Oct. 11, 1932. H. MULLENDORE 1,881,859

PACKAGING MACHINE

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Fig. 10

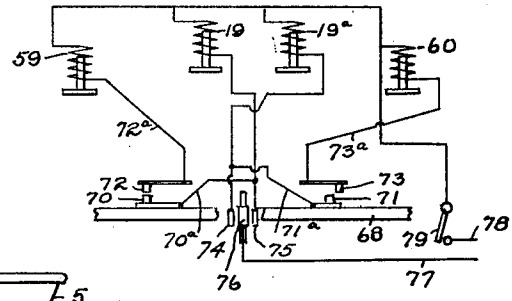


Fig. 1.

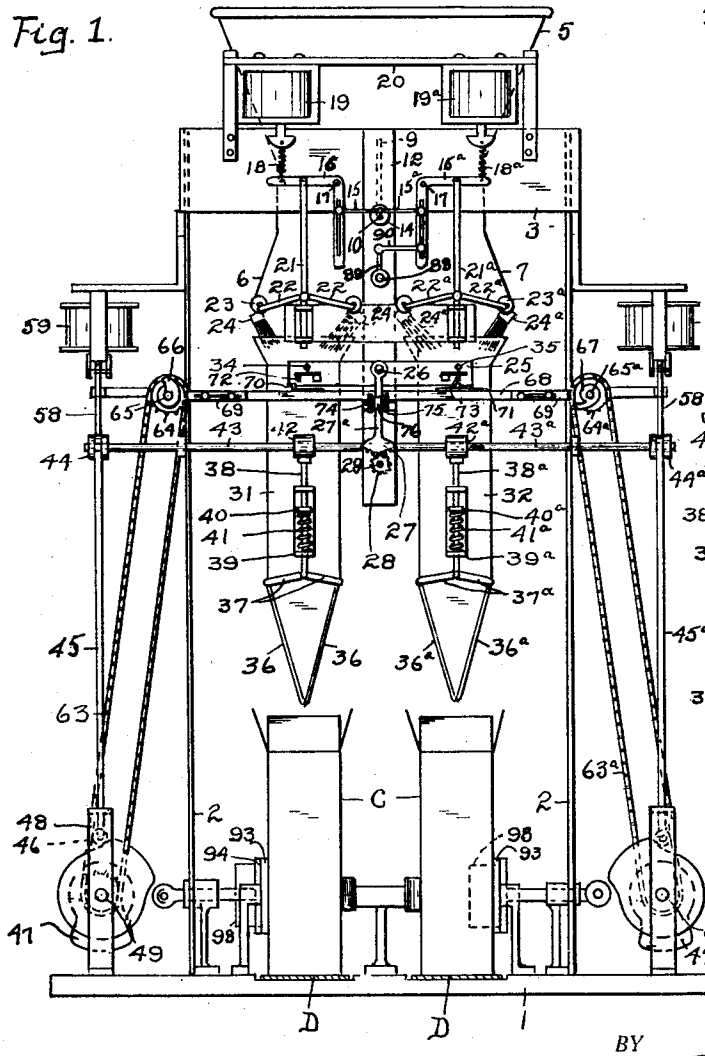
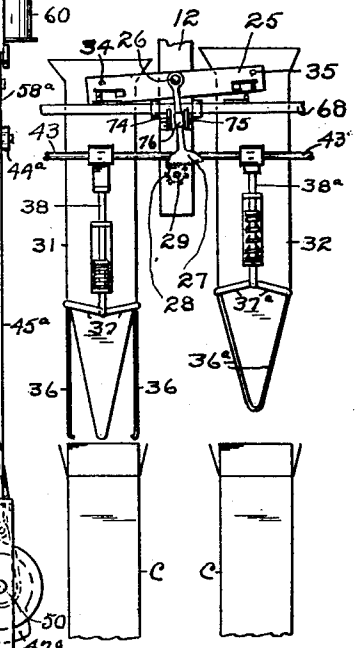


Fig. 8



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PACKAGING MACHINE

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Fig. 4.

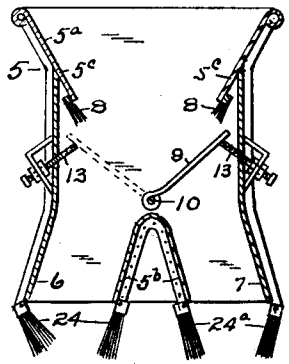
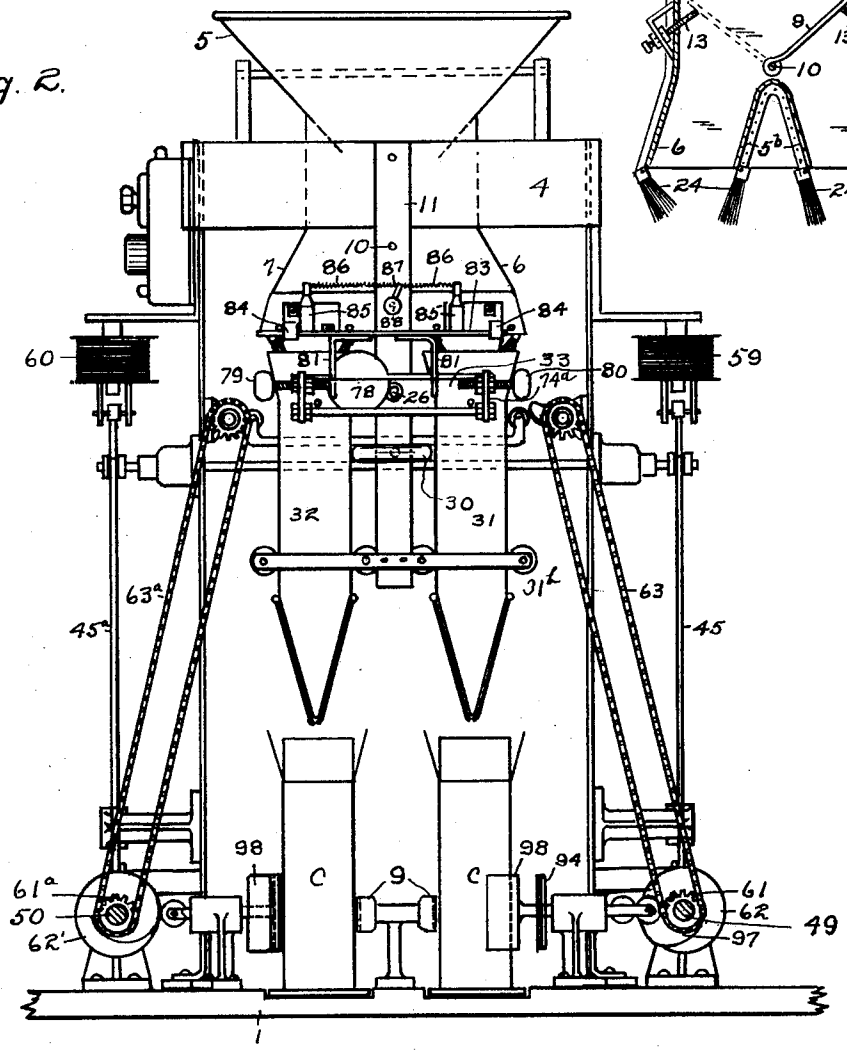


Fig. 2.



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PACKAGING MACHINE

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Fig. 6

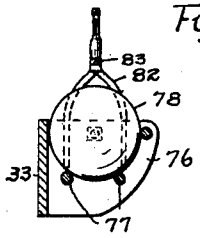
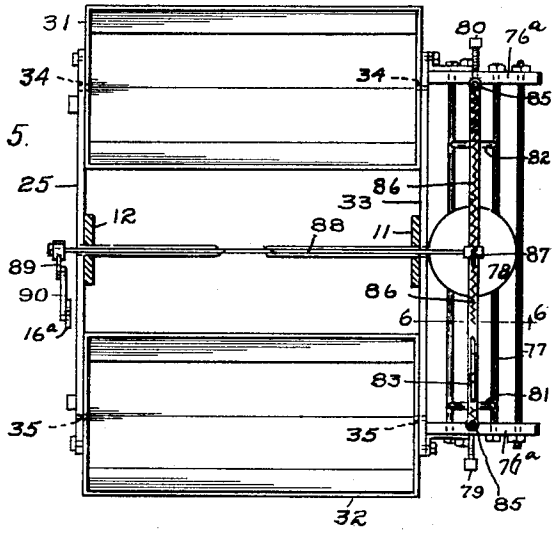


Fig. 5.



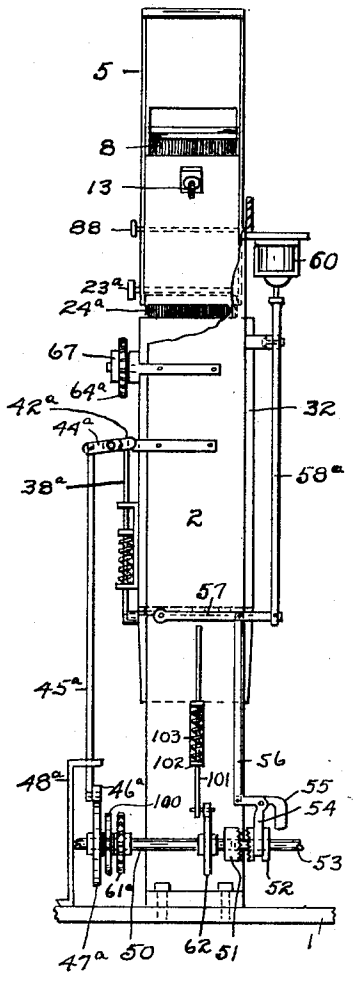


Fig. 3.

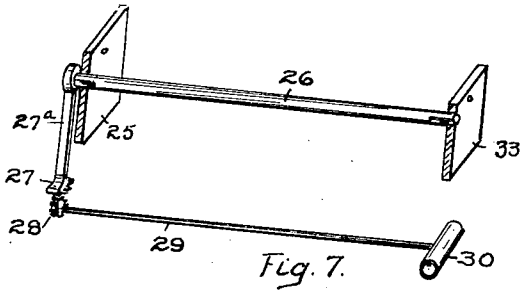


Fig. 7.

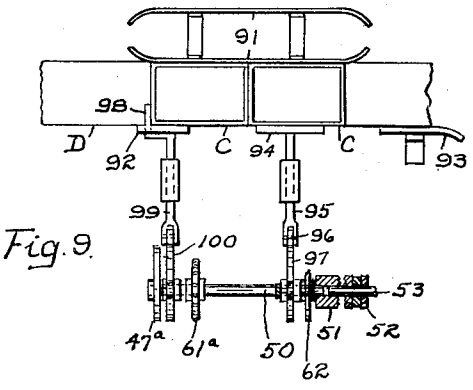


Fig. 9.

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Patented Oct. 11, 1932 1,881,859

UNITED STATES PATENT OFFICE

HARVEY MULLENDORE, OF FORT WAYNE, INDIANA, ASSIGNOR TO PERFECTION BISCUIT COMPANY, OF FORT WAYNE, INDIANA

PACKAGING MACHINE

Application filed September 16, 1929. Serial No. 392,800.

The invention relates to machines for filling containers such as for depositing crackers in paper board boxes or cartons.

The object of the invention is to provide an efficient machine by which boxes or cartons may be filled automatically with various articles.

Another object is to provide in a filling device novel means for feeding the material to the containers in weighed quantities and another object is to provide novel controlling means for the feeding mechanism. Other objects and advantages will appear hereinafter.

The invention is illustrated in the accompanying drawings in which

Figure 1 is a front elevational view of a machine embodying the invention; Fig. 2 a rear elevational view of the same; Fig. 3 a side view of the machine; Fig. 4 a vertical cross section of the hopper; Fig. 5 a plan view of the measuring receptacles and rolling weight mechanism; Fig. 6 a cross section on line 6—6 of Fig. 5; Fig. 7 a perspective view of the mercury tube tilting mechanism; Fig. 8 an elevational view of the measuring receptacles in exaggerated operating condition; Fig. 9 a plan view of the container controlling mechanism and Fig. 10 a diagram of the electrical mechanism and circuits.

Referring to the illustrative embodiment of the invention, 1 is the base of the machine upon which the standards 2 of the main frame are mounted. Two cross members 3, 4 are secured to the upper ends of the standards and support between them the hopper 5. The hopper 5 (Fig. 4) is formed with a flaring top 5^a and a flaring bottom divided by the walls 5^b into two chutes 6, 7. The upper inclined side walls 5^c are extended downwardly and converge within the hopper and at the lower end of each extension is fixed a brush 8 adapted to be closely approached by the valve or flap 9 that is mounted on a shaft 10 revolubly carried by two vertical bars 11, 12 secured to the cross members 3, 4 respectively, the shaft extending through the hopper. Adjusting screws 13 are mounted in the opposite walls of the hopper at the proper point to be abutted by the valve or flap 9 at the outer end of its movement, the maximum movement of the flap being controlled by said screws 13.

A disk 14 is secured to the shaft 10 and to this disk are eccentrically attached two links 15, 15^a the opposite ends of the links being adjustably attached respectively to the bell crank levers 16, 16^a that are pivoted at 17 to the cross member 3. The upper arms of the levers are connected respectively to the springs 18, 18^a, which springs are also connected to the armatures of the solenoids 19, 19^a respectively. The solenoids are mounted on a bracket 20 supported by the member 3. Rods 21, 21^a are pivotally connected to the upper arms of the levers 16, 16^a and to these rods are pivotally connected the opposed ends of the links 22, 22^a. The links 22 are also eccentrically pivoted to two disks 23 that are suitably connected to the brushes 24 respectively, and the links 22^a are similarly connected to brushes 24^a through the disks 23^a. The brushes 24 and 24^a are disposed at the lower end of the chutes 6 and 7 respectively. The brushes of each set are adapted to swing toward each other to close the lower end of the chute upon which they are mounted, the closure being effected when the solenoids 19, 19^a are energized. Devices hereinafter described control the solenoids so that they are energized alternately whereby to close the chutes alternately.

A bar 25 is secured to a rock shaft 26 that is supported by the bars 11 and 12, the portions of the shaft 26 in the bars 11 and 12 having a knife edge upon which the bar rocks. A segment gear 27 is suitably secured to the shaft 26 and meshes in a gear 28 mounted on a shaft 29 borne by the fixed bars 11 and 12. A mercury tube 30 is secured to the opposite end of the shaft 29 and is tilted in opposite directions as the shaft 26 is rocked.

Two measuring receptacles 31 and 32 are pivotally hung on the bars 25, 33, the bar 33 being secured to the opposite or rear end of the shaft 26. The pivots are indicated at 34, 35. Two doors 36, 36^a are hinged to the lower end of each receptacle and normally close said end. Guide rollers 31^b are suitably

supported on the bar 11 and engage the opposite sides of the receptacles. Two levers 37, 37ª are suitably attached to the doors respectively and their adjacent ends are pivoted to the rods 38, 38ª respectively, which rods are longitudinally slidably supported by the brackets 39, 39ª mounted on the measuring receptacles 31, 32 respectively. Collars 40, 40ª are secured to the rods 38, 38ª and springs 41, 41ª engage the collars and the lower end of the brackets, the springs normally opposing the opening of the doors. The doors 36, 36ª are opened by the levers 42, 42ª secured to the shafts 43, 43ª respectively that are revolubly supported on the standard 2 and on the bar 12. Each lever when rocked downwardly, depresses the rod beneath it and causes the doors to open as shown in Fig. 8.

The shaft 43 is rocked by a lever 44 to which a rod 45 is connected. The lower end of the rod carries a roller 46 that rides on a cam 47 by which cam the rod is intermittently elevated to rock the shaft. The rod is longitudinally slidable in a guide 48 mounted on the base 1. The rod 45ª engaged by the cam 47ª similarly causes the shaft 43ª to rock to cause the doors 36ª to open.

The cams 47, 47ª are secured to the shafts 49, 50 respectively, which shafts are revolubly supported on the base 1. Each said shaft carries a clutch member 51 (Fig. 3) the other member 52 of the clutch being slidably keyed on another revoluble shaft 53 to which power is suitably applied. The usual forked lever 54 engages the clutch member 52 and is pivoted to a fixed bracket 55. A link 56 is connected to the upper arm of the lever 54 and to a lever 57 pivoted at one end to the standard 2. A rod 58ª is pivoted to the free end of the lever 57, the upper end of which rod is suitably connected to the armature of the solenoid 60, the rod 58 and solenoid 59 corresponding to the rod 58ª and solenoid 60. The solenoids are suitably supported on the standards 2.

The solenoids 59, 60 are adapted to be energized alternately so that the shafts 49 and 50 are driven alternately to cause alternate opening of the doors 36, 36ª and to cause alternate rotation of the sprocket wheels 61 and 61ª secured thereto as well as the rotation of the cam 62 on the shaft 50 and a similar cam on the shaft 49.

Chains 63, 63ª engaging the sprockets 61, 61ª drive the sprocket wheels 64, 64ª suitably mounted on the shafts 65, 65ª that are carried by the standards 2. Cams 66, 67 are secured to the shafts 65, 65ª respectively and said cams are so disposed as to alternately abut the opposite ends of the switch bar 68 and reciprocate it longitudinally. The extremities of the bar have adjustable ends 69 thereon to regulate the position of said ends relatively to the actuating cams 66, 67.

Two contacts 70, 71 are mounted on the switch bar 68 and are adapted to be engaged respectively by the contacts 72, 73 mounted on the rock bar 25. The contact 70 is electrically connected by the wire 70ª to the solenoid 19 and the contact 71 is electrically connected by the wire 71ª to the solenoid 19ª. The contact 72 is electrically connected by the wire 72ª to the solenoid 59 and the contact 73 is electrically connected by the wire 73ª to the solenoid 60. Two contacts 74, 75 are mounted on the frame bar 12 at opposite sides of the lever 27ª that carries the segment gear 27 and said contacts are adapted to be engaged by a contact 76 mounted on the lever 27ª. The contacts 74, 75 are electrically connected to the wires 71ª and 70ª respectively and in operation the contact 76 engages one of the contacts 74, 75 before the switch bar moves the contact 70 or 71 into position for engagement by the corresponding contact 72 or 73. Hence solenoid 19 is energized before solenoid 60 is energized and solenoid 19ª is energized before solenoid 59.

A ball runway 74ª is mounted on the cross bar 33 and consists of the end plates 76ª and cross rods 77 engaged to both plates. A ball 78 is adapted to roll from end to end of the raceway, the extent of the movement being determined by the set screws 79 and 80 mounted in the end plates. The set screws are adjusted in accordance with the weight of the material to be packed in the containers or cartons C, the latter being moved under the receptacles 31, 32ª successively in two rows by the endless belts D. Two yokes 81, 82 are adjustably secured to a bar 83 and depend into the race way for engagement by the ball 78. The bar 83 is longitudinally slidably mounted in the brackets 84 which project outwardly from the lower end of the hopper and two upright posts 85 are mounted on the bar. Springs 86 are connected at one end to the posts and at their other ends to an arm 87 projecting from a disk secured to the shaft 88 that is revolubly carried by the frame bars 11 and 12. An arm 89 (Fig. 1) is secured to the opposite end of the shaft 88 and a link 90 is pivotally connected to the arm 89 and to the lever 16ª, so that when either solenoid 19, 19ª is energized and rocks the lever 16 or 16ª the shaft 88 will be rocked and the bar 83 will be shifted to move the yokes toward the end of the race way that is descending under the influence of the weight of the contents of the receptacle that is pivoted to the corresponding end of the bar 33, the yokes respectively starting the ball to move in its run way.

In order to control the proper positioning of the cartons C under the receptacles 31, 32, I mount two fixed guards 91 upon which the cartons may bear as the conveyers D carry them forwardly. Opposing each fixed guard 91 are two fixed guards 92, 93 upon which the cartons also bear and which

cooperate with the guard 91 to guide the cartons. A push plate 94 is mounted on a reciprocable bar 95 that carries a roller 96 at its opposite end, the roller riding on a cam 97 secured to the shaft 50 (Fig. 9). This push plate causes each carton to properly position laterally on the conveyer with respect to the receptacle and retards its movement until the stop plate 98, carried by a rod 99 having rolling engagement with a cam 100 on shaft 50, is moved into the path of the carton and holds it from further movement while the carton is being filled from the measuring receptacle above it. Similar fixed guards and push and stop plates are disposed on the other side of the other conveyer D to guide and control the cartons carried by that conveyer.

A rod 101 (Fig. 3) reciprocably mounted in the fixed bracket 102 rides on the cam 62, the spring 103 opposing the upward movement of the rod. The upper end of the rod when said rod is elevated by the cam abuts the lever 57 and holds up the rod to maintain the closure of the clutch members 51 and 52 until the shaft 53 completes a full rotation, this being desirable since the electromagnet deenergized when the switch bar began its movement in the opposite direction to that which caused the contact thereon to close the circuit to said solenoid. The cam 62 is so designed that when its high point passes under the rod 101 the end will drop and bump an inclined edge of the cam to cause the cam to rotate a small amount and carry the shaft 50 with it, and thereby assure that the cam, say cam 67, which has just reciprocated the switch bar 68 will be out of the way of the return movement of said bar by the other cam 66. A similar rod similarly functions with respect to the shaft 49.

The shaft that corresponds to the shaft 53 and is engaged to the shaft 49 by a clutch similar to the clutch 51—52, is driven in any suitable manner by the shaft 53 so that the two shafts will rotate synchronously.

Assuming that the receptacle 31 is down and discharging its contents into a container, the contact 76 is in engagement with the contact 75 and closes the circuit to the solenoid 19 by which the lever 16 was rocked to close valve 9 on chute 6 and to close the brushes 24. Brushes 24ª are open and the receptacle 32 is in its uppermost position and receiving the feed through the chute 7. The contacts 70 and 72 are engaged thereby closing the circuit to the solenoid 59 which causes the clutch to connect shaft 49 to its driving shaft and drive the cam 66 and all other parts on said shaft 49. This cam reciprocates the switch bar 68 to separate the contacts 70 and 72 and upon so doing the solenoid 59 deenergizes but the rod corresponding to rod 101 holds in the clutch until the cam has made a full rotation. The continued reciprocation of the bar 68 eventually moves the contact 71 under contact 73. By this time the receptacle 31 has emptied and the receptacle 32 has received the weight of material for which the throw of the ball 78 has been set by the adjustment of the screws 79. The receptacle 32 therefore over balances the ball and the receptacle 31 and it descends and rocks the bar 33. The shaft 26 is also rocked by the bar 33 which in turn rocks the arm 27ª to the left (Fig. 1) whereby contact 76 breaks its connection with the contact 75 to deenergize the solenoid 19 and engages contact 74 to close the circuit to solenoid 19ª which rocks the lever 16ª to cause the valve 9 to close the chute 7 and to cause the brushes 24ª to close the discharge end of the chute 7. The movement of the lever 16ª causes shaft 88 to rotate and through the spring 86 cause the yoke against which the ball 78 was resting to give the ball a start down the now inclined runway. The segment gear 27 at the same time rotates the shaft 29 which inclines the mercury tube 30 in the same direction as the run way to smoothen up and assure the complete movement of the receptacles. Immediately after the engagement of contacts 76 and 74 the contact 71 is in position to engage the contact 73 and when so engaged the solenoid 60 is energized. In the meantime as the receptacle moved upwardly the shafts 49 and 43 were idle so that the spring 41 caused the doors 36 to close and the shaft 43 and the lever 42 returned to normal position under the influence of gravity on the rod 45. Upon the energization of the solenoid 60 the clutch members 51 and 52 are engaged to drive the shaft 50 and rotate the several cams and the sprocket wheel thereon, whereby the cam 67 is rotated to reciprocate the switch bar 68 in the opposite direction, the cam 47ª causing the lever 42ª to depress the rod 38ª for opening the doors 36ª on the receptacle and the cam 97 reciprocates the rod 101 upwardly and the cams reciprocate the push and stop plates at the proper times to control the containers on the conveyer.

What I claim is:

1. In a packaging machine the combination of a rocking member, measuring receptacles supported on the opposite ends of the rocking member and adapted to rock said member, means to feed materials to be packed in weighed quantities to the receptacles alternately, means to support containers beneath the receptacles, means to cause the contents of the receptacles to discharge alternately into the containers and electrically controlled means responsive to the rocking movement of the rocking member to actuate the feed means and the discharge means.

2. In a packaging machine, a rocking member, a weight adapted to travel under the influence of gravity along the said member, means to regulate the travel of said weight,

measuring receptacles supported by the rocking member, means to feed materials to be packed to alternate receptacles in weighed quantities, the weight of which materials causes the receptacles to descend alternately and rock the rocking member, means to support containers beneath the receptacles, means to open the receptacles alternately for discharging the contents thereof into the containers, and means responsive to the rocking movement of the rocking member to operate the feed means and the receptacle opening means.

3. In a packaging machine, a rocking member, measuring receptacles suspended from the rocking member, chutes adapted to feed material to be packed to the receptacles respectively, means to close the lower end of each chute, means to control the flow of material into either chute, solenoids having operative connections with the closing means respectively and with the controlling means, an electrical circuit for each solenoid including a contact on the rocking member, a reciprocating contact adapted to engage the contact on the rocking member, a terminal contact and a switch arm having an operative connection with the rocking member and adapted to be rocked thereby to engage said terminal contacts alternately whereby to close the electrical circuits to the solenoids alternately and thereby cause the chutes to close alternately.

4. In a packaging machine, the combination of a rocking member, measuring receptacles pivotally mounted on said member and adapted to rock the same in opposite directions under the influence of materials to be packed that are fed to the receptacles alternately, a rolling member on the rocking member adapted to regulate the weight of materials fed to each receptacle, means to feed the materials to the receptacles and electrically actuated means responsive to the movement of the rocking member to control the feed means whereby to cause the feed to flow to the receptacles alternately.

5. In a packaging machine, the combination of a rocking member, measuring receptacles pivotally mounted on the rocking member, means to feed materials to be packed to the receptacles alternately in weighed quantities whereby to cause the rocking member to rock in opposite directions, doors on the receptacles adapted when opened to permit the discharge of the materials therefrom, means to convey containers beneath the receptacles, a plurality of solenoids, a plurality of contacts carried by the rocking member and electrically connected to the solenoids respectively, a reciprocable switch bar adapted to close the electrical circuits at the contacts alternately whereby to energize the solenoids alternately, means to reciprocate the switch bar in opposite directions, said last named means being responsive to the energization of the solenoids and means responsive to the energization of the solenoids for opening the doors on the receptacles respectively.

6. In a packaging machine, the combination of a rocking member, a plurality of solenoids, a plurality of driving shafts, a plurality of driven shafts, clutch mechanisms operatively connected to the solenoids respectively and adapted to connect the driving shafts to the driven shafts respectively, electrical contacts on the rocking arm, electrically connected to the solenoids respectively, a pair of fixed contacts, a rocking switch arm operatively connected to the rocking member and adapted to engage the fixed contacts alternately, said rocking switch arm forming the terminal of an electrical circuit, a reciprocable bar having two contacts thereon electrically connected to the fixed contacts respectively, cams to reciprocate the bar in opposite directions, means operatively connecting the cams to the driven shafts respectively, measuring receptacles mounted on the rocking arm, means to feed to the receptacles alternately the materials to be packed in measured quantities, the weight of which material causes the receptacles to descend and rise alternately and rock the rocking member whereby the electrical circuits to the solenoids are closed alternately and said solenoids cause the driven shafts to rotate alternately, means to support containers beneath the receptacles and means driven by the driven shafts to open the receptacles alternately.

In witness whereof I have hereunto subscribed my name, this 12th day of September, 1929.

HARVEY MULLENDORE.