

Oct. 23, 1945.

S. R. HOWARD

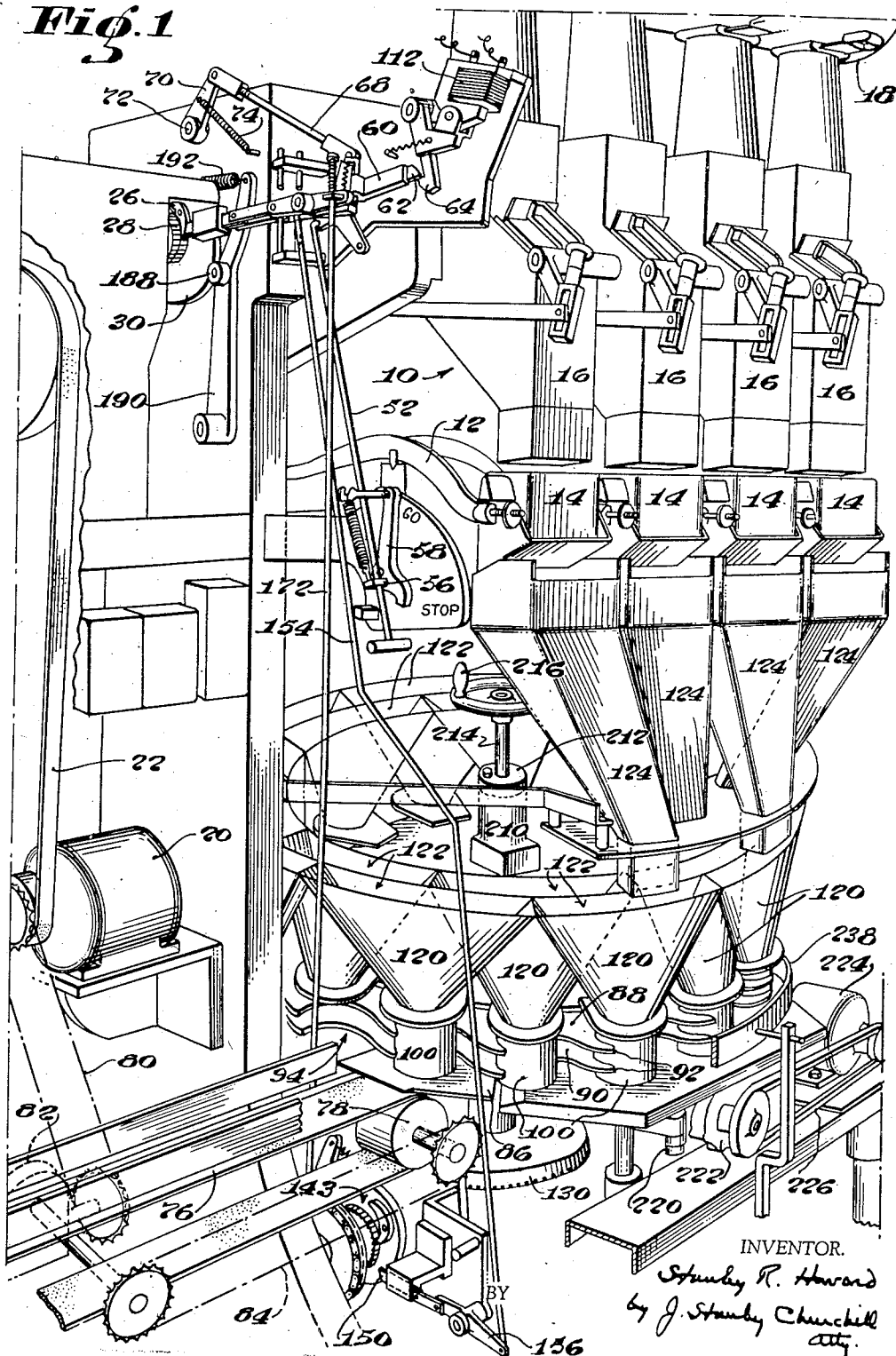
2,387,585

PACKAGING MACHINE

Filed March 28, 1942

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FIG. 1



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Fig. 3

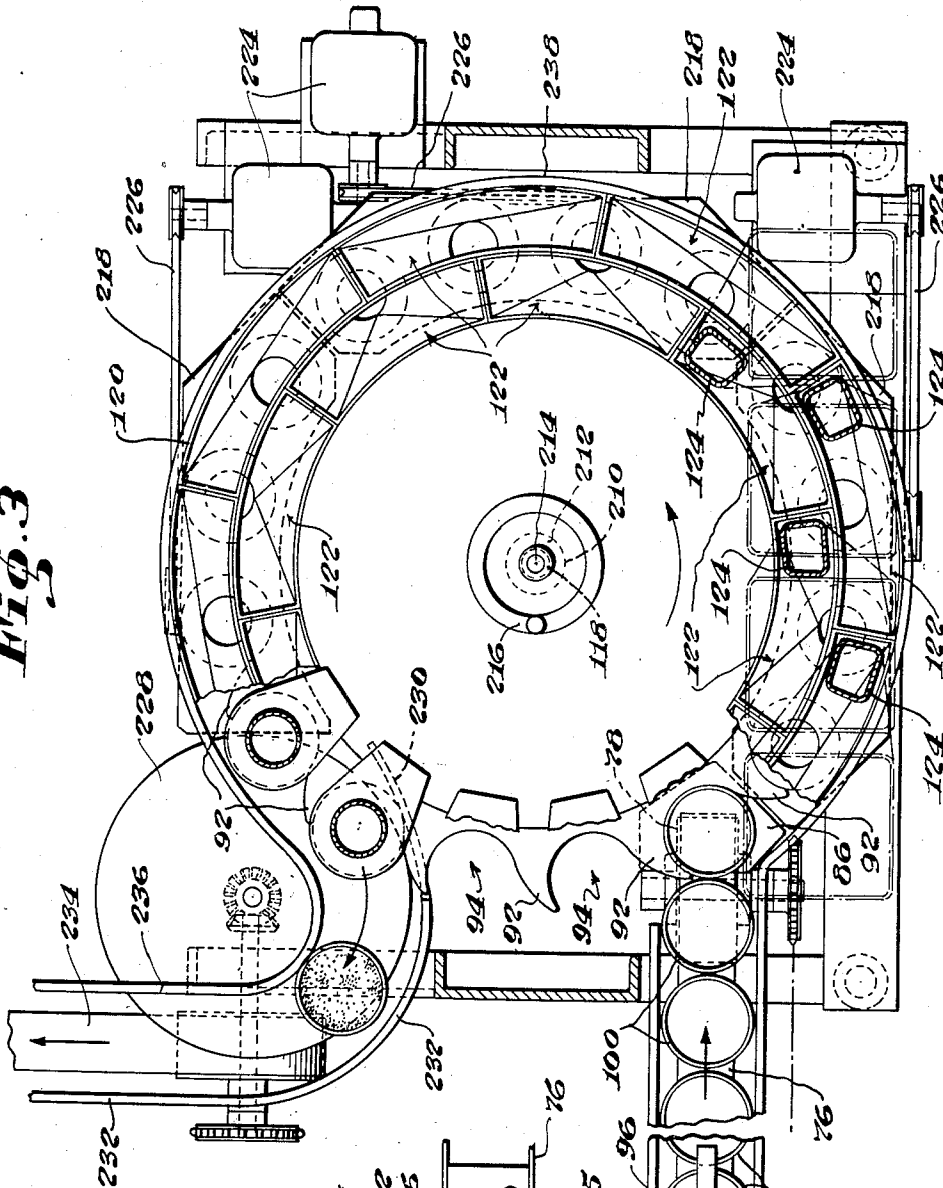
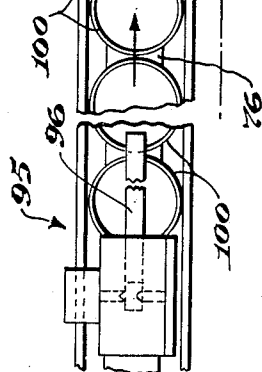
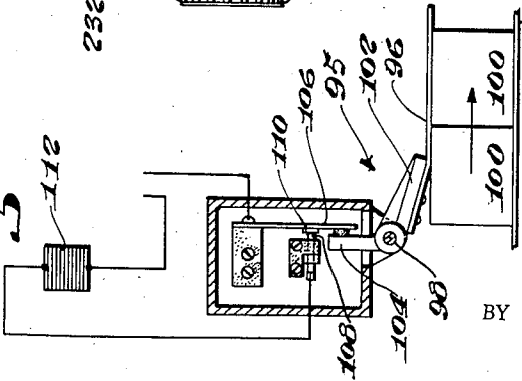


Fig. 4



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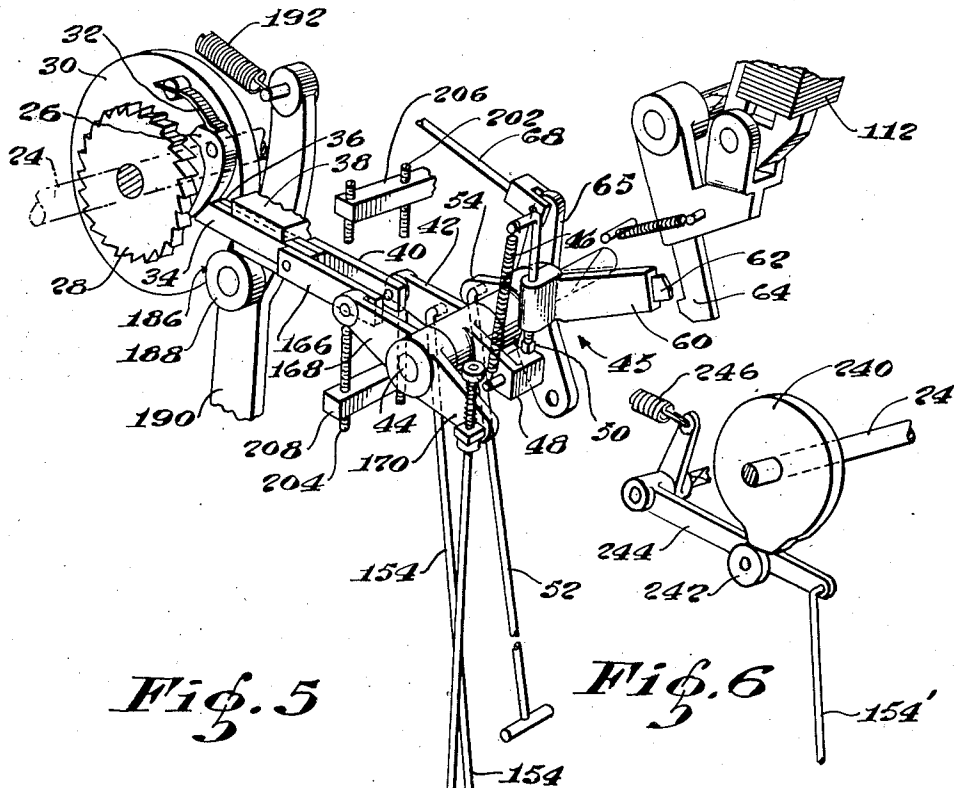
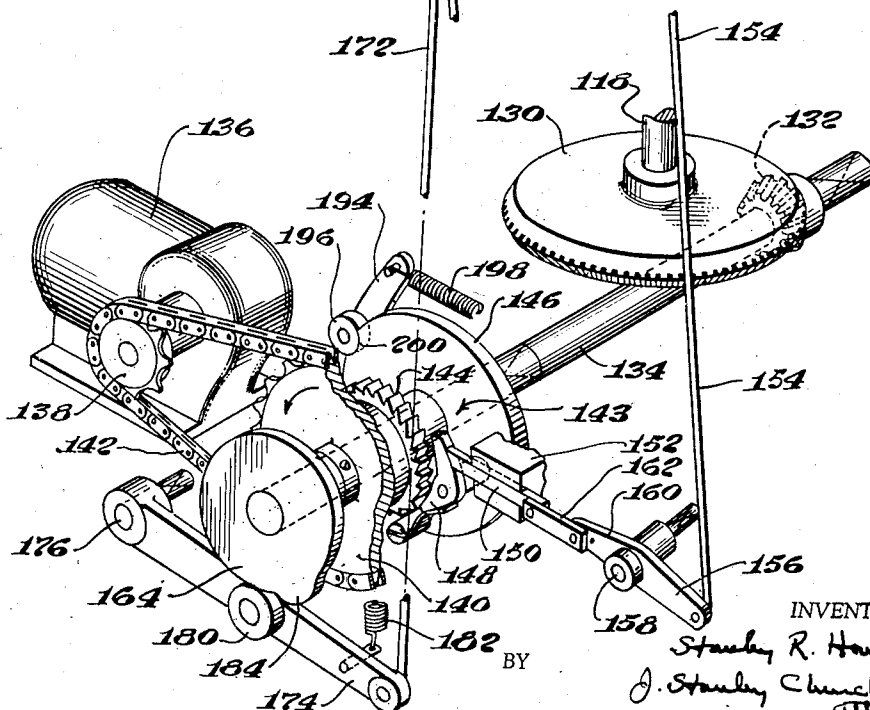


Fig. 5

Fig. 6



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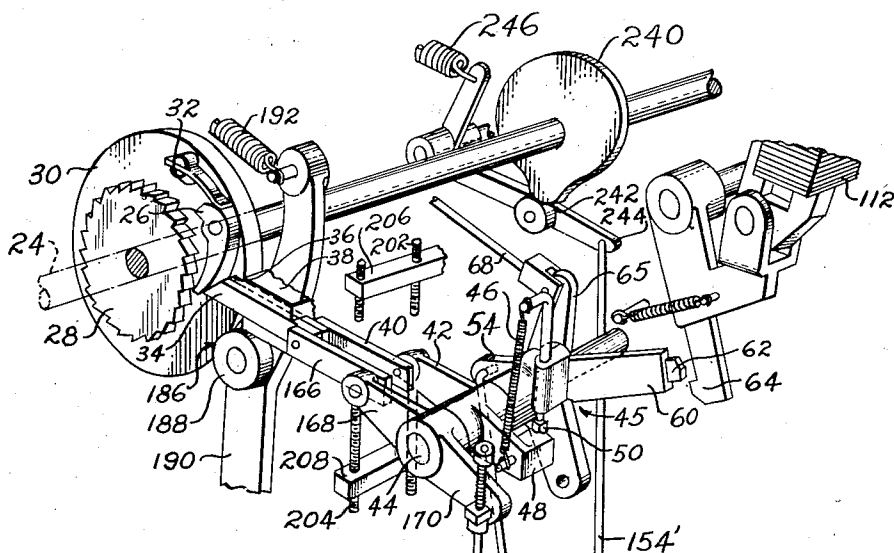
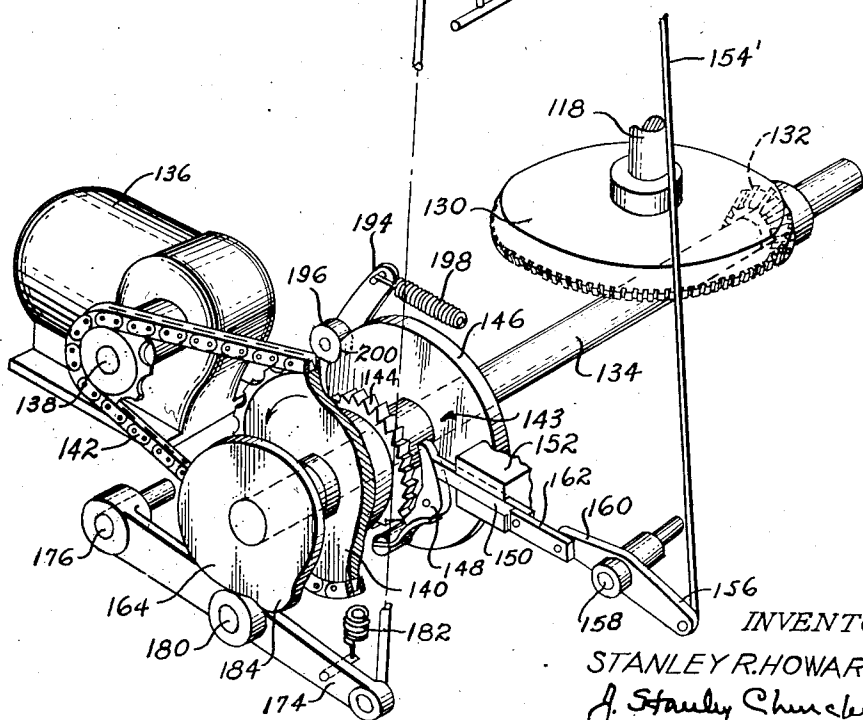


Fig. 7



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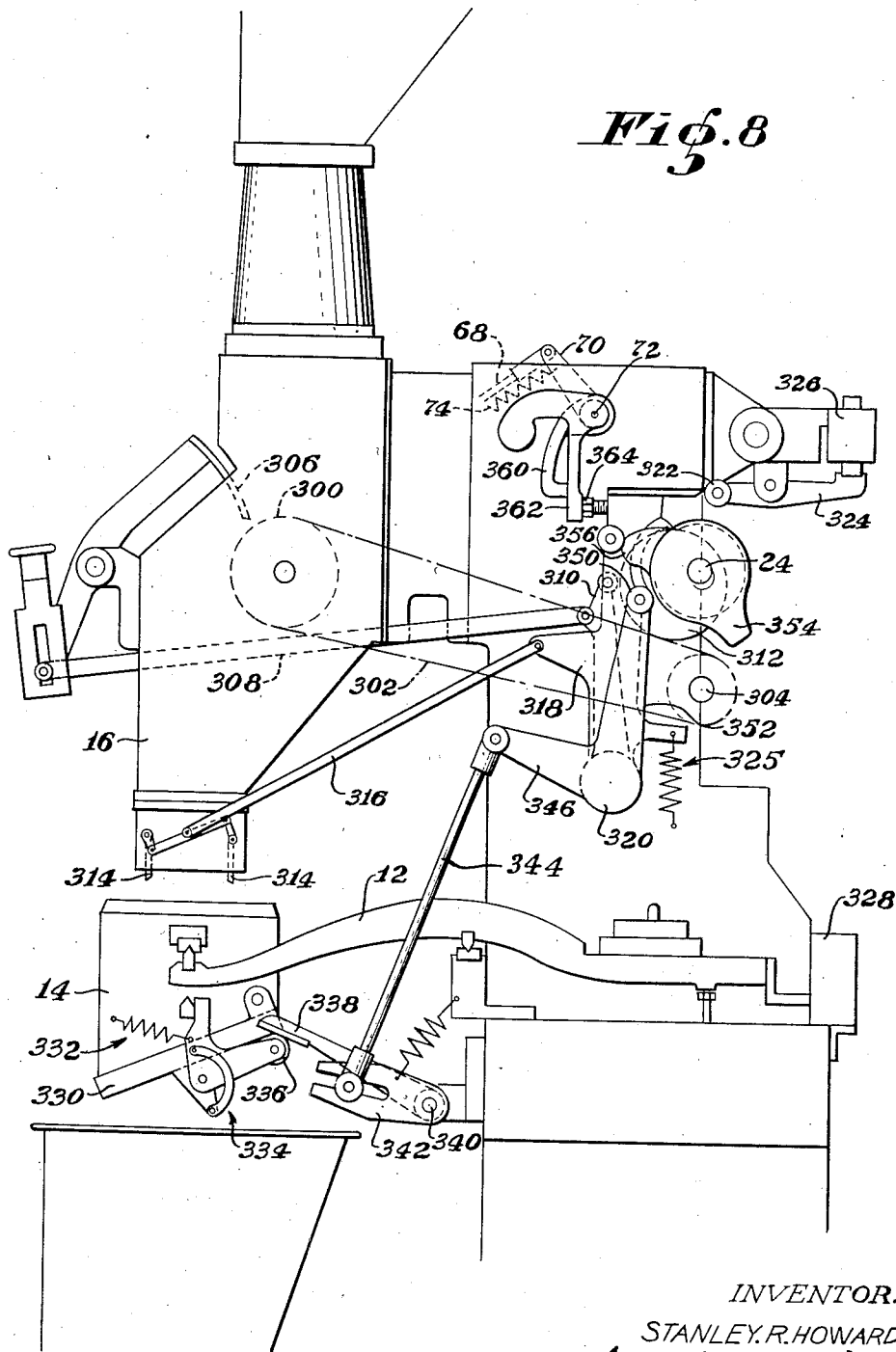
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Filed March 28, 1942

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Fig. 8



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2,387,585

PACKAGING MACHINE

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Application March 28, 1942, Serial No. 436,599

12 Claims. (Cl. 249—18)

This invention relates to a packaging machine.

The invention has for an object to provide a novel and improved packaging machine having a plurality of load forming devices which may and preferably will comprise weighing devices operative to deposit their weighed loads into a plurality of successive continuously moving containers, and in which provision is made for controlling the movement of the containers with relation to the operation of the load forming devices whereby to assure the proper deposition of the loads into their respective containers.

With this general object in view, and such others as may hereinafter appear, the invention consists in the packaging machine and in the various structures, arrangements, and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a perspective view of an automatic packaging machine embodying the present invention; Fig. 2 is a front elevation of the packaging machine illustrating the container supporting and moving apparatus; Fig. 3 is a plan view of the apparatus shown in Fig. 2 some of the parts being shown in cross-section as taken on the line 3—3 of Fig. 2; Fig. 4 is a detail view of a safety switch shown in Fig. 3 for controlling the operation of the machine in the event the supply of containers is depleted; Fig. 5 is a perspective view of control mechanism for regulating the operation of the weighing machine and the container moving apparatus; Fig. 6 is a detail view in perspective showing a modified form of control mechanism for regulating the movement of the containers in accordance with the weighing operation; Fig. 7 is a perspective view similar to Fig. 5 showing the modified form of control mechanism; and Fig. 8 is a view in side elevation of weighing mechanism comprising the load forming unit of the illustrated packaging machine.

In general, the present invention contemplates a packaging machine having a plurality of load forming units, which, as herein illustrated, may and preferably will comprise a plurality of weighing devices arranged to form their loads in a predetermined time interval, during normal operation. Upon completion of the weighing operation, the weighing units are arranged to simultaneously release their weighed loads into containers arranged to be moved continuously therebeneath. Provision is made for supporting and continuously moving the containers to be filled

and for guiding the formed loads from the weighing devices into their respective containers during such movement. As herein shown, the container moving mechanism and the means for guiding the material into the containers comprise a rotating member having a plurality of funnels provided with elongated arcuate openings arranged to receive the material released by the weighing devices during movement of the rotary member and to guide the material into the containers supported therebeneath and movable therewith. The rotating member is preferably independently driven in timed relation to the operation of the weighing devices so that the rotary member is in position to receive the weighed loads as they are released from the weighing devices, and, in the continuous operation of the machine, a new set of arcuate openings arrive in position to receive the succeeding loads subsequently released from the weighing devices. Under normal operating conditions, the weighing units will have completed their weights and will release their formed loads in the predetermined time established therefor and the rotating member with the containers will be moved continuously past the weighing devices to receive the weighed loads.

In accordance with one feature of the present invention, control mechanism is provided for the rotating member, such control mechanism being operatively connected to the weighing devices and arranged to permit the rotary member to continue its rotation as long as the weighed loads are formed and released in the predetermined time established therefor. However, in the event that the load forming mechanism is delayed, the rotary member will come to rest to await completion of the load forming operation. Provision is also made for assuring the proper disposition of the rotary member with respect to the delivery chutes when the formed loads are released from the weighing devices so that the weighed loads will not be released until the rotary member has presented its arcuate openings in position to receive the loads. In the illustrated embodiment of the invention, the timing mechanism preferably comprises a cam set to arrive at a predetermined position when the arcuate openings are in operative position to receive the weighed loads. The cam is operatively connected to the weighing mechanism and is arranged to interrupt the operation thereof and thus prevent the release of the weighed loads until the rotary unit is in such operative position with respect to the discharge chutes of the weighing devices. It will be under-

stood, however, that under normal operating conditions, the control mechanisms operate to permit the rotating member to continue its rotation in timed relation to the release of the formed loads of the weighing devices.

Referring now to the drawings, the illustrated load forming means indicated generally at 10 preferably comprises a plurality of weighing units which may be of any usual or preferred form now upon the market, and inasmuch as the details of the weighing units of themselves form no part of the present invention, only sufficient portions of such mechanisms have been herein illustrated and will be hereinafter described as will enable the different features of the present invention to be understood. For a complete disclosure of the form and mode of operation of such weighing mechanisms, reference is made to the United States patents to Howard, No. 2,151,107 dated March 21, 1939 and No. 2,207,885 dated July 16, 1940 and No. 2,204,134, dated June 11, 1940. In general, such weighing mechanisms include a plurality of devices each comprising a scale beam 12 provided with a receptacle 14 into which the material to be weighed is fed in the usual manner from feed hoppers 16 which receive the material from an overhead supply bin 18. The flow of the material onto the scales is controlled by suitable gates and operating mechanisms therefor, and provision is also made for resetting and locking the scales in accordance with the common practice in the usual forms of automatic weighing machines now upon the market. Upon completion of the weighing operation, the weighed loads formed in the receptacles 14 are automatically dumped through discharge chutes into the containers. For the purposes of the present invention it is believed to be sufficient to state that the weighing mechanism is driven by a motor 20 through a belt connection 22 and thence through suitable gearing (not shown) to a main driving shaft 24, see Fig. 5. From this shaft 24 the gate operating mechanism, the scale resetting mechanism, the material feeding mechanism and the receptacle dumping mechanism are driven so that the operation of the entire weighing mechanism is controlled by the shaft 24 in accordance with the usual practice.

As best shown in Fig. 8, the present weighing unit includes a rotary feeding member 300 driven by a chain connection 302 from a clutch shaft 304. Provision is made for varying the stream of material fed by the member 300 and as herein shown, a pivotally mounted gate 306 connected by a link 308 to an arm 310 is arranged to be rocked by a cam 312 to provide a relatively large stream of material at the start of a weighing cycle and to gradually reduce the stream as the weighing operation progresses.

The mouth of the hopper 16 is provided with a pair of interconnected gates 314 normally open during the weighing operation and which are arranged to be closed when the scale has made its weight. As herein shown, the gates 314 are connected by a link 316 to a trip lever 318. The trip lever 318 pivotally mounted at 320 is maintained in its illustrated or weighing position by cooperation with a roller lock 322 mounted upon one end of a pivoted lever 324. The second end is provided with the movable member of an electro-magnet 326 which latter is wired to a scale-operated switch 328 constructed and arranged so that when the scale makes its weight, the electro-magnet is deenergized, freeing the lever

324 and permitting the trip lever 318 to rock in a clockwise direction viewing Fig. 8 under the influence of a spring 325 and to thus effect closing of the gates 314.

The above described trip mechanism may substantially comprise that shown in Fig. 2 of the Howard Patent No. 2,204,134 and as herein shown, provision is made for dumping the weighed loads from the receptacles upon completion of the weighing operation. The receptacle 14 is provided with a gate 330 comprising the bottom thereof and is held in its closed position by a spring 332 through toggle linkage 334 arranged to prevent opening of the gate by the weight of the material therein. The linkage 334 is provided with a roller 336 arranged to be pressed downwardly to effect opening of the gate 330 by an arm 338 fast on a rocker shaft 340. The shaft 340 is provided at its outer end with an arm 342 connected by a link 344 to one arm 346 of a bell crank pivotally mounted at 320. A roller 350 carried by the second arm 352 of the bell crank cooperates with a cam 354 fast on the cam shaft 24. The cam 354 is designed to effect dumping of the receptacles immediately upon the start of a new cycle of operation, and upon closing of the gate 330 by the spring 332 and resetting of the scale beam, the trip lever 318 is reset to again open the hopper gates 314 by a cam 356 fast on the shaft 24 to thus start another weighing operation.

As herein shown, the drive to the main driving shaft 24 includes a one revolution clutch comprising a pawl 26 and ratchet 28 arranged to effect rotation of the shaft one revolution per weighing cycle. The pawl 26 is carried by a disc 30 which is loose on the shaft 24, the ratchet 28 being fixed on the shaft. The pawl is urged into cooperative engagement with its ratchet by a spring 32 and is arranged to be withdrawn from engagement with its ratchet at the end of one revolution by either of two pawl stops 34 or 36. The pawl stops 34, 36 are slidably mounted in a supporting member 38 and form part of the control mechanism for controlling the various operations of the machine to be hereinafter more fully described.

As herein shown, one of the pawl stops, 36, is connected by a toggle link 40 to one arm 42 of a two-armed lever pivotally mounted on a shaft 44. Various conditions must be satisfied before the pawl stop 36 may be withdrawn. It will be observed that withdrawal of the pawl stop 36 is effected when the lever 42 is rocked clockwise viewing Fig. 5, and a second pivotally mounted lever 45 provided with several arms is connected by a spring 46 to the second arm 48 of the two-armed lever. A set screw 50 in engagement with the arm 48 operates to rock the latter when the lever 45 is permitted to rock. There are three conditions which must be satisfied before the lever 45 will be operated to remove the pawl stop 36. First, an operating link 52 connected at one end to an arm 54 of the lever 45 must be free to slide longitudinally in a swivel member 56 carried by a stop and start lever 58 as shown in Fig. 1. When the lever 58 is in its stop position, the swivel 56 will be in a position to prevent the link 52 from moving upwardly and thus prevent withdrawal of the pawl stop. A second arm 60 of lever 45 is provided with a latch member 62 arranged to be engaged by a hook 64 to prevent withdrawal of the pawl stop 36 in the event that no containers are present on the incoming conveyer as will be hereinafter described. A

third arm 65 of lever 45 is connected by a link 63 to an arm 73 fixed to a rocker shaft 72 forming part of the control for the weighing mechanism 10 as fully illustrated and described in the Howard patents above referred to, and, in operation, the shaft 72 is not permitted to rock under the influence of the spring 74 until all the scales have completed their weights and the weighed loads in the receptacles are in readiness to be dumped at the start of another cycle of operation.

As illustrated in Fig. 8, the mechanism for preventing rocking of the shaft 72 until the scales of all the units of the machine have made their weights includes a pair of cooperating arms 360, 362 for each weighing unit, one arm 360 being fast on the shaft 72 and the other 362 being loose thereon and counterweighted to effect rocking in a counterclockwise direction viewing Fig. 8. The arm 362 is arranged to engage a set screw 364 carried by the trip lever 318 so that when the latter is in its illustrated weighing position, the arm 362 will be held in a substantially vertical position. The arm 360 of each unit rests against its respective arm 362 to prevent rocking of the shaft 72 by the spring 74. In operation, as each scale makes its weight and its trip lever 318 is released to rock in a clockwise direction, the loosely mounted arm 362 is freed to permit rocking of the shaft 72 upon tripping of the last scale to make its weight. Upon resetting of the trip lever 318 as above described, the shaft 72 will likewise be reset.

From the description thus far, it will be observed that when the operating link 52 is raised and a supply of containers is provided on the incoming conveyor, the pawl stop 36 will be withdrawn upon completion of the weighing operation. Assuming that the pawl stop 34 is also withdrawn at this time, the shaft 24 will be permitted to rotate, and, in operation, the weighed loads formed during the previous cycle are immediately dumped. In operation, as soon as the pawl 26 is released and the shaft 24 starts to revolve, the shaft 72 operates to reset the pawl stop 36 into the path of the pawl so that in the event that all the scales have not completed their weights by the time the shaft 24 has made one revolution, the shaft will come to rest. However, under normal operating conditions, the weights are completed and the driving shaft 24 is released to start another weighing cycle at substantially equal predetermined time intervals.

As above described, the containers are fed continuously past the weighing devices to receive the weighed loads as the latter are released from the weighing units. As illustrated in Figs. 1 and 3, the containers are delivered to the machine from a source of supply on an incoming conveyor belt 76 which runs over a driving pulley 78 and which may be driven through connections from the motor 28 including a chain and sprocket drive 80, a speed reducing unit 82, and a chain and sprocket drive 84, as clearly shown in Fig. 1. The containers are delivered in a line to present the foremost thereof onto a stationary platform 86 and into the path of rotary conveying members 88, 90 provided with arms 92 forming openings 94 into which successive foremost containers 96 are received and conveyed in a circular path.

As above stated, provision is made for detecting an absence in the supply of containers on the incoming belt and for preventing operation of the machine in the event that no containers are present, and as illustrated in Figs. 3 and 4

control mechanism indicated generally at 55 is provided which includes a detecting arm 98 disposed in the path of the incoming containers and arranged to rest on top of the containers passing thereby. The detecting arm 98 is pivotally mounted at 99 and is attached to one arm 102 of a bell-crank, the second arm 104 of which is arranged to move a spring contact 105 to open a circuit at contacts 100, 110 to an electromagnet 112 when the containers are depleted. The electromagnet 112, as shown in Fig. 1, is operatively connected to the latch hook 64 and is arranged to hold the hook up out of the path of the latch arm 62 to permit withdrawal of the pawl stop 36 when the electromagnet is energized. However, when the containers are depleted, the detecting arm 98 will drop and rock the arm 104 in a clockwise direction, viewing Fig. 4, to open the circuit as described, and to de-energize the electromagnet which will permit the latch hook 64 to rock into the path of the arm 62 and thus prevent withdrawal of the pawl stop 36. Replenishing the supply of containers operates to reset the contacts to free the latch arm 62 and permit withdrawal of the pawl stop.

The rotary conveying member 88 is carried by an upper disc 114 and the conveying member 90 is carried by a lower disc 116 and as illustrated in Fig. 2, the discs 114, 116 are mounted to rotate with a central shaft 118. The upper disc 114 is also arranged to support a plurality of funnels 120 having their lower ends in alignment with their respective containers 96 and provided at their upper ends with elongated arcuate openings 122 arranged to receive the material released from the weighing units into the discharge chutes 124. As clearly shown in Figs. 1 and 2, the upper ends of the guide funnels 120 are arranged in two concentric rows, the outer row being arranged in alignment with the lower ends of two of the four discharge chutes 124, and the inner row being in alignment with the lower ends of the remaining discharge chutes.

Provision is made for driving the discs 114, 116 in timed relation to the release of the weighed loads from the weighing devices so as to assure the deposition of the loads into their respective containers. As herein shown, the discs are secured to the central shaft 118 which is mounted to rotate in bearings 126 in a frame member 128. The lower end of the shaft 118 is provided with a bevel gear 130 which is arranged to mesh with a bevel gear 132 fast on a drive shaft 134. As herein shown, the shaft 134 is arranged to be driven from a motor 136 through sprockets 138, 140, chain 142, and through a pawl and ratchet clutch indicated generally at 143. The sprocket 140 is formed integrally with a ratchet 144 and is freely rotatable on the shaft 134. A pawl carrier disc 146 which is fast on the shaft 134 is provided with a pawl 148 arranged to cooperate with the ratchet 144 to drive the shaft and effect rotation of the rotary conveying members 88, 90 and the arcuate funnels 120.

In order to control the rotation of the shaft 134, a pawl stop 150 slidably mounted in a bracket 152 is arranged to be extended into the path of the tail of the pawl 148 to disengage the pawl from the ratchet at the end of one revolution. In one embodiment of the invention, as illustrated in Figs. 1 and 5 provision is made for withdrawing the pawl stop 150 through connections from the pawl stop arm 42 of the upper pawl and ratchet clutch, which, as previously

described, is arranged to be rocked to withdraw the pawl stop 36 at the end of the weighing operation. As herein shown, a link 154 is connected at one end to the arm 42 and at its other end to one arm 156 of a two-armed lever pivotally mounted on a shaft 158. The second arm 160 of the two-armed lever is connected by a link 162 to the pawl stop 150 to form a toggle line connection. Thus, in operation, when the arm 42 is rocked clockwise viewing Fig. 5 to withdraw the pawl stop 36 from the path of the pawl 26 to permit rotation of the weighing mechanism shaft 24, the pawl stop 150 is simultaneously withdrawn to permit rotation of the driving shaft 134 through the connections above described. It will be observed that when the upper pawl stop 36 is reset by rocking of the shaft 72 as previously described, the lower pawl stop 150 will likewise be reset to disengage the pawl 148 at the end of one revolution of the shaft 134.

Under normal operating conditions, the weighing mechanism will complete its operations and effect withdrawal of the pawl stop 150 before the shaft 134 makes a complete revolution so that, in effect, the rotary container moving and filling unit will move continuously without interruption, but in the event the weighing operation is delayed, the shaft 134 will come to rest and await completion of the weighing operation. Thereafter, initiation of the dumping operation of the previously formed loads and rotation of the rotary container supporting and filling unit will be simultaneous.

Provision is also made in the illustrated packaging machine for assuring proper disposition of the arcuate openings 122 with respect to the lower ends of the discharge chutes 124 when the loads are released from the weighing receptacles. As herein shown, this is accomplished by a pace setting or timing cam 164, see Fig. 5, which is fixed to the outer end of shaft 134 and is operatively connected to the second pawl stop 34 of the pawl and ratchet clutch of the weighing mechanism. The second pawl stop 34 is connected by a link 166 to one arm 168 of a two-armed lever, pivotally mounted on the shaft 44, the second arm 170 of which is connected by a rod 172 to a cam lever 174. The cam lever 174 is pivotally mounted at 176 and is provided with a roller 180 held in cooperative engagement with its cam 164 by a spring 182. The cam 164 is provided with a high spot 184, and, in assembling the machine, the cam is preferably adjusted to effect withdrawal of the pawl stop 34 when the rotating funnels arrive at a predetermined position with relation to the discharge chutes. Such predetermined position of the funnels, as indicated in Fig. 3, places the lower ends of the discharge chute at the extreme right hand end of their respective elongated arcuate openings 122 of the funnels so that as the funnels are revolved in the direction of the arrow, Fig. 3, advantage may be taken of the full length of each opening to receive the material being discharged. In practice, the time taken for one set of arcuate openings to pass the discharge spouts and for a second set of arcuate openings to arrive in position to receive a subsequent load is substantially the same predetermined time interval established for the weights to be completed, so that under normal operating conditions the pawl stops 34, 36 and 150 are withdrawn substantially simultaneously to permit continuous rotation of the rotating funnel unit. If the weights are not completed within such predetermined established

time intervals, the pawl stop 150 will not be withdrawn and the rotating funnel unit will come to rest preferably with the high spot 184 of the cam 164 in position to effect withdrawal of pawl stop 34, and with the arcuate openings 122 in operative position to receive the weighed loads upon completion of the weighing operation. On the other hand, if the weighing operations are completed prior to the predetermined time established therefor, the loads will not be released until the rotary funnel unit arrives in operative position to receive the loads whereupon the cam 184 operates to withdraw the pawl stop 34 to initiate another cycle of operation, as described.

Provision is made for assuring termination of rotation of the weighing mechanism shaft 24 at the end of one revolution so that it will come to rest in the same relative position each time. This is accomplished by the provision of a cut-out 186 in the pawl carrier disc 30 in which a roller 188 carried by a pivoted arm 190 is provided with a spring 192 which urges the roller into the cut-out, thus preventing backlash of the shaft and assuring proper disposition of the operating mechanism to start another cycle of operation. A similar arm 194, roller 196, and spring 198 is provided for cooperation with a cut-out 200 in the pawl carrier disc 146 on the shaft 134. Adjustable limiting stops 202, 204 suitably supported in brackets 206, 208 extending from the machine frame, may be provided to limit the movement of the pawl stop toggle connections in either direction as illustrated in Figs. 1 and 5.

Provision may also be made for adjusting the height of the revolving funnel unit in order to accommodate different heights of containers, and, as illustrated in Fig. 2, the upper rotating disc 114 is provided with an elongated hub 210 having a cap member 212 attached to its upper end. An adjusting screw 214 fitted into a threaded hole in the cap is provided with a handle 216 at one end, its lower end bearing against the top of the central shaft 118. Upon rotation of the handle 216 in one direction, the disc 114 together with its attached funnels will be raised, and, conversely, rotation in the opposite direction will permit the unit to be lowered on the shaft. An elongated key (not shown) may be provided to prevent rotation of the disc with relation to the central shaft, while permitting movement longitudinally thereof, as described. In practice, the discharge chutes 124 may be replaced by chutes of different proportions to accommodate a different size or height of container thus precluding any interference between the top of the funnels 122 and the bottom of the discharge chutes 124 when it is necessary to elevate the funnels 123 for a different height of container.

Provision is also made in the illustrated and preferred embodiment of the invention for shaking the containers during their travel through the circular path in order to settle the goods in the containers. As illustrated in Figs. 2 and 3 the shaking mechanism comprises one or more vibrating units each comprising a platform 218 upon which the containers rest while being moved by the rotary conveying unit. The vibrating units 218 may comprise any usual or preferred shaker mechanisms now upon the market and as herein shown include resilient supports 220, a casing 222 provided with opposed overbalanced rotary weights (not shown) which are rotated to produce the vibratory motion, through a motor 224 and belt connection 226. As herein illustrated a plurality of vibrating units 218 may

be provided in the circular path each of which may be independently operated so that in practice one or more may be turned on in accordance with the amount of settling required by the particular material being packaged. As illustrated in Fig. 3, the filled and settled containers are discharged from the arms 92 of the rotary conveying members 88, 90 onto a rotary platform 228 by the extended portion 230 of a guide rail 232. The rotary platform transfers the containers onto a discharge belt 234 which carries the containers away from the machine between rail 232, 238, the latter forming an extension of the circular rail 238 for guiding the containers through the circular path.

In the modified embodiment of the invention, see Figs. 6 and 7, the control mechanism includes a cam 240 mounted fast on the weighing mechanism shaft 24 which is arranged to withdraw the pawl stop 150 when the shaft 24 starts to revolve at the beginning of a new cycle of operation. As herein shown a cam roll 242 carried by a pivotally mounted lever 244 is arranged to cooperate with the cam 240, being urged into engagement with its cam by a spring 246. A rod 154' connected at one end to the lever 244 is connected at its other end to the arm 153 of the pawl stop operating linkage previously described. In the operation of the device, the rotary container moving and filling unit is arranged to travel at a rate of speed such as to bring a new set of arcuate openings into position to receive the weighed loads in the predetermined time established for the weighing operations to be completed, and, at such time, the cam 164 will have withdrawn the pawl stop 34, under normal operating conditions. Thereafter, when the weights are completed, the pawl stop 36 will be withdrawn to start the weighing mechanism shaft 24. The cam 240 is set to withdraw the pawl stop 150 as soon as the shaft 24 starts to rotate, and as previously described, at substantially the same time a cam 354 operates to release the weighed loads of the previous cycle from the receptacles 14 to fall into the discharge chutes 124. Under normal operating conditions, the rotating unit will be in position to receive the discharged loads, as indicated by the withdrawal of pawl stop 34 by cam 164, and the pawl stop 150 will have been withdrawn before the pawl 143 was engaged so that the shaft 134 will operate continuously. However, in the event that the weighing operation is delayed, the pawl stops 36 and 150 will not be withdrawn at this time and the shaft 134 will come to rest with the high spot 184 of the cam 164 in position to effect withdrawal of pawl stop 34 and with the arcuate openings of the rotary unit in operative position to receive the weighed loads when the weighing mechanism shaft 24 is again started. Subsequently, when the weighing operation is completed, the pawl stop 150 will be withdrawn by the cam 240 to permit rotation of the rotary unit for another cycle of operation. On the other hand, in the event the weighing operation is completed before the predetermined time established, the pawl stop 34 will not be withdrawn to release the weighed loads until the rotary unit is in operative position to receive them, as controlled by the cam 164. Thus in one embodiment of the machine, the rotation of shafts 24 and 134 are initiated simultaneously while in the embodiment illustrated in Fig. 7 the shaft 24 starts its rotation before the shaft 134 can start. In either event, however, pawl stop 34 must be

withdrawn by the pace setting cam 164, indicating that the arcuate openings of the rotary unit are in operative position to receive the weighed loads, before either shaft can start on a new cycle of operation.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a packaging machine, in combination, load forming means, continuously moving container moving means adapted to receive and move containers in a circular path, a series of guide funnels mounted on said container moving means in a position above the containers supported thereby for receiving successive loads from said load forming means and guiding the same into the containers, said funnels being constructed with inlets of arcuate elongated shape arranged alternately in two concentric circles, each inlet being substantially longer than the pitch distance between adjacent containers upon said container moving means the outlets of said funnels being in the same circular path and disposed at the same pitch distance as that of the containers to be filled, and control means operatively connected to the load forming mechanism for permitting continuous operation of said container moving means when the load forming mechanism completes its operation within a predetermined established time and for stopping the container moving means in the event that the load forming mechanism fails to complete the formation of the load within such time.

2. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism constructed to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently driven and continuously operated container moving means for moving successive containers past said load forming mechanism in timed relation to the operation of said load forming mechanism to receive the loads as they are released, and control means operatively connected to said load forming mechanism for permitting continuous operation of said container moving means when the load forming mechanism completes its operation within a predetermined established time and for stopping the independently driven container moving means in the event that the load forming mechanism fails to complete formation of the loads within the predetermined time established therefor and for again initiating the operation of the container moving means upon completion of the load forming operation.

3. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism constructed to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently driven and continuously operated container moving means for moving successive containers past said load forming mechanism in timed relation to the operation of said load forming mechanism to receive the loads as

they are released, means movable with the containers into which the formed loads are discharged, said last named means being arranged to guide the loads into their respective containers during the continuous movement thereof, and control means operatively connected to said load forming mechanism for permitting continuous operation of said container moving means when the load forming mechanism completes its operation within a predetermined established time and for stopping the independently driven container moving means in the event that the load forming mechanism fails to complete formation of the loads within the predetermined time established therefor and for again initiating the operation of the container moving means upon completion of the load forming operation.

4. In a packaging machine operated in successive cycles, in combination, automatic load forming means comprising a plurality of weighing devices constructed to form a plurality of weighed loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently driven and continuously operated container moving means for moving successive containers past said load forming means in timed relation to the operation of said weighing devices to receive the loads as they are released, means movable with the containers into which the formed loads are discharged, said last named means being arranged to guide the loads into their respective containers during the continuous movement thereof, and control means operatively connected to said load forming mechanism for permitting continuous operation of said container moving means when the load forming mechanism completes its operation within a predetermined established time and for stopping the independently operated container moving means in the event that the load forming mechanism fails to complete formation of the loads within the predetermined time established therefor and for again initiating the operation of the container moving means upon completion of the load forming operation.

5. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism constructed to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently driven rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release of the formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, and control means operatively connected to said load forming mechanism for permitting continuous operation of said container moving means when the load forming mechanism completes its operation within a predetermined established time and for stopping the independently driven container moving means in the event that the load forming mechanism fails to complete formation of the loads within the predetermined time established therefor and for again initiating the operation of the container moving

means upon completion of the load forming operation.

6. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism constructed to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently driven rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release of the formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, discharge chutes leading from said load forming mechanism to said funnels, and means actuated by said continuously rotated container moving means and operatively connected to said load forming means for assuring proper disposition of the funnels with respect to the discharge chutes at the start of each cycle of operation when said loads are released, and control means actuated by said load forming mechanism and operatively connected to said independently operated container moving means for permitting continuous operation of the latter when the load forming mechanism completes its operation within a predetermined established time.

7. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism constructed to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently operated rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release of the formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, discharge chutes leading from said load forming mechanism to said funnels, means actuated by said continuously rotated container moving means and operatively connected to said load forming means for assuring proper disposition of the funnels with respect to the discharge chutes at the start of each cycle of operation when said loads are released, and control means actuated by said load forming mechanism and operatively connected to said container moving means for stopping the container moving means in the event that the load forming mechanism fails to complete formation of the loads within the predetermined time established therefor.

8. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism constructed to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, driving means for said load forming mechanism, independently operated rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release

of the formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, discharge chutes leading from said load forming mechanism to said funnels, and means including a pace setting cam driven by said container moving means and operatively connected to said load forming means for assuring proper disposition of the funnels with respect to said discharge chutes at the start of each cycle of operation when the loads are released.

9. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism adapted to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release of said formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, discharge chutes leading from said load forming mechanism to said funnels, control means for said load forming mechanism comprising a one revolution clutch arranged to prevent operation of the load forming mechanism to start a new cycle of operation until all the formed loads are completed, a second one revolution clutch for said rotary container moving means operatively connected to said first one revolution clutch and arranged to bring the rotary container moving means to rest in the event that the loads are not completed within the predetermined time established therefor.

10. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism adapted to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release of said formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, discharge chutes leading from said load forming mechanism to said funnels, control means for said load forming mechanism comprising a one revolution clutch arranged to prevent operation of the load forming mechanism to start a new cycle of operation until all the formed loads are completed, a second one revolution clutch for said rotary container moving

means operatively connected to said first one revolution clutch and arranged to bring the rotary container moving means to rest in the event that the loads are not completed within the predetermined time established therefor, and a timing cam for said rotary container moving means operatively connected to said first one revolution clutch and arranged to prevent initiation of a new cycle of operation in the event that said elongated arcuate openings are not in proper position to receive the loads to be discharged from said discharge chutes.

11. In a packaging machine operated in successive cycles, in combination, automatic load forming mechanism adapted to form a plurality of loads each cycle of operation and to release the loads formed during successive cycles in substantially equal predetermined time intervals, rotary container moving means for continuously moving successive containers past said load forming mechanism and in timed relation to the release of said formed loads, means movable with the containers comprising a plurality of funnels having elongated arcuate openings into which the formed loads are discharged, said funnels being arranged to guide the loads into their respective containers during the continuous movement thereof, discharge chutes leading from said load forming mechanism to said funnels, operating means for said load forming mechanism including a shaft and a one revolution clutch for controlling said shaft to prevent initiation of a new cycle of operation until all the formed loads are completed, a second one revolution clutch for said rotary container moving means, a cam on said shaft operatively connected to said second one revolution clutch arranged to permit continuous rotation of said rotary container moving means when the loads are completed and a new load forming cycle has started within the predetermined time interval.

12. In a packaging machine, in combination, a plurality of weighing units constructed to form a plurality of weighed loads each cycle of operation, means for releasing the previously weighed loads at the beginning of each cycle of operation, means for driving said weighing units, control means for preventing initiation of a new cycle of operation until all the weighing units have made their weights, independently driven rotary container moving means for continuously moving successive containers past said weighing units, means controlled by said weighing units arranged to bring the rotary container moving means to rest in the event that the weighing of all the weighed loads are not completed within a predetermined established time, and auxiliary control means comprising a cam actuated by said continuously rotated container moving means and operatively connected to said weighing unit driving means for preventing initiation of a new cycle of operation until the rotary container moving means is in proper position to receive the weighed loads.

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