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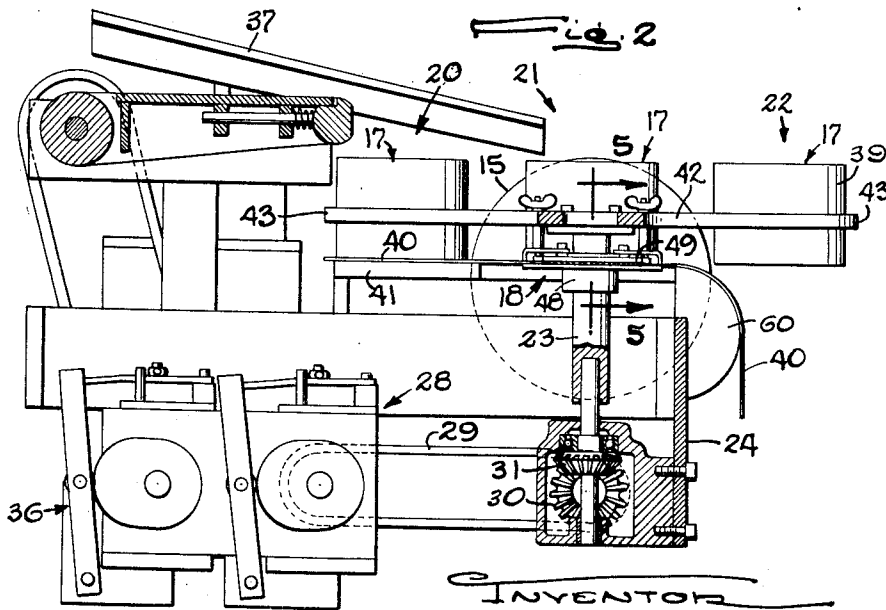
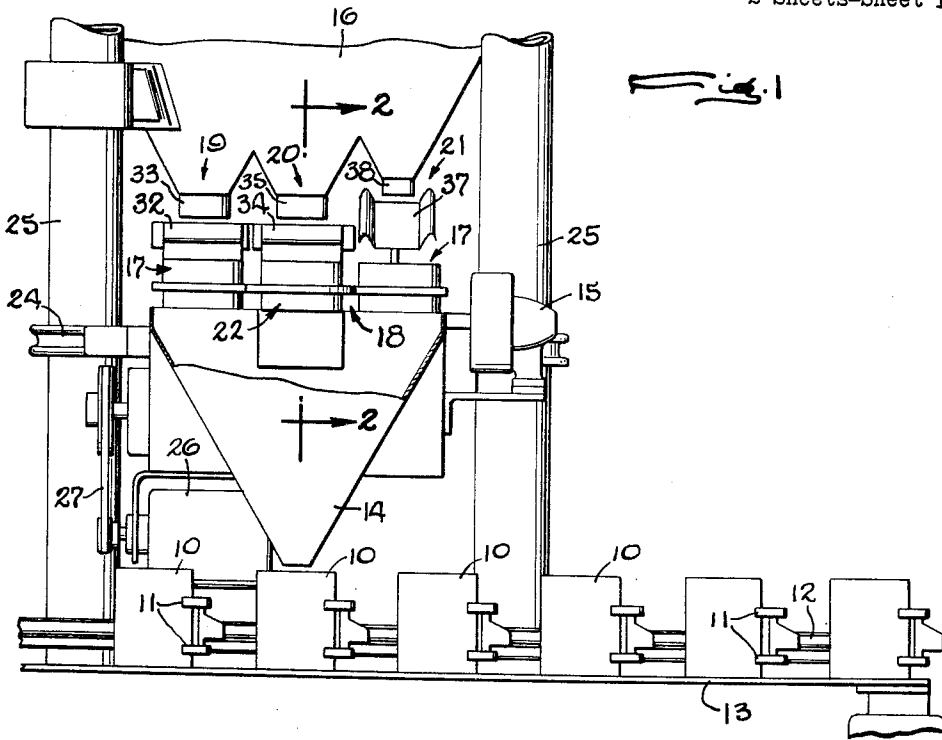
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MECHANISM FOR DISPENSING WEIGHED QUANTITIES OF MATERIAL

Filed Nov. 9, 1959

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

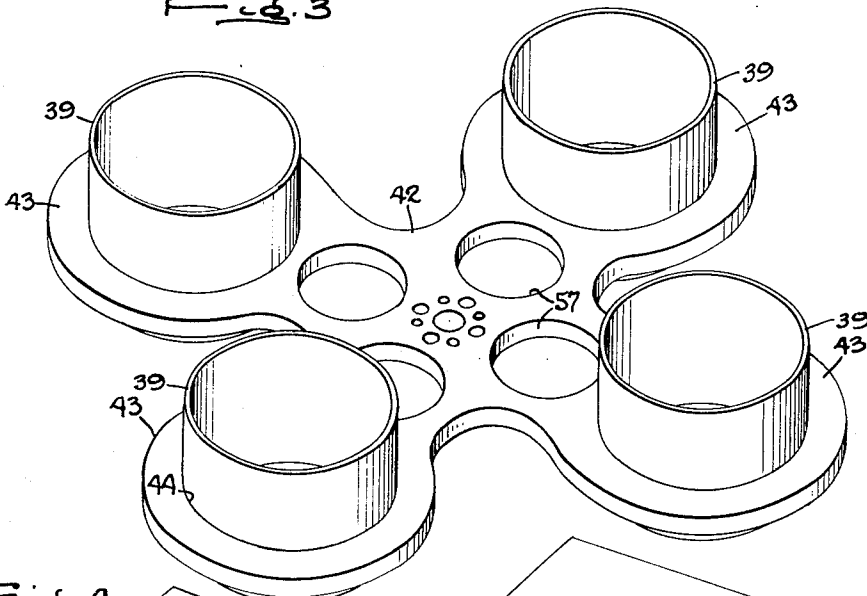


Fig. 4

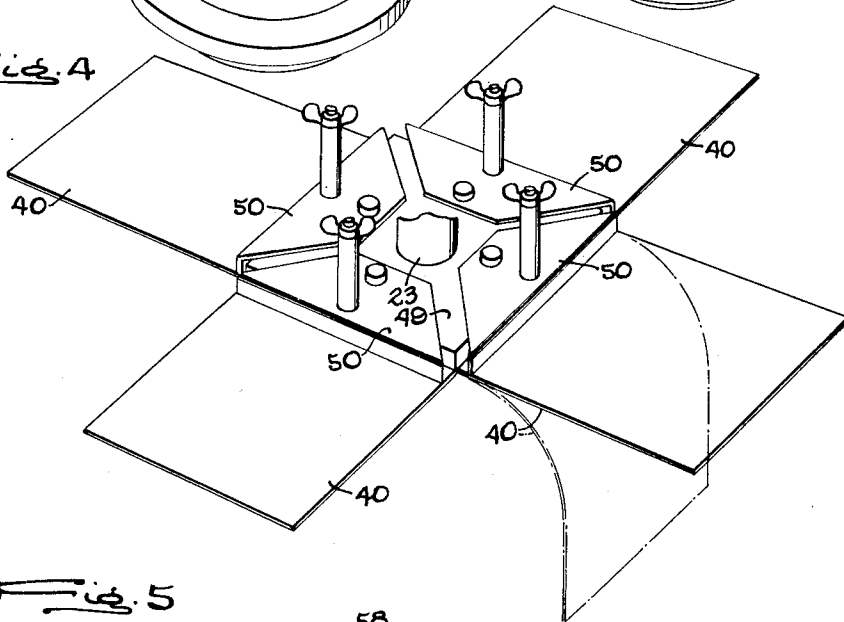
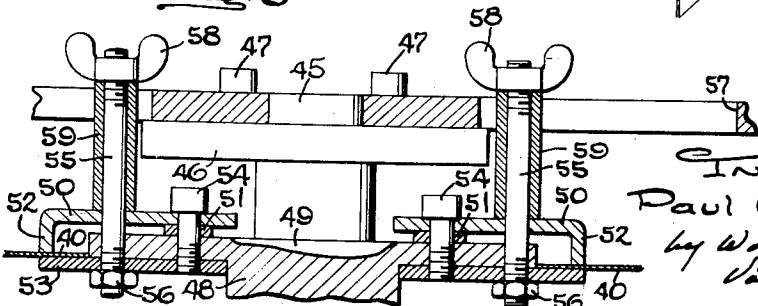


Fig. 5



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MECHANISM FOR DISPENSING WEIGHED QUANTITIES OF MATERIAL

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 7 Claims. (Cl. 177—53)

This invention relates to a mechanism for measuring a predetermined quantity of a material according to weight and dispensing the measured material into a container. More particularly, the invention relates to such a mechanism in which one or more receptacles are indexed successively through a plurality of stations in which each receptacle first is partially filled, then is weighed while simultaneously additional material is delivered to the receptacle to provide the desired weight and, finally, the receptacle is emptied into the ultimate container. In its more detailed aspects, the invention has reference to a mechanism in which the receptacles are carried by a rotating turret and stations are angularly spaced around the axis of the turret.

The general object of the invention is to provide a new and improved mechanism of the above character which permits the material in the receptacles to be weighed with extreme accuracy and which insures rapid and complete emptying of the receptacles.

Another object is to achieve the foregoing object by forming each receptacle in two parts, a horizontal flexible sheet which supports the material and an independently supported tube which is disposed above the sheet to insure that the material advances with the sheet without spilling whereby the only part of the receptacle that rests on the weighing device is the sheet and the receptacle may be emptied simply by letting the sheet fall away from the tube.

A more detailed object is to support the tubes on a turret with the tubes angularly spaced around the turret axis and to support the sheets from the same turret so that the tubes and the sheets turn together but the sheets are free to drop away from the tubes.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a fragmentary elevational view of a packaging machine employing a dispensing mechanism constructed in accordance with the present invention.

FIG. 2 is an enlarged sectional view taken along the line 2—2 in FIG. 1.

FIG. 3 is an enlarged perspective view of the tubes which form a part of the receptacles of the dispensing mechanism.

FIG. 4 is an enlarged perspective view of the flexible sheets and their supporting means.

FIG. 5 is an enlarged fragmentary perspective view taken along the line 5—5 in FIG. 2.

As shown in the drawings for purposes of illustration, the invention is embodied in a machine for measuring a predetermined quantity of material, such as powder, and depositing the material in a pouch or bag 10. The latter may be gripped by clamps 11 which hold the bags in an upright position and which are spaced apart along an endless chain 12. The chain is disposed horizontally and mounted on a base 13 to advance the bags intermittently thereby to deliver the bags successively to a position beneath a filling spout 14 through which the material is delivered to the bags.

The amount of material in each charge delivered to a bag 10 is under the control of a weigher 15 which shuts off the flow of material from a supply hopper 16 to a

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receptacle 17, the material then being discharged from the receptacle into the spout 14. The arrangement of this measuring and dispensing means may be generally the same as disclosed in the copending application of Leo F. Matti, Serial No. 759,057, filed September 4, 1958, now Patent No. 2,957,674, to which reference may be had for details of construction. Such an arrangement may include a turret 18 (FIG. 2) supporting a plurality of receptacles 17, in this case four, which are indexed successively through first and second bulk filling stations 19 and 20 (FIGS. 1 and 2), a weighing and final fill station 21 and a discharge station 22.

In the present instance, the turret 18 comprises an upright shaft 23 (FIG. 2) journaled in a horizontal support 24 which is adjustably mounted on two spaced columns 25 upstanding from the base 13. The shaft 23 is turned through steps of 90 degrees by a suitable motor 26 (FIG. 1) which, through a belt 27, drives an indexing mechanism 28. Through a chain 29, the indexing mechanism turns a gear 30 meshing with a gear 31 on the lower end of the shaft 23.

Mounted on the support 24 is a belt conveyor 32 (FIG. 1) which projects in under one nozzle 33 of the hopper 16 and extends over the receptacle 17 at the station 19. A similar conveyor 34 is disposed alongside the conveyor 32 to carry material from a second nozzle 35 of the hopper to the receptacle at the station 20. The conveyors are driven by the same motor 26 which drives the turret 18 through a second indexing mechanism 36 (FIG. 2). The timing is such that the conveyors are driven during each dwell of the turret and for a period in which they deliver a total quantity of material less than the ultimate desired amount.

After a receptacle 17 has been indexed through the stations 19 and 20 and has received the major amount of material, it is advanced to the station 21 where the material is supported by the platform of a weighing device 15. At this station a vibratory conveyor 37 carries a small amount of material from a third nozzle 38 on the hopper 16 to the receptacle. The vibration of the conveyor 37 is under the control of the weighting device 15 so that, as soon as the exact measured amount of material is received in the receptacle, this conveyor is stopped. The indexing mechanism 28 is responsive to the advance of the bag conveyor 12 and also is under the control of the weighing device 15 whereby the turret 18 is turned only if a bag 10 is positioned beneath the spout 14 and the proper quantity of material has been deposited in the receptacle 17 at the station 21. Such turning of the turret delivers the filled receptacle to the fourth station 22 where the material is dumped into the spout 14 and flows to the bag beneath the spout. The indexing mechanism 36 for the filling conveyors 32 and 34 begins its cycle immediately upon the completion of the turning of the turret.

The present invention contemplates constructing the turret 18 in a novel manner so as to support the material at the station 21 on the weighing device 15 for accurate measurement and to permit rapid and complete dumping of the material from the receptacle 17 into the spout 14. To this end, each receptacle is formed in two parts, a rigid vertical tube 39 and a flexible sheet 40 (FIGS. 2, 3 and 4) underlying the tube and the material therein. Both parts are connected to the turret shaft 23 to turn therewith from station to station. At the stations 19 and 20, the sheet 40 rests on a stationary member 41 which thereby supports the material in the tube. From the station 20, the sheet moves off the member 41 and onto the platform of the weighing device 15. At this point, the platform supports only the material in the tube and a portion of the weight of the sheet. Since the

latter is flexible and light weight, its effect on the weighing device may be easily compensated. At the last station 22, there is no support under the sheet which thus simply drops down and permits the material to fall from the tube 39 into the spout 14.

In the present instance, the tubes 39 are supported on the shaft 23 by means of a flat spider 42 which is formed with four arms 43 projecting radially outwardly from the shaft and equally spaced around the shaft axis so that one arm overlies each of the stations 19, 20, 21 and 22. A circular hole 44 is formed in each arm and each hole receives one of the tubes 39. The hub of the spider is received on the reduced upper end portion 45 (FIG. 5) of the shaft 23 and overlies a plate 46 fast on the shaft. The spider is secured to the plate by bolts 47 to cause the spider and hence the tubes to turn with the shaft.

Fixed to the shaft 23 beneath the spider 42 is a collar 48 formed with a square flange 49 for supporting the flexible sheets 40. Four brackets 50 (FIGS. 4 and 5) angularly spaced around the shaft 23 are held above the flange 49 by a spacer 51 and are formed with downturned peripheral flanges 52 which oppose the outer edge portions of a square plate 53 disposed beneath the flange 49, the brackets and the plate being held on the flange 49 by screws 54. The opposed surfaces of the bracket flanges 52 and the plate 53 form jaws for receiving the inner end portions of the flexible sheets 40 and clamp the latter to the shaft 23. Such clamping is effected by bolts 55 which project through the brackets 50, the flange 40 and the plate 53. Nuts 56 are threaded onto the lower ends of the bolts which extend up through holes 57 in the spider 42 for convenient access. Wing nuts 58 are threaded onto the upper ends of the bolts and sleeves 59 are disposed between these nuts and the brackets 50 so that, by tightening the wing nuts, the brackets are bent down and clamp the sheets 40 against the plate 53.

Herein, the supporting member 41 which underlies the flexible sheets 40 at the stations 19 and 20 is a flat horizontal plate which extends angularly around the shaft 23 from the spout 14 at the front of the machine to a point closely adjacent to the platform of the weighing device 15 and the platform and the plate are substantially level so that, as the sheets are indexed from the station 20 to the station 21, they slide easily from the plate to the platform. Extending horizontally across the front of the machine is semicylindrical guide 60 (FIG. 2) which is secured to the support 24 with its upper edge close to and level with the plate 41 and the weighing platform. As each sheet 40 is indexed away from the weighing station 21, it drops down away from the associated tube 39 and over the guide 60 as shown most clearly in FIG. 2 and this permits the material supported by the sheet to fall into the spout 14 and from there into the bag 10. Subsequently, the sheet rides up the guide and back onto the plate 41.

With the foregoing arrangement, a receptacle 17 dwells beneath the end of the conveyor 32 at the station 19 while the conveyor is being driven through indexing mechanism 36. The conveyor delivers a quantity of material into the tube portion 39 of the receptacle, the material resting on the flexible sheet portion 40 which in turn is supported by the plate 41. After the conveyor has completed its cycle, the indexing mechanism 28 turns the shaft 23 one step. Since both the tube 39 and the sheet 40 are attached to the shaft, these parts are advanced to the next station 20, the sheet sliding along the plate 41. While the receptacle 17 is dwelling at this station, the conveyor 34 delivers additional material to the tube bringing the total quantity to an amount slightly under that which ultimately is desired.

When the shaft 23 is indexed next, the sheet 40 slides off the plate 41 and onto the platform of the weighing device 15. During this movement, as well as during the advance from the station 19 to the station 20, the mate-

rial deposited on the sheet 40 is moved with the latter by the tube 39 which turns in unison with the sheet. While the sheet is dwelling on the weighing platform, the conveyor 37 is vibrated adding a small amount of material to the tube 39. When the proper quantity of material has been deposited in the tube, this condition is sensed by the weighing device 13 which stops the vibration of the conveyor 37. Then, if a bag 10 is positioned beneath the spout 14, the shaft 23 is indexed another quarter-turn. This causes the sheet 40 to move off the weighing platform and across the guide 60. As the sheet moves across the guide, it drapes down and permits the material in the tube to fall down into the spout 14.

I claim as my invention:

1. In a machine for weighing and dispensing successive charges of material, the combination of, a base, a member journaled on said base to turn about a vertical axis, a vertical tube radially spaced from said axis and rigidly connected to said member to turn with the latter, mechanism for turning said member thereby to advance said tube successively through a filling station, a weighing station and a discharge station, said stations being angularly spaced around said axis, a support having a flat horizontal surface spaced a short distance beneath said tube and extending from said filling station to said weighing station, a weigher having a platform disposed at said weighing station with the upper surface of the platform level and contiguous with the surface of said support, a flexible sheet secured to said member and projecting horizontally in under said tube to rest on said surfaces as the tube moves through said filling and weighing stations, means operable to deliver material to said tube at said filling station whereby the material rests on said sheet and is supported by said surfaces, said sheet upon reaching said discharge station deflecting under the weight of the material and permitting the material to flow out through the bottom of said tube, and a stationary guide extending from said weighing station through said discharge station to said filling station to guide said sheet as it deflects downwardly at said discharge station and then back up onto said support.

2. In a machine for weighing and dispensing successive charges of material, the combination of, a base, a member journaled on said base to turn about a vertical axis, a vertical tube radially spaced from said axis and rigidly connected to said member to turn with the latter, mechanism for turning said member thereby to advance said tube successively through a filling station, a weighing station and a discharge station, said stations being angularly spaced around said axis, a support having a flat horizontal surface spaced a short distance beneath said tube and extending from said filling station to said weighing station, a weigher having a platform disposed at said weighing station with its upper surface level and contiguous with the surface of said support, a flexible sheet secured to said member and projecting horizontally in under said tube to rest on said surfaces as the tube moves through said filling and weighing stations, and means operable to deliver material to said tube at said filling and weighing stations whereby the material rests on said sheet and is supported by said surfaces, said sheet upon reaching said discharge station deflecting under the weight of the material and permitting the material to flow out through the bottom of said tube.

3. In a machine for weighing and dispensing material, the combination of, a base, a member journaled on said base to turn about a vertical axis, a weigher having a horizontal platform disposed alongside said axis, a plurality of flexible sheets angularly spaced around said axis and connected to said member to project radially outwardly therefrom, a plurality of tubes, one for each of said sheets and each disposed immediately above the corresponding sheet, means rigidly connecting said tubes to said member, mechanism for turning said member thereby to turn said tubes and said sheets bodily therewith

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and slide the sheets successively onto and off of said platform, and means for delivering material to the interior of the tube which is disposed above the sheet resting on said platform whereby a column of material rests on the sheet and is supported by the platform, said sheet deflecting downwardly as it slides off said platform thereby to permit the material to flow out of the bottom of the corresponding tube.

4. In a machine for weighing and dispensing material, the combination of, a base, a member journaled on said base to turn about a vertical axis, a weigher having a horizontal platform disposed alongside said axis, a flexible sheet connected to said member and projecting horizontally over said platform to rest thereon, a tube rigid with said member and disposed immediately above said sheet, means for delivering material to the interior of said tube whereby a column of material rests on said sheet and is supported by said platform, mechanism for turning said member thereby to turn said tube and said sheet bodily therewith, and a spout disposed alongside said platform, said sheet deflecting downwardly as it slides off said platform and over said spout thereby to permit the material to flow out of said tube and into the spout.

5. In a machine for weighing and dispensing material, the combination of, a base, a member journaled on said base to turn about a vertical axis, a weigher having a horizontal platform disposed alongside said axis, a flexible sheet connected to said member and projecting horizontally over said platform to rest thereon, a tube rigid with said member and disposed immediately above said sheet, means for delivering material to the interior of said tube whereby a column of material rests on said sheet and is supported by said platform, and mechanism for turning said member thereby to turn said tube and said sheet bodily therewith, said sheet deflecting downwardly as it slides off said platform thereby to permit the material to flow out through the bottom of said tube.

6. In a machine for weighing and dispensing material,

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the combination of, a base, a member mounted on said base to move along a predetermined horizontal path, a weighing device having a horizontal platform disposed along said path, a flexible sheet connected to said member to move therewith and projecting horizontally over said platform to slide along the latter, a tube rigid with said member and disposed immediately above said sheet, a dispensing device operable to deliver material to the interior of said tube whereby a column of material rests on said sheet and is supported by said platform, means responsive to said weighing device and operable to stop said dispensing device when a predetermined weight of material has been delivered to said tube, and mechanism for moving said member along said path thereby to move said sheet and said tube bodily therewith, said sheet deflecting downwardly as it slides off said platform thereby to permit the material to flow out through the bottom of said tube.

7. In a machine for measuring and dispensing material, the combination of, a base, a member mounted on said base to move along a predetermined horizontal path, a horizontal platform disposed along said path, a flexible sheet connected to said member to move therewith and projecting horizontally over said platform to slide along the latter, a tube rigid with said member and disposed immediately above said sheet, means for delivering a measured quantity of material to the interior of said tube whereby a column of material rests on said sheet and is supported by said platform, and mechanism for moving said member along said path thereby to move said sheet and said tube bodily therewith, said sheet deflecting downwardly as it slides off said platform thereby to permit the material to flow out through the bottom of said tube.

References Cited in the file of this patent

UNITED STATES PATENTS

750,830	Doble	Feb. 2, 1904
2,821,354	Kindseth	Jan. 28, 1958