoted to the post **107** is fixed at one end to the clamp table **95**, and these arms are connected at their free ends to a pair of link members **110**, **111** pivoted to the arms at one end and together at their other ends by a pin **112**. By swinging the links **110** and **111** out or in, the arms **106** and **109** move the blower head **62** and clamp table **95** together or apart respectively. This swinging movement is accomplished

by a link 114 pivoted to the pin 112 joining the toggle links 110 and 111 and to a toggle arm 115 swingably mounted on a support arm 116 secured to the post 107. The toggle arm 115 is moved by a crank mechanism which includes a link 118 pivoted to the toggle arm at one end and to a horizontal crank arm 119 at its other end. The crank arm is in turn fixed to a vertical crank rod 120 journaled in brackets 121 on the post. To rotate the crank rod 120 a second horizontal crank arm 123 is fixed on the lower end of the crank rod 120 and is pivotally engaged with the follower rod 124 of a cam mechanism 125. The follower rod 124 carries, at its free end, a roller or follower 127 urged against the surface of a rotating cam 128 by a spiral spring 129. As the cam rotates, the roller 127 rides on the cam surface and the follower rod 124 is moved back and forth to swing the crank arm 123 which rotates the crank rod 120 to swing the upper crank arm 119 and thereby swing the toggle arm 115. This movement of the toggle arm swings the toggle links either out or in and thereby moves the blower head 62 and clamp 95 towards or away from each other.

When the blower head 62 is against the hopper 63 and the clamp table 95 holds the lower screen 75 against the die 64, air is applied by the blower head to the hopper to force sugar into the die. As the sugar flows into the die through the holes 76 in the upper screen, air in the die passes out through the screens, as shown in Figure 6, and the die is completely filled. The blower head 62 and clamp 95 are then moved apart to release the hopper, screens and die, and the die turret 52 is indexed to position the filled die above an open bag. At this point the inner and outer die members 84 and 85 are separated and the sugar contained therein is either pushed or allowed to drop into the bag. When the die contents have been discharged, the die turret is rotated to index the die to a cleaning position where a washing mechanism 132 (Figures 9 and 11) sprays the die with air or water to remove any residual particles of sugar which have stuck to the die walls.

The washing mechanism 132 comprises a cone shaped nozzle 133 having ports 134 therein through which a fine spray 135 of air, water or steam can be directed into the die 64. To insure a thorough washing of the die, the nozzle 133 is rotated by a belt 138 which is driven by a motor 138*a* and engages a pulley 139 fixed to the nozzle 133. A transfer ring 140 on the lower end of the nozzle permits the nozzle 133 to rotate during the cleaning operation.

While the die is being cleaned, the screens 74 and 75 are thoroughly brushed by rotating brushes 142, 143 to remove any residual sugar particles (Figure 8). From the cleaning station, the cleaned screens 74 and 75 and die 64 are indexed into position beneath the supply hopper 63 where the die is again filled and the cycle repeated.

Summary of operation

With the mechanism described above, a bag 21 is formed from a strip 23 of heat sealable plastic material by folding a sheet of the material into facing strips 30 and 31 and periodically sealing the strips to form a succession of bags. Individual bags 21 are cut from the strip, seized by grippers 25 on a conveyor 44, and carried to the filling and closing stations 26 and 27 of the mechanism. At the filling station 26 the bag mouth is expanded for receiving a charge of material from a filling mechanism 45.

Simultaneously with the formation of a bag 21 a measuring die 64, forming a part of the filling mechanism 46, is filled with brown sugar by clamping the die between a pair of screens 74 and 75 and under the outlet nozzle 68 of a supply hopper 63. Brown sugar from the hopper is then forcibly blown by a blower head 62 into the die 64. The die is then indexed over the open bag mouth and is expanded to allow the formed sugar mass to drop or be pushed into the bag 21. The bag is then closed and sealed and, at the same time the die and screens are washed and cleaned to remove any residual sugar particles which may have stuck to them. At the same time, the hopper 63 is indexed to a position beneath the material source 71 where is receives another change of material preparatory to the next filling operation. The cycle is then repeated rapidly and automatically.

I claim:

1. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, three turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, die carried by said second turret to turn with the latter between a first position along said first axis and a second position spaced from the first axis, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, a screen carried by said third turret and projecting in between said cylinder and said die when the latter are in their respective first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism subsequently operable to turn said turrets and advance said cylinder and said die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

2. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, three turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, die carried by said second turret to turn with the latter between a first position along said first axis and a second position spaced from the first axis, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, a screen carried by said third turret and projecting in between said cylinder and said die, means for clamping said blower head, cylinder, screens and die together when said cylinder and die are in their first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are clamped together thereby to blow the material from the cylinder into the die, mechanism subsequently operable to release said clamping means, means operable upon the release of said clamping means to turn said turrets and advance said cylinder and said die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

3. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a

blower head operable intermittently to blow air along a first predetermined axis, three turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, a die carried by said second turret to turn with the latter between a first position along said first axis, a second position spaced from the first axis and a third position spaced from the first and second positions, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, a screen carried by said third turret and projecting in between said cylinder and said die when the latter are in their respective first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism subsequently operable to turn said turrets and advance said cylinder and said die to their second positions, means operable when said die is in said second position to transfer the material from the die to a container, said mechanism being subsequently operable to turn said turrets and advance said die to its third position, and means operable when said die is in said third position for cleaning said die and said screen of residual cohesive granules.

4. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, three turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, at least two cylinders carried by a first one of said turrets to turn with the latter, said cylinder turret thereby positioning each cylinder alternately in a first position along said first axis and in a second position spaced from the first axis, means operable to dispense a quantity of material into each of said cylinders when the cylinder is in said second position, at least two dies carried by said second turret to turn with the latter, said die turret thereby positioning each die alternately in a first position along said first axis and in a second position spaced from the first axis, one of said cylinders being interposed between said head and one of said dies when the cylinder and the die are in their respective first positions, a screen carried by said third turret and projecting in between the first position cylinder and the first position die, means operable to cause said head to blow air along said first axis when the cylinder and the die are alined in their first positions thereby to blow the material from the cylinder into the die, mechanism subsequently operable to turn said turrets and advance the blown cylinder and the filled die to their second positions and the full cylinder and the empty die to their first positions, and means operable when the filled die is in said second position to transfer the material from the die to a container.

5. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, three turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, at least two material containing cylinders carried by a first one of said turrets to turn with the latter, said cylinder turret thereby positioning each cylinder alternately in a first position along said first axis and in a second position spaced from the first axis, means operable to dispense a quantity of material into each of said cylinders when the cylinder is in said second position, each of said cylinders having an outlet spout, at least two dies carried by said second turret to turn with the latter, said die turret thereby positioning each die alternately in a first position along said first axis, in a second position spaced from the first axis, and in a third position spaced from said first and second positions, one of said cylinders being interposed between said head and one of said dies when the cylinder and the die are in their respective first positions, a pair of screens carried by said third turret to turn with the latter, said turret thereby positioning a portion of said screens alternately in a first position along said first axis and in a second position spaced from the first axis, said screen portions projecting in the first turret position on opposite sides of said die and with one of said screens between said cylinder and said die, thereby preventing the passage of material from the die while permitting the escape of air during the blow, said one screen having spaced apertures therethrough corresponding in size to the outlet spouts and in number to at least the number of said cylinders, means for clamping said blower head, cylinder, screens, and die together when said cylinder and die are in their first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are clamped together thereby to blow the material from the cylinder into the die, mechanism subsequently operable to release said clamping means, means operable upon the release of said clamping means to turn said turrets and advance said cylinder and said die to their second positions, means operable when said die is in said second position to transfer the material from the die to a container, and a cleaning mechanism operable when said die and said screens are in their respective third positions for cleaning the same of residual cohesive granules, said mechanism including a nozzle for directing a cleaning fluid internally of said die and a pair of spaced brushes for scrubbing said screens.

6. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, a pair of turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, a die carried by said second turret to turn with the latter between a first position along said first axis and a second position spaced from the first axis, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism subsequently operable to turn said turrets and advance said cylinder and said die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

7. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, three turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each

other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, die carried by said second turret to turn with the latter between a first position along said first axis and a second position spaced from the first axis, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, means for clamping said blower head, cylinder, and die together when said cylinder and die are in their first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are clamped together thereby to blow the material from the cylinder into the die, mechanism subsequently operable to release said clamping means, means operable upon the release of said clamping means to turn said turrets and advance said cylinder and said die to their second position to transfer the material from the die to a container.

8. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device having, in combination, a blower head operable intermittently to blow air along a first predetermined axis, a pair of turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, die carried by said second turret to turn with the latter between a first position along said first axis and a second position spaced from the first axis, said die comprising first and second separable portions, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism subsequently operable to turn said turrets and advance said cylinder and said die to their second positions, means operative in response to the rotation of the die turret to position the die in said second position for separating said first die portions from said second die portions, and means operable when said die is in said second position and said die portions are separated to transfer the material from the die to a container.

9. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a first predetermined axis, a pair of turrets mounted to turn about individual axes angularly spaced around and parallel to said first axis, each of said turrets intersecting said first axis whereby portions of the turrets overlap each other and said head, a cylinder carried by a first one of said turrets to turn with the latter between a first position along said first axis and a second position spaced from the first axis, means operable to dispense a quantity of material into said cylinder when the cylinder is in said second position, a die carried by said second turret to turn with the latter between a first position along said first axis, a second position spaced from the first axis, and a third position spaced from said first and second positions, said cylinder being interposed between said head and said die when the cylinder and the die are in their respective first positions, means operable to cause said head to blow air along said first axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism subsequently operable to turn said turrets and advance said cylinder and said die to their second positions, means operable when said die is in said second position to transfer the material from the die to a container, said mechanism being subsequently operable to turn said turrets and advance said die to its third position, and means operable when said die is in said third position for cleaning said die of residual cohesive granules.

10. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material, means for positioning said cylinder alternately in a first position along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, a die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced from said axis, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, means operable to cause said head to blow air along said axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism for subsequently operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

11. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position with said spout opening along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, a die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced from said axis, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, means operable to cause said head to blow air along said axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder outlet into the die, means interposed between said cylinder outlet and said die in the first position for preventing the escape of material from said die while passing air therefrom during the blow, mechanism for subsequently operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

12. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position with said spout opening along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, a die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced

from said axis, a screen having an aperture therethrough for passing the granular material and a plurality of surrounding smaller apertures for restricting the passage of granular material, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, said screen being interposed between said cylinder and said die with said aperture corresponding to said spout and with the smaller apertures covering the die, means operable to cause said head to blow air along said axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder through said spout and screen aperture into the die, air in the die escaping through the smaller screen apertures, mechanism for subsequently operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

13. A device for measuring and dispensing a predetermined quantity of granules consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material, means for positioning said cylinder alternately in a first position along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, an expandable die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced from said axis, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, means operable to cause said head to blow air along said axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder into the die, mechanism for subsequently operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions, means operative in response to the advancing of said die to said second position for expanding the same, and means operable when said die is expanded in said second position to transfer the material from the die to a container.

14. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position spared from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, a die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced from said axis, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, means for clamping said blower head, cylinder, and die together when said cylinder and die are in their first positions, means operable to cause said head to blow air along said axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder outlet into the die, means interposed between said cylinder outlet and said die in the first position for preventing the escape of material from said die while passing air therefrom during the blow, mechanism for subsequently operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions, and means operable when said die is in said second position to transfer the material from the die to a container.

15. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position with said spout opening along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, a die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced from said axis, a pair of spaced screens, means for positioning said screens on opposite sides of said die in the first position for preventing the passage of material therefrom while permitting the escape of air during the blow, one of said screens having an aperture therethrough corresponding to said spout for passing the granular material, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, said one screen being interposed between said cylinder and said die with said aperture corresponding to said spout, means for clamping said blower head, cylinder, screens, and die together when the same are in their first positions, means operable to cause said head to blow air along said axis when said cylinder, screens, and die are clamped together in their first positions thereby to blow the material from the cylinder through said spout and screen aperture into the die, air in the die escaping through said screens, mechanism subsequently operable to release said clamping means, means for operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions upon the release of said clamping means, and means operable when said die is in said second position to transfer the material from the die to a container.

16. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position with said spout opening along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, an expandable die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis and in a second position spaced from said axis, a pair of spaced screens, means for positioning said screens on opposite sides of said die in the first position for preventing the passage of material therefrom while permitting the escape of air during the blow, one of said screens having an aperture therethrough corresponding to said spout for passing the granular material, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, said one screen being interposed between said cylinder and said die with said aperture corresponding to said spout, means for clamping said blower head, cylinder, screens, and die together when the same are in their first positions, means operable to cause said head to blow air along said axis when said cylinder, screens and die are clamped together in their first positions thereby to blow the material from the cylinder through said spout and screen aperture into the die, air in the die escaping through said screens, mechanism subsequently operable to release said clamping means, means for operating said

cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions upon the release of said clamping means, means operative in response to the advancing of said die to said second position for expanding the die, and means operable when said die is expanded in said position to transfer the material from the die to a container.

17. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position with said spout opening along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, a die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis, in a second position spaced from said axis, and in a third position spaced from said first and second positions, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, means operable to cause said head to blow air along said axis when said cylinder and said die are in their first positions thereby to blow the material from the cylinder outlet into the die, means interposed between said cylinder outlet and said die in the first position for preventing the escape of material from said die while passing air therefrom during the blow, mechanism for subsequently operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions, means operable when said die is in said second position to transfer the material from the die to a container, and means operable when said die is in its third position for cleaning the same of residual cohesive granules.

18. A device for measuring and dispensing a predetermined quantity of material consisting essentially of cohesive granules, said device comprising, in combination, a blower head operable intermittently to blow air along a predetermined axis, a cylinder for containing the granular material and having an outlet spout, means for positioning said cylinder alternately in a first position with said spout opening along said axis and in a second position spaced from said axis, means for dispensing a quantity of granular material into said cylinder when the cylinder is in said second position, an expandable die for measuring and shaping a predetermined quantity of the granular material, means for positioning said die alternately in a first position along said axis in a second position spaced from said first position and in a third position spaced from said first and second positions, a pair of spaced screens, means for positioning said screens alternatey in a first position on opposite sides of said die in its first position for preventing the passage of material therefrom while permitting the escape of air during the blow in a second position spaced from said axis, and in a third position spaced from said first and second positions, one of said screens having an aperture therethrough corresponding to said spout for passing the granular material, said cylinder being interposed between said head and said die when the cylinder and die are in their respective first positions along said axis, said one screen being interposed between said cylinder and said die with said aperture corresponding to said spout, means for clamping said blower head, cylinder, screens, and die together when the same are in their first positions, means operable to cause said head to blow air along said axis when said cylinder, screens and die are clamped together in their first positions thereby to blow the material from the cylinder through said spout and screen aperture into the die, air in the die escaping through said screens, mechanism subsequently operable to release said clamping means, means for operating said cylinder positioning means and said die positioning means to advance the cylinder and the die to their second positions upon the release of said clamping means, means operative in response to the advancing of said die to said second position for expanding the die, and means operable when said die is expanded in said position to transfer the material from the die to a container, and a cleaning mechanism operable when said die and said screens are in their respective third positions for cleaning the same of residual cohesive granules, said mechanism including a nozzle for directing a cleaning fluid internally of said die and a pair of spaced brushes for scrubbing said screens.

19. A method of dispensing and packaging a predetermined quantity of material composed of cohesive granules, said method comprising the steps of, dispensing a quantity of the material at least equal to said predetermined quantity into a container, blowing said material from said container into a receptacle whose volume equals said predetermined quantity thereby to form said material into a shaped mass corresponding to the shape of said receptacle, and transferring said mass into a flexible walled bag thereby to form a package having substantially the same shape as said mass and containing said predetermined quantity of cohesive granular material.

20. The method of dispensing and packaging a predetermined quantity of material composed of cohesive granules, said method comprising the steps of blowing said material into a receptacle whose volume equals said predetermined quantity thereby to form said material into a shaped mass corresponding to the shape of said receptacle, and transferring said mass into a flexible walled bag thereby to form a package having substantially the same shape as said mass.

21. A method of dispensing and packaging a predetermined quantity of material composed of cohesive granules, said method comprising the steps of, dispensing a quantity of the material at least equal to said predetermined quantity into a container, blowing said material from said container into a receptacle whose volume equals said predetermined quantity thereby to form said material into a shaped mass corresponding to the shape of said receptacle, transferring said mass into a flexible walled bag thereby to form a package having substantially the same shape as said mass and containing said predetermined quantity of cohesive granular material, and cleaning said receptacle to remove residual cohesive granules therefrom thereby to present a clean receptacle for receiving material from the container.

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