

June 16, 1964

T. JUNGMAIR
MACHINE FOR CHARGING POWDERED COMMODITIES
INTO PACKAGING CONTAINERS

3,137,358

Filed Nov. 30, 1960

2 Sheets-Sheet 1

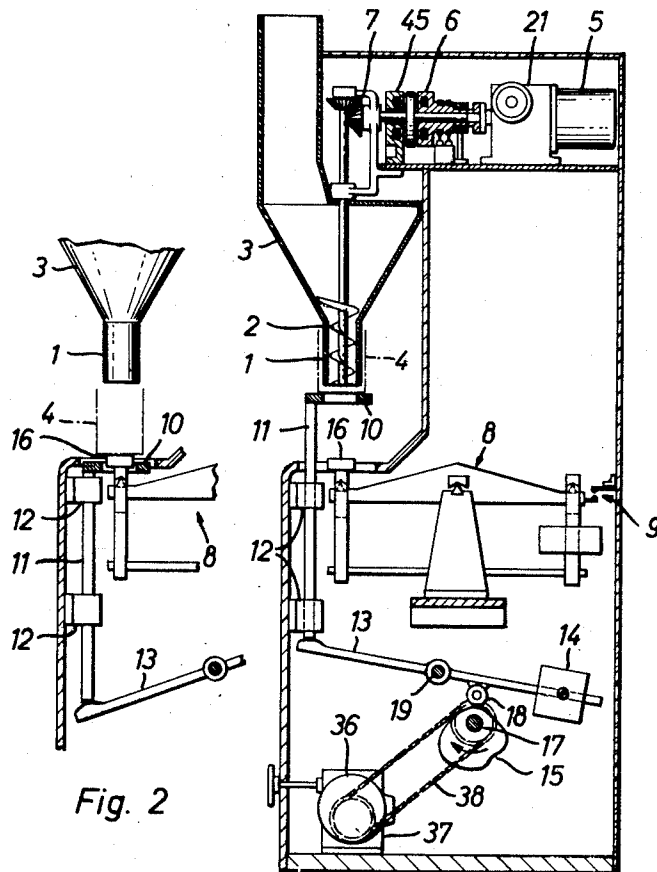


Fig. 2

Fig. 1

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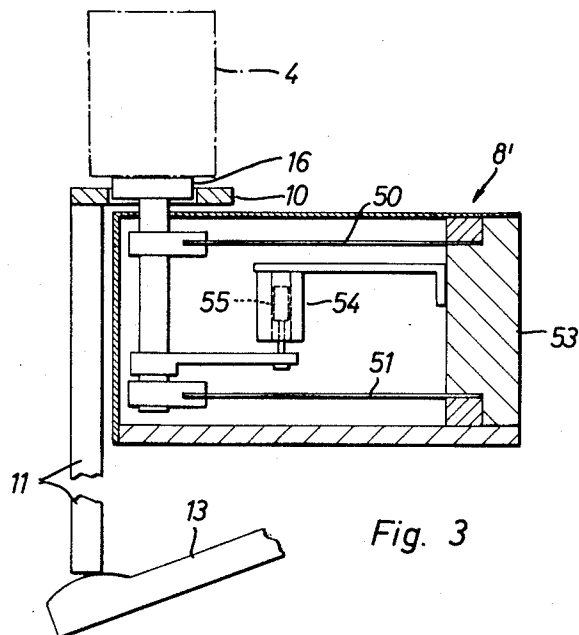


Fig. 3

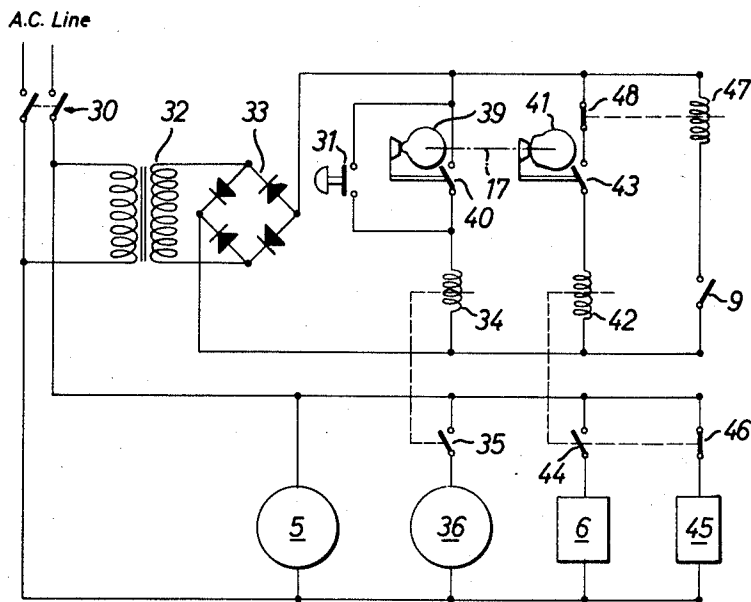


Fig. 4

1

3,137,358

MACHINE FOR CHARGING POWDERED COMMODITIES INTO PACKAGING CONTAINERS

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8 Claims. (Cl. 177—81)

This invention relates to a machine for charging powdered commodities into packaging containers. More particularly, the machine includes a feed screw rotatable in a charging nozzle to force the commodity into the container against a counter pressure, and a weigher with a load carrier which is positioned so that containers mounted thereon can be slipped over the charging nozzle.

There are machines of this character in which each packaging container to be filled is placed empty on a spring- or gravity-biased support and is pushed beneath the charging nozzle. During the ensuing infed of charging commodity into the container, the latter is pressed away from the charging nozzle, in proportion to the rate of filling of the container, against the pressure applied to the aforesaid support. The full charge in these known machines is determined either by the height to which the container has been filled, or by a specific number of turns of the screw. Experience teaches, however, that in both instances there are times when a satisfactory weighing accuracy cannot be achieved. In the case of the control by height of fill, which is performed by interrupting the feed of charging commodity after the container has been pushed away a pre-set distance, weight inaccuracies frequently occur due to differences in the cross section of respective containers. In the event that the quantity delivered by the screw is controlled in accordance with a number of rotations of the latter, it has been found that because friction conditions do not remain constant during these pressure-filling operations but may continually vary in dependence on the granular size and moistness of the charging commodity, it is not always possible to avoid large tolerances in the weighing. Moreover it has so far not been possible to allow for differential compressions of the commodity concerned.

An object of the present invention is an apparatus which avoids these defects.

Another object is to present a simple but foolproof apparatus giving accurate weight of material at pre-set compressions.

Yet another object is a construction which enables packaging containers to be filled at a high rate of output with a firmly compacted charge of very accurate weight. Furthermore, by selection of different counterweights, it is intended to achieve a corresponding variation of the degrees of compression of the charge.

A further object is the use, in a machine of the type set forth above, of an apparatus operable independently of the weigher for raising the container over the charging nozzle and comprising a counterweight which, during a first charging period, applies the counter-pressure to the feed by the screw but is adapted to have its action on the container suspended, by means of a control device such that the load carrier of the weigher will take over the support of the container, shortly before the end of the charging operation, to allow final filling on a gravity basis.

A preferred embodiment of the invention is referred to below with reference to the accompanying diagrammatic drawings. In these drawings:

FIGURE 1 is a cross section through a machine according to the invention.

FIGURE 2 is a detail of the machine according to FIGURE 1, shown in another operative position.

2

FIGURE 3 illustrates the weigher of spring-actuated type which is used in the machine for control of the filling operation, and

FIGURE 4 is an electrical diagram of the machine.

In the drawing there is shown a dispensing machine in which the charged commodity is dispensed from a hopper 3 under counter pressure into containers, such as 4, through the agency of a feed screw 2 which turns in a charging nozzle 1. A container 4 is placed on a support 10 carried by a rod 11 which is movable vertically in sleeve bearings 12. At its lower end rod 11 rests on one arm of a two-armed lever 13 which is pivotally supported by pivot 19. The other arm of lever 13 carries an adjustable counterweight 14. The rod 11, together with the support 10, is first lifted by means of counterweight 14, thereby to telescope the open mouth of the container 4, mounted on the support 10, over the charging nozzle 1. This movement, which is used to initiate a charging operation through the agency of the counterweight 14 on lever 13, is permitted by the fact that a camplate 15 which is secured to a control spindle 17 is rotated into a position which allows for the descent of the arm of lever 13 carrying counterweight 14. For this purpose the arm carries a roller 18 which is adapted to bear against the periphery of camplate 15 under the influence of weight 14. To enable the counterweight 14 to be fully effective in exerting force against the container 4 and the material charged into it during the charging operation, the profile of the camplate 15 is such that, during the major part of the filling procedure, the roller 18 of lever 13 is out of contact with the camplate (see FIGURE 1). It is only after a specific period of time, during which nearly the full target weight has been compressed into the container 4 and as a result thereof the support 10 and the rod 11 descend that the camplate 15 can again contact the roller 18 and, as a consequence of its rotation, rock the lever 13 in a counter clockwise direction to enable the support 10 and the rod 11 to drop back into the lower dead position (FIGURE 2) under their own weight. Support of the container is then taken over by the load carrier 16 of a weigher 8, which then controls the final filling of the container 4 in a way which will be referred to below. The support 10 has an open central part to allow the load carrier 16 to pass freely therethrough.

The rotary movement requisite for performing the filling operation is imparted to the feed screw 2 by an electric motor 5, for example through a variable speed gear 21, an electromagnetic clutch 6 and a bevel gearing 7, see FIGURE 1. The machine is started up by connecting it to the A.C. line by means of a switch 30. The filling procedure is then initiated by transitory operation of a switch 31, as a consequence of which a relay 34 is energized through a transformer 32 and a rectifier 33, and closes a contact 35 to set an electric motor 36 in operation. Motor 36 drives the control spindle 17 and its cam 15, through a variable speed gearing 37 and a chain drive 38. Connected in the circuit of relay 34, in parallel with switch 31, is a contact switch 40 which can be operated by a camplate 39 also arranged on the spindle 17. The camplate 39 is so constituted that the motor 36 is stopped after one rotation of spindle 17.

After the container 4 has been pushed up by the support 10 over the charging nozzle 1 in the manner described above, on commencement of a charging cycle, a further camplate 41 on the control spindle 17 closes a pair of contacts 43 in the circuit of a relay 42, causing this relay 42 to close a switch 44 to energize the electromagnetic clutch 6. At the same time the relay 42 breaks its contact 46, thereby to inactivate an electromagnetic brake 45 which is used for braking the screw 2. As a

3

result the screw 2 starts to turn and to feed the charging commodity into container 4. When the target weight is reached, the weigher 3 closes a contact 9 which in turn makes the circuit of a relay 47 which then, by means of a contact 48 therein, interrupts the circuit of relay 42, whereby the electromagnetic clutch 6 is disengaged and the electromagnetic brake 45 re-applied.

Instead of a balance arm weigher 8, a spring weigher 8', such as that shown in FIGURE 3, can be used in the machine. In this case the load carrier 16 is suspended by leaf springs 50, 51, which are secured in the housing 53 of the weigher. The movements of the load carrier 16 are measured by a fixed differential transformer 54, the movable core of which is attached to carrier 16.

I claim:

1. Apparatus for charging a measured quantity of material into a container comprising means for discharging said material, means supporting said container adjacent the first said means for receiving the material discharged therefrom, said latter means urging said container towards the first said means with a force to compact said material as it is discharged into the container against the back pressure of material already discharged into the container, means coupled to said latter means for rendering the same inoperative and for withdrawing the support furnished thereby for the container and means for supporting said container independently of said latter means for furnishing continuous support for said container with the latter means inoperative, said means for independently supporting said container being responsive to the weight of material in said container and coupled to the first said means for terminating discharge of said material with a predetermined weight of material in the container.

2. Apparatus as claimed in claim 1 wherein said latter means comprises a support, a counterweight, means coupling the counterweight to the support for normally urging the support towards said first means, and a cam operative to overcome said counterweight and to displace said support away from said first means.

3. Apparatus for charging a measured quantity of material into a container comprising means for discharging said material, first and second means supporting the container adjacent the means discharging the material so that the container is charged with said material, means urging the first means towards the means discharging the material so that said material is compacted as it is charged into said container against the back pressure of material already discharged into the container, time responsive means for displacing said first means out of contact with said container after a predetermined period of time, said second means thereafter independently supporting said container with said first means displaced, said second means being responsive to the weight of material in said container and operatively coupled to the means discharging the material to terminate discharge of said material with a predetermined quantity of material in said container.

4. A machine, for charging powdered material into packaging containers, comprising a discharge nozzle having an outlet, a feed screw rotatably disposed in said nozzle, means for driving said feed screw, a support for said container adjacent the nozzle outlet, means biasing said support towards said nozzle outlet, weighing means including a load carrier also positioned adjacent said nozzle outlet and adapted to support said container independently of said support, said carrier being movable with respect to the nozzle outlet independently of said support, and means to render the second said means in-

4

operative in response to a timed operation of the feed screw driving means to retract said support, said container being supported solely by said weighing means with the support retracted.

5. A machine for charging powdered material into a packaging container, comprising a discharge nozzle having an outlet, a feed screw rotatably disposed in said nozzle, means for driving said feed screw to discharge said material from said nozzle, a support for said container, a counterweight, means connecting the counterweight to the support for urging said support towards the nozzle outlet for compacting said material in the container as the material is discharged into the container, a weighing mechanism including a load carrier also positioned adjacent said nozzle outlet and adapted for supporting said container, said load carrier being movable with respect to said nozzle outlet independently of said support for the container, and mechanical means to initiate the action of the feed screw driving means and to counteract the action of said counterweight to displace said support for the container away from the nozzle outlet, said container then being independently supported on the load carrier.

6. A machine as claimed in claim 5, in which said mechanical means comprise a spindle, a first cam on said spindle and operative to overcome the weight of said counterweight, a second cam on said spindle to control starting of the feed screw, and a third cam on the spindle to stop the later after one revolution thereof.

7. A machine as claimed in claim 5, in which said support for said container and said load carrier interfit with clearance and are mounted for coaxial movement.

8. A machine for charging powdered material into a packaging container comprising a discharge nozzle having an outlet, a feed screw rotatably disposed in said nozzle, a first electric motor for driving said feed screw, an electromagnetic clutch for coupling said motor to said screw, a support for said container, means biasing said support towards the nozzle outlet to compress powdered material fed into said container, said biasing means comprising a pivoted rocking arm bearing against said support, and a counterweight adjustably supported on said arm a weighing mechanism including a load carrier also positioned adjacent said nozzle outlet and adapted to support said container, said load carrier being reciprocable with respect to the nozzle outlet in response to the weight of material in the container and independently of said support for the container, a spindle rotatably supported adjacent said rocking arm, a second electric motor for driving said spindle, a first cam on said spindle and having a profile adapted to contact said rocking arm to counteract the weight of the counterweight and to displace the rocking arm whereby the support for the container is displaced and said container is supported solely on the load carrier, a second cam on said spindle, and electrical control means operatively coupled to said second cam to control said electromagnetic clutch.

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