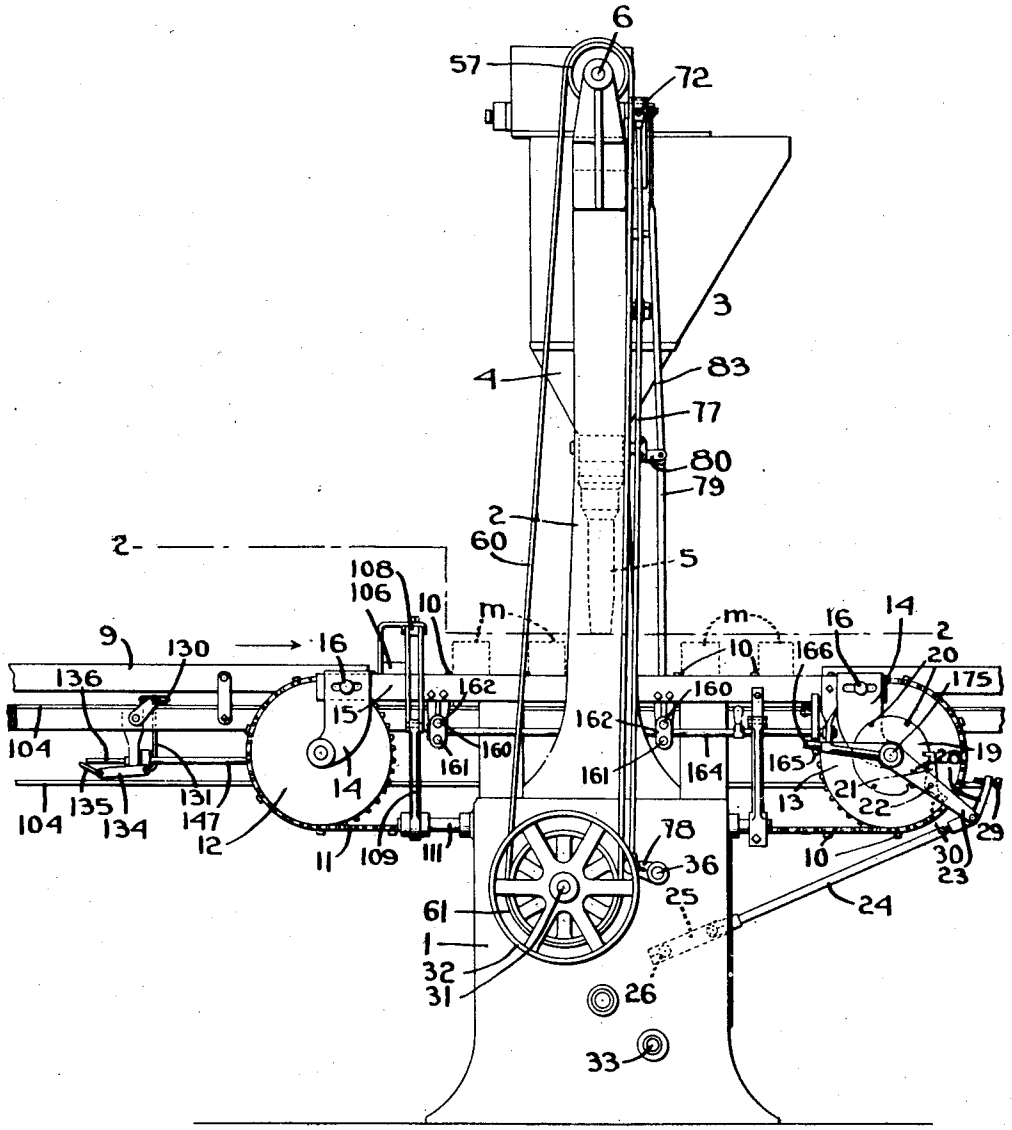
Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 1

Fig. 1.



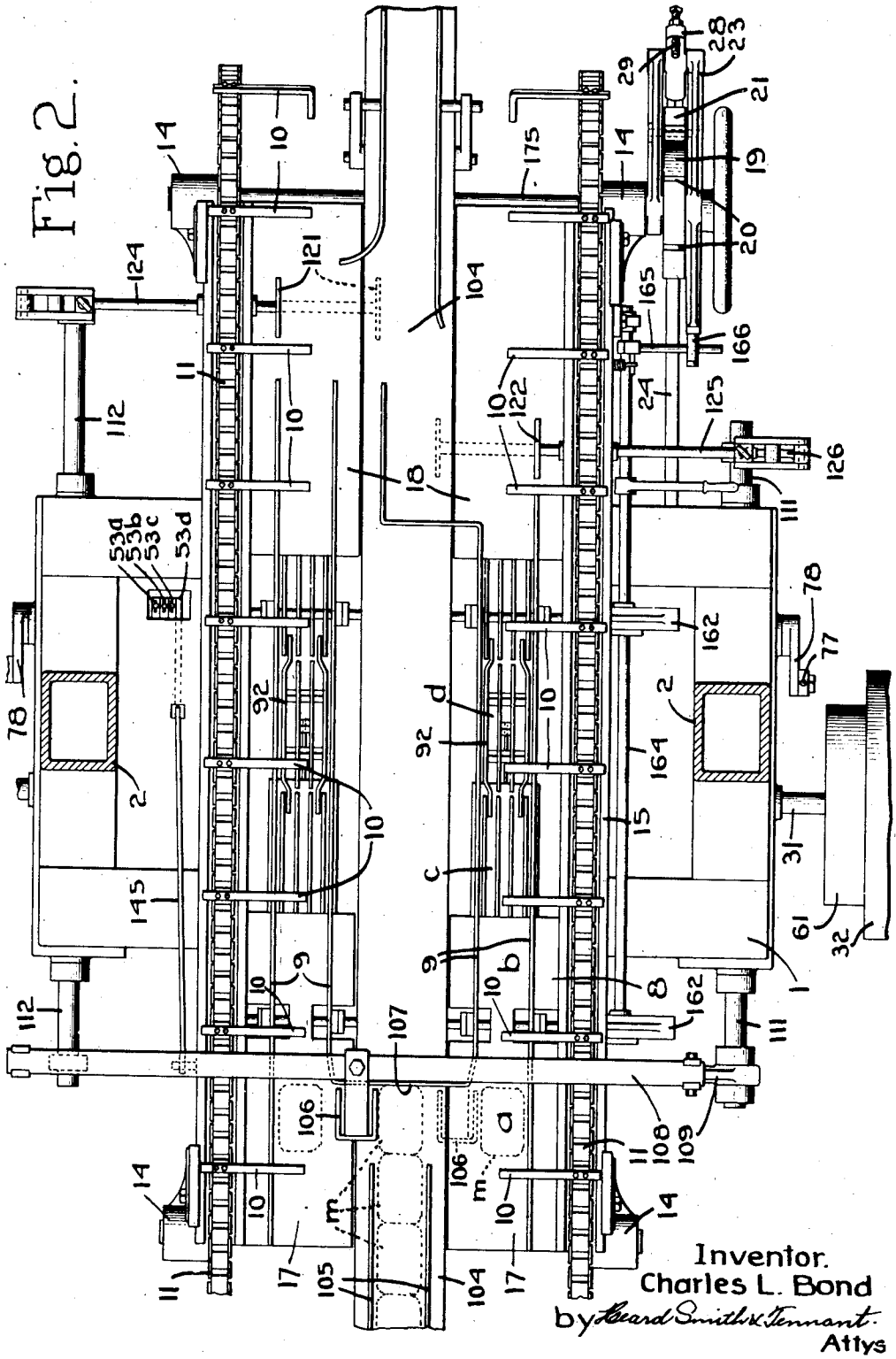
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Attys

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CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 2

Fig. 2.



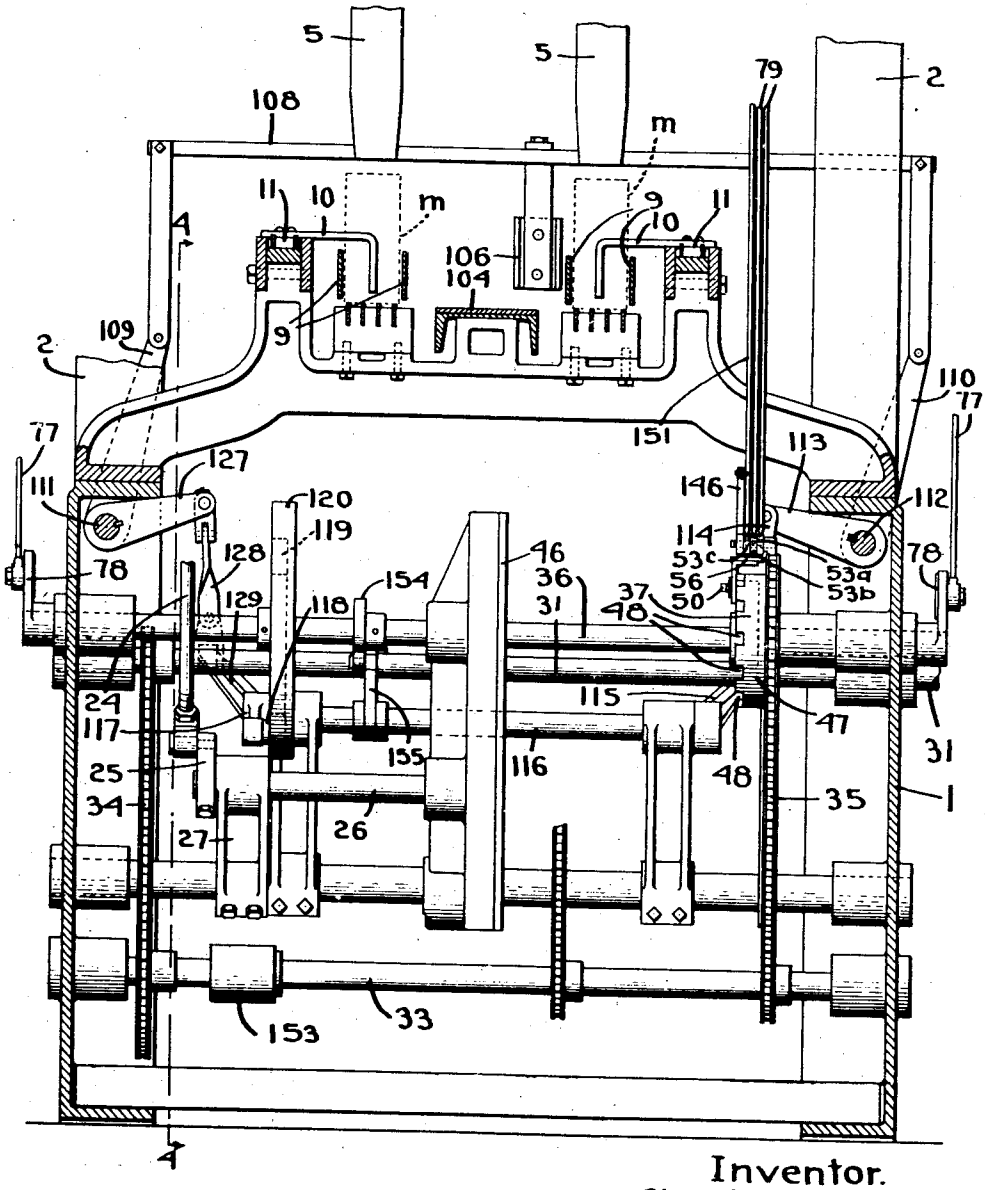
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CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 3

Fig. 3.



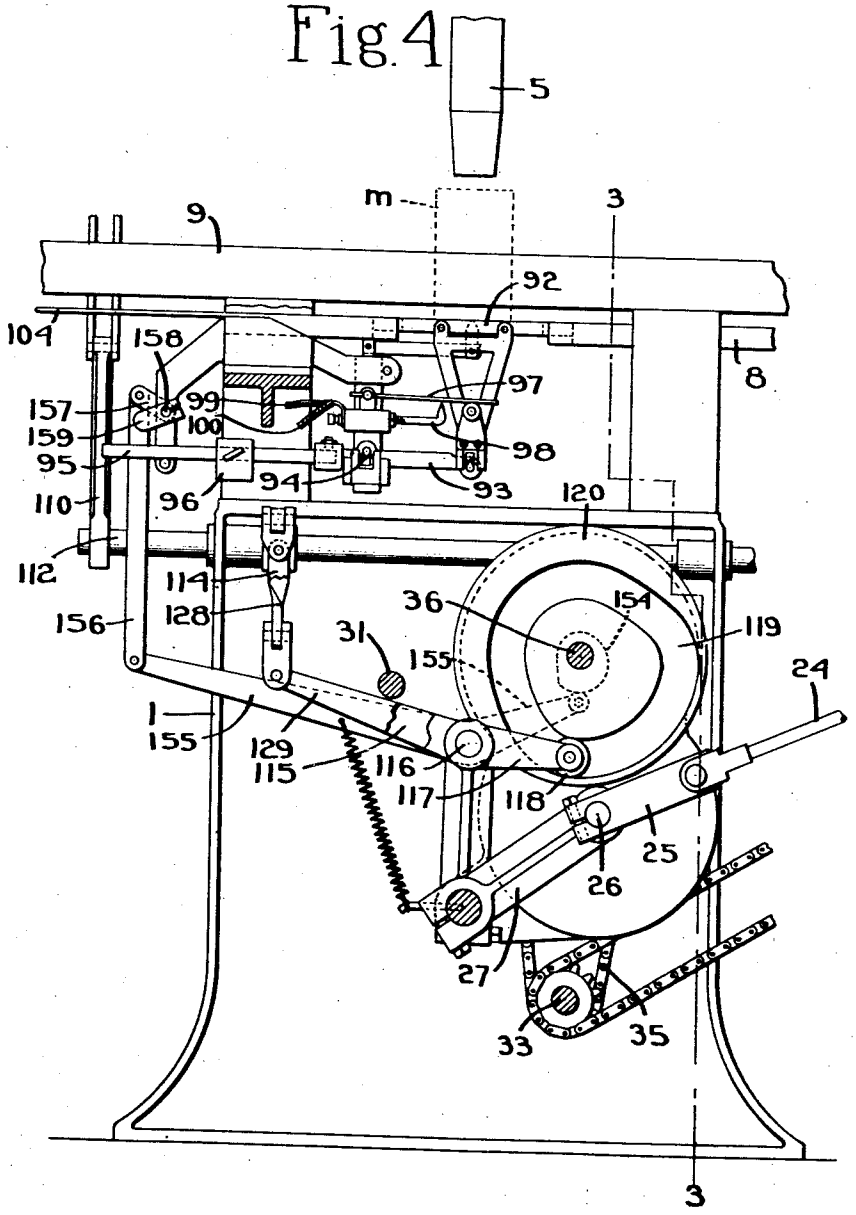
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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 4

Fig. 4



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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 5

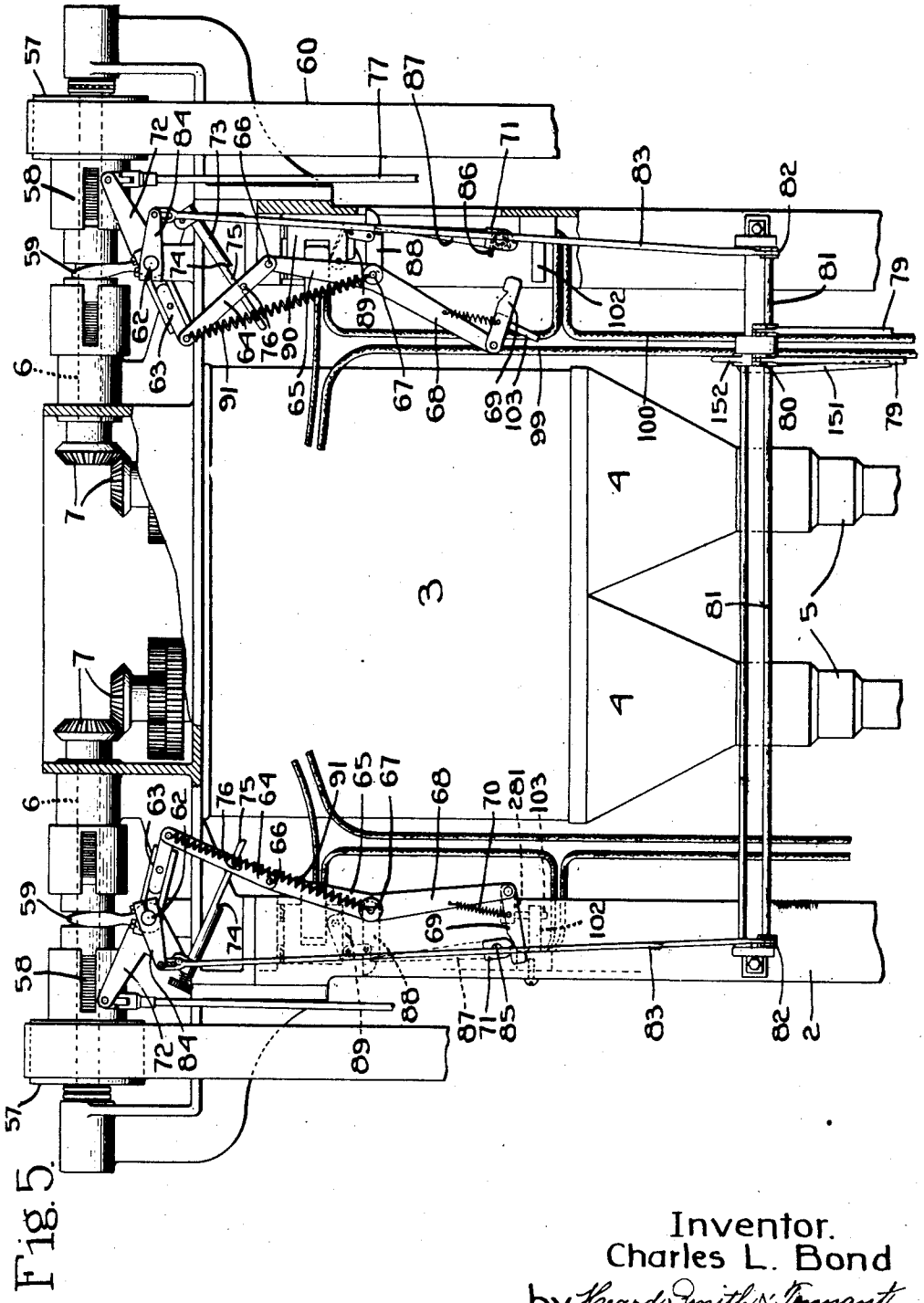


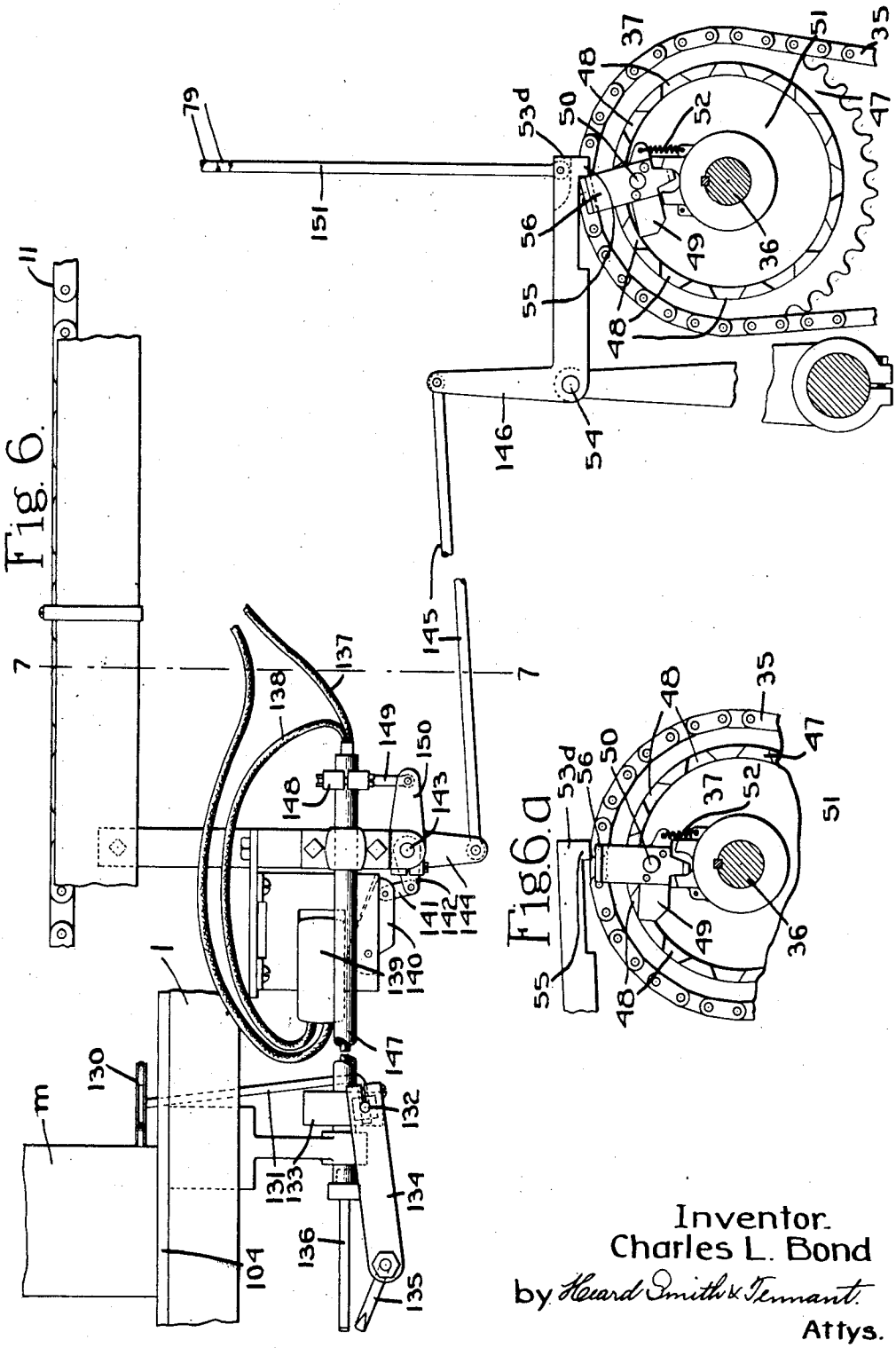
Fig. 5.

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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 6



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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 7

Fig. 7.

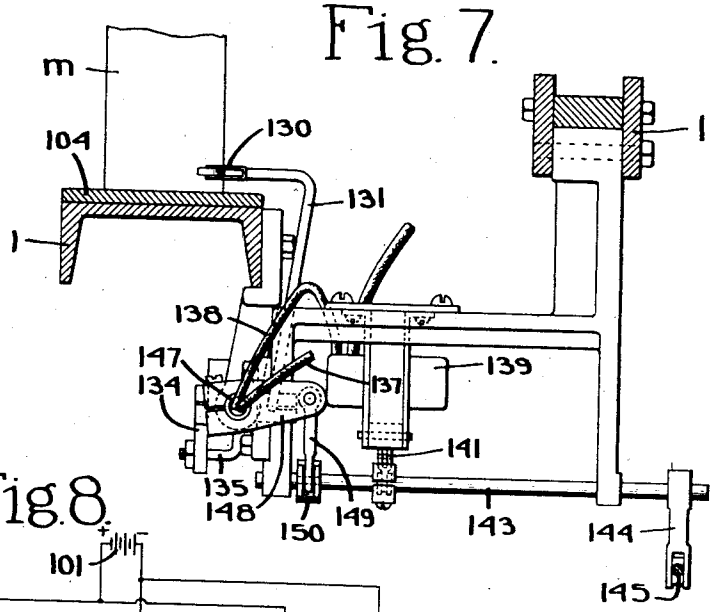


Fig. 8.

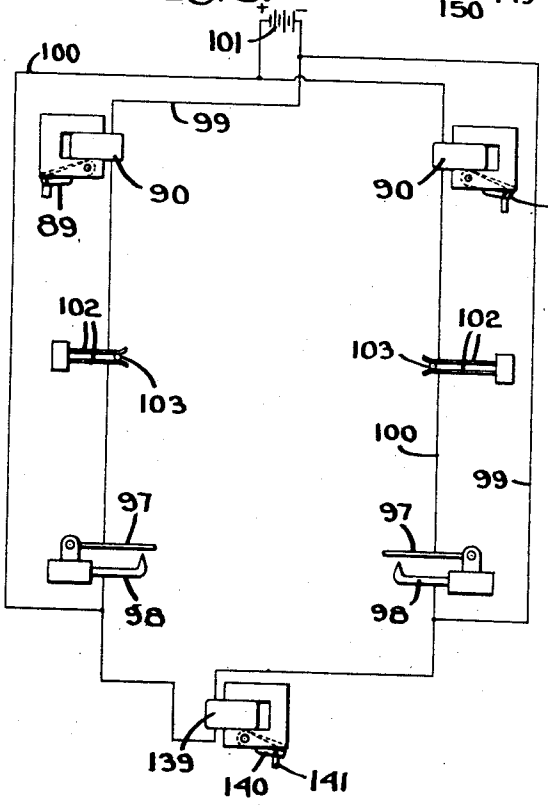


Fig. 9.

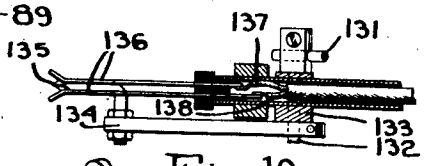
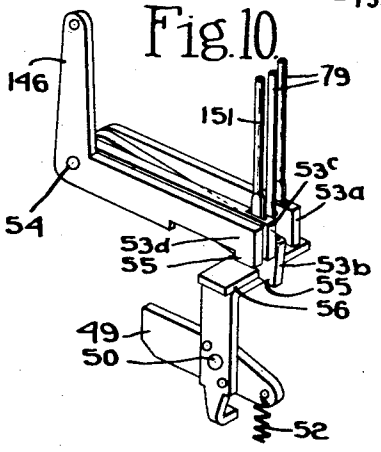


Fig. 10.



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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 8

Fig. 11

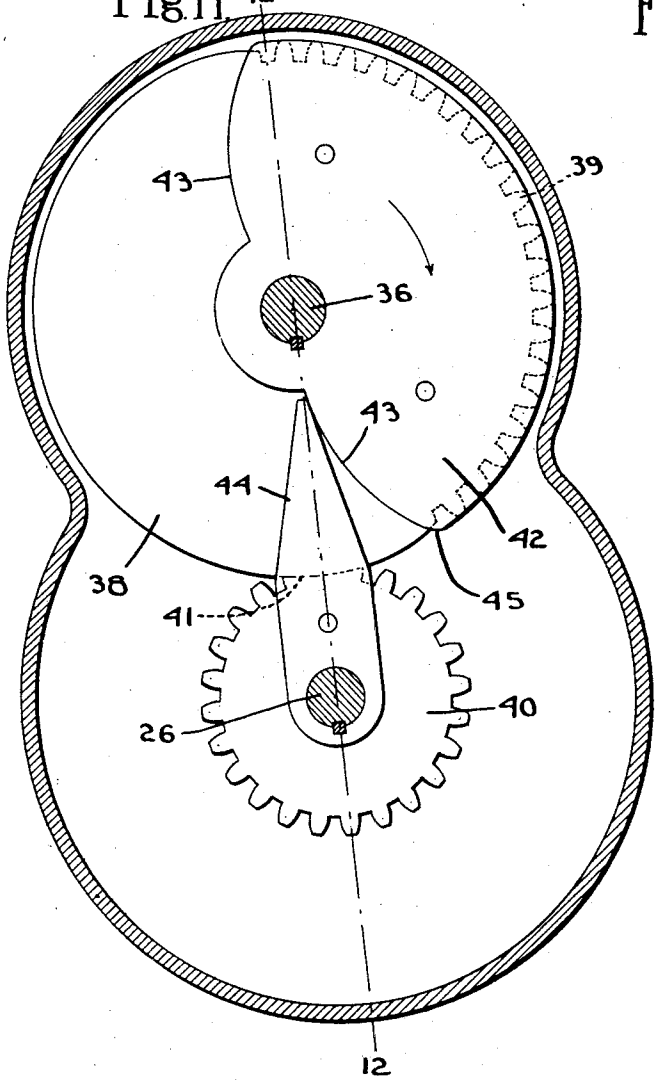
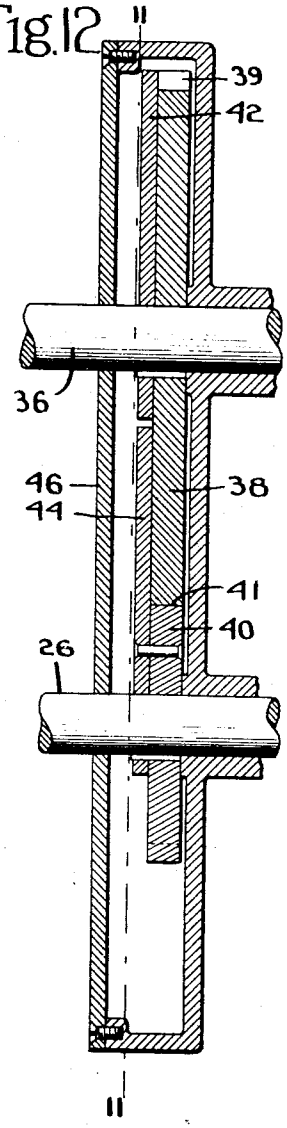


Fig. 12



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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 9

Fig. 13.

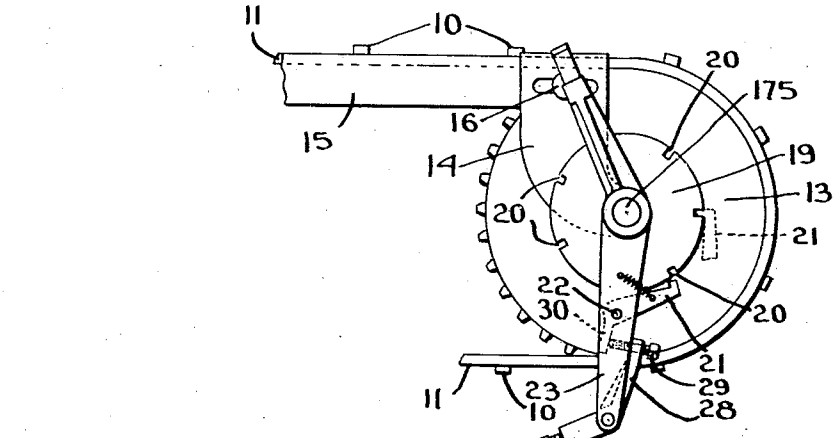


Fig. 14

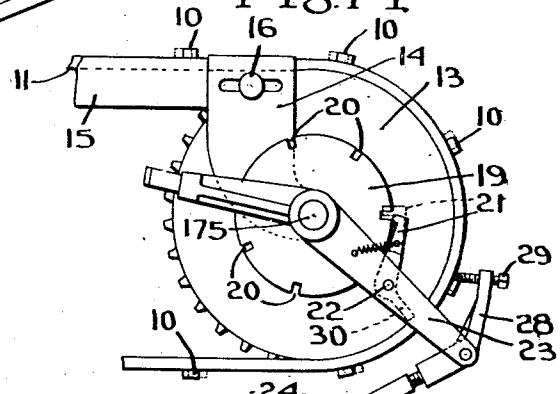
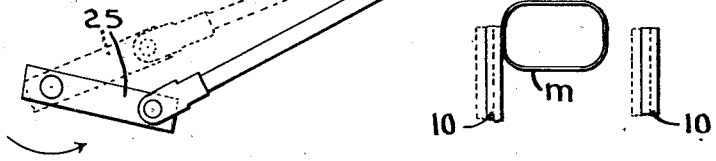


Fig. 15.



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Oct. 1, 1929. C. L. BOND 1,729,991

CARTON FILLING MACHINE

Filed Nov. 22, 1923 10 Sheets-Sheet 10

Fig. 16.

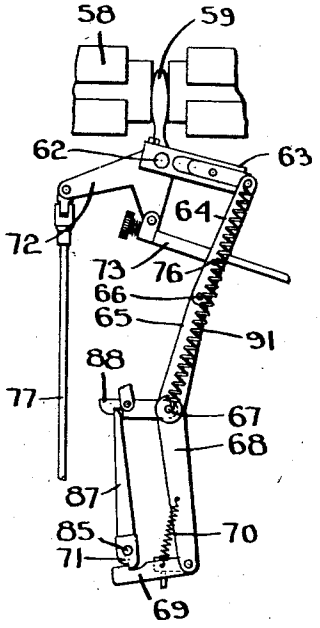


Fig. 17.

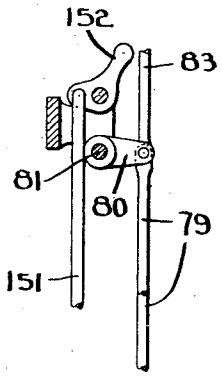


Fig. 18.

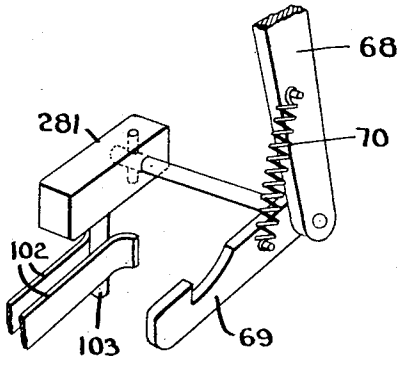


Fig. 20.

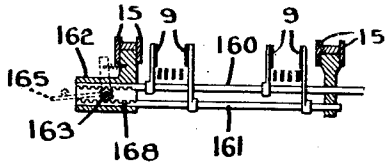
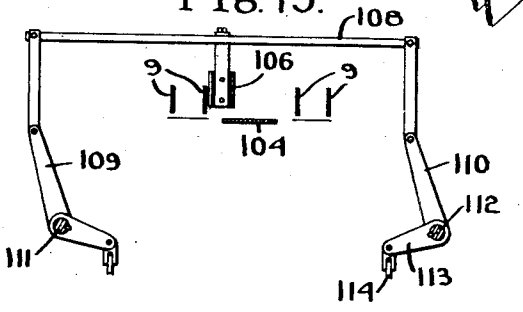


Fig. 19.



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Patented Oct. 1, 1929 1,729,991

UNITED STATES PATENT OFFICE

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CARTON-FILLING MACHINE

Application filed November 22, 1923. Serial No. 676,282.

This invention relates to carton-filling machines which are adapted to fill cartons with material in granular or powdered form and to deliver a predetermined weight to each carton.

The device includes a carton-filling mechanism and carton-feeding mechanism by which the empty cartons are fed to the filling mechanism and the filled cartons are delivered therefrom, and one feature of the invention relates to a novel construction by which both the carton-filling mechanism and the carton-feeding mechanism are actuated from the same driving means and by which the carton-filling mechanism is connected to the driving means by the carton-feeding mechanism, but is disconnected therefrom automatically when the carton has received the predetermined quantity of material.

Another feature of my invention relates to a carton-filling machine having a plurality of carton-filling mechanisms and to a construction by which the empty cartons that are fed into the machine are distributed automatically to the several carton-filling mechanisms so that a plurality of cartons may be filled simultaneously.

Other features of the invention relate to various improvements in carton-filling machines making for increased speed and greater accuracy in operation and which will be more fully hereinafter set forth.

In the drawings wherein I have illustrated a selected embodiment of my invention, Fig. 1 is a side view of a carton-filling machine embodying my invention;

Fig. 2 is a plan view of the carton-feeding mechanism, the uprights supporting the carton-filling mechanism being shown in section on substantially the line 2—2, Fig. 1;

Fig. 3 is a section on substantially the line 3—3, Fig. 4;

Fig. 4 is a section on the line 4—4, Fig. 3;

Fig. 5 is a view of the carton-filling mechanism;

Fig. 6 is a fragmentary view showing the clutch for connecting the carton-feeding mechanism to the driving mechanism and part of the means for controlling said clutch;

Fig. 6ª is a view showing the clutch in engagement;

Fig. 7 is a view taken on substantially the line 7—7, Fig. 6;

Fig. 8 is a wiring diag am;

Fig. 9 shows the contacts used in connection with the device illustrated in Figs. 6 and 7;

Fig. 10 shows the clutch-controlling dogs;

Fig. 11 is a view of the gear for operating the carton-feeding mechanism, said view being taken on substantially the line 11—11, Fig. 12;

Fig. 12 is a section on the line 12—12, Fig. 11;

Figs. 13 and 14 show the actuating means for the carton-feeding devices;

Fig. 15 illustrates the way in which the carton-feeding fingers are moved backwardly as the carton is being weighed;

Fig. 16 is a detail of the clutch mechanism for the carton-filling devices;

Fig. 17 is a detail view showing the manual control for the clutch 37;

Fig. 18 is a fragmentary perspective view showing the latch 63 and the associated switch device;

Fig. 19 is a diagram view of the carton-transferring device;

Fig. 20 is a sectional view showing the means for separating the guide rails 9 from the carton during the weighing operation.

The entire machine comprises carton-filling mechanism, carton-feeding mechanism for feeding empty cartons to the filling mechanism, a driving element, means for connecting the carton-feeding mechanism to the driving element, other means rendered operative when the carton-feeding mechanism is connected to the driving element to connect the carton-filling mechanism to the driving element, and means controlled by the weight of the carton as it is filled to disconnect the carton-filling means from the driving element;

The operative parts of the machine are supported on a suitable frame 1 which is properly designed for this purpose. This frame has two posts or standards 2 rising therefrom which support the carton-filling device, indi-

cated generally at 3. This carton-filling device may have any suitable or usual construction and is herein shown as comprising a hopper 4 to contain the material with which the cartons are to be filled, a delivery funnel 5 communicating with the hopper and through which the material is delivered to the carton and suitable means for either positively forcing the material through the funnel into the carton or at least controlling its delivery therefrom.

One convenient construction is that illustrated in my Patent No. 1,499,388, July 1st, 1924, and which comprises an auger or screw-shaped element rotatably mounted in the funnel and adapted by its rotation to positively deliver the material through the funnel into the carton. This device is shown as operated from a shaft 6 through suitable gears 7.

Although my present invention may be embodied in a machine having a single carton-filling mechanism yet I have herein illustrated it as it might be embodied in one having a plurality of such mechanism by which a plurality of cartons may be simultaneously filled, there being two carton-filling mechanisms shown in the drawing, each having its own shaft 6 and gears 7 from which it is operated.

The carton-feeding means is constructed to feed empty cartons *m* to the carton-filling mechanism and then to deliver the filled cartons therefrom. The carton-feeding mechanism herein shown gives the cartons an intermittent or step-by-step motion, one step bringing an empty carton beneath the funnel 5 into position to be filled and the next step delivering the filled carton from the filling mechanism and bringing another empty carton into position to be filled.

The frame 1 is provided with a platform portion 8 having a guideway thereon along which the cartons are carried by the carton-feeding mechanism, this guideway comprising two guide rails 9 forming between them a path along which the cartons are carried. The cartons are moved forwardly by carton-feeding arms 10 that are carried by and extend laterally from an endless chain device 11, the latter passing around two sprocket wheels 12 and 13 that are carried in brackets 14, the latter being adjustably secured to the rail 15 of the frame by suitable bolts 16. There is one such guideway and carton for each of the carton-filling mechanisms.

The empty cartons are delivered onto the receiving portion 17 of the platform 8 in position to be engaged by one of the feeding arms 10 and the sprocket chain 11 with its arms 10 is given a step-by-step forward movement, each forward movement being equal to the distance between adjacent arms 10. An empty carton *m*, therefore, delivered onto the platform at the point *a*, Fig. 2, will at the first forward step be brought to the point *b* and at the next forward step be brought to the point *c* and at the subsequent forward step will be brought to the point *d* beneath the carton-filling mechanism, at which place the carton is filled. The next forward step brings the filled carton onto the delivery portion 18 of the platform from which it will be removed as will be presently described.

For thus giving the carton-feeding means its intermittent or step-by-step movement I have provided the following means. The shaft 175 of the sprocket wheel 13 has fast thereon a disk 19 having a plurality of notches 20 therein, said disk co-operating with a spring-pressed feed pawl or dog 21 which is pivotally mounted at 22 on a pawl-carrying yoke 23 that is pivoted on the shaft 175. This pawl-carrying yoke 23 is pivotally connected by a link 24 to a crank arm 25 fast on a shaft 26, that is journalled in a suitable bracket 27. The means for driving the shaft 26 will be presently described.

At each rotation of said shaft 26 the dog-carrying arm is moved from the position shown in Fig. 1 to that shown in Fig. 13 and as the feed dog 21 normally has engagement with one of the notches 20 such movement will give the ratchet wheel 13 a forward step. The parts are so designed that this forward step will be sufficient to carry the carton from one of the stations *a*, *b*, *c*, or *d* in Fig. 2 to the next adjacent station.

Means are provided for automatically disconnecting the dog 21 from its notch 20 at the end of the forward step so that the dog may have its return movement while the sprocket wheel and carton-feeding means remain stationary. For this purpose the link 24 is provided with a tail or extension 28 carrying an adjustable dog releaser in the form of a screw 29, the latter being so positioned that just before the crank 25 is passing the dead center said screw will engage a tail 30 of the dog and swing it out of the notch 20 as shown in Fig. 13. This dog releaser will hold the dog out of engagement with the notch until after the link 24 has begun its return movement and the dog is out of line with the notch so that when the dog is released by the screw 29 the spring acting on the dog brings it against the periphery of the disk. Said dog will then ride over said periphery on its back movement until it drops into the next notch 20, as shown in dotted lines Fig. 14.

The connections for operating the carton-feeding mechanism are driven from a driving element herein shown in the form of a shaft 31 journalled in the frame and operated from a driving pulley 32. This shaft is connected to a counter-shaft 33 by a sprocket chain 34 and the counter-shaft 33 is connected by a chain 35 to a shaft 36 through the medium of a clutch device indicated generally at 37.

The shaft 36 is in turn geared to the shaft 26 by which the feed dog 21 is actuated as above described.

The gearing between the shafts 36 and 26 is an intermittent gearing constructed so that the shaft 26 will have a complete rotation during one-half rotation of the shaft 36 and will then remain at rest during the other half of the rotation of the shaft 36. The reason for this form of intermittent driving gearing will be presently described.

This intermittent gearing connecting the shafts 26 and 36 is indicated in Figs. 11 and 12 and it comprises a disk 38 fast on the shaft 36 and having gear teeth 39 cut in a portion of its periphery, and a gear 40 fast on the shaft 26 and having gear teeth adapted to mesh with the teeth 39. The gear 40 has a blank portion 41 which is concavely curved to fit the periphery of the disk 38 and the latter has fast thereto a plate 42 having the curved cam surfaces 43 that are adapted to co-operate with an arm 44 fast to the gear 40.

When the parts are in the position shown in Fig. 11 the shaft 36 with its disk 38 may turn in the direction of the arrow without rotating the gear 40 and in fact the latter will be locked from rotation by the engagement of the curved face 41 with the periphery of the disk 38.

The plate 42 is so shaped that the point 45 thereof comes at the dividing line between the teeth 39 and the smooth face of the disk 38 and with this construction said point 45 will engage the arm 44 just as the teeth 39 are about to engage the teeth of the gear 40. The engagement of the point 45 with the arm 44 will give the gear 40 an initial turning movement and as soon as the teeth 39 are in mesh with the gear 40 then said gear will be rotated by the gear 39. The gear 40 has the same number of teeth as the toothed portion of the disk 38 and, therefore, the engagement of the teeth 39 with the gear 40 will rotate the latter one complete revolution. When the teeth 39 pass out of engagement with the gear 40 then the latter will be locked from rotation by the engagement of the non-toothed portion of the disk 38 with the edge 41 and the shaft 26 will thus remain stationary until the shaft 36 has completed its rotation. This gear is shown as enclosed in a housing 46.

It has been above stated that the shaft 36 is driven through the medium of a clutch 37. This clutch comprises a continuously rotating clutch member 47 driven by the sprocket chain 35 and provided with a plurality of notches 48 and a clutch dog 49 which is pivotally mounted at 50 on a hub 51 that is fast to the shaft 36. The clutch dog is acted on by a spring 52 which tends normally to swing it into its operative position shown in Fig. 6[a], in which position said dog occupies one of the notches 48 so that rotary motion of the clutch member 47 in the direction of the arrow will operate to drive the shaft 36. When the clutch dog is swung into the position shown in Fig. 6 the clutch is unclutched as the dog will be withdrawn from the notch 48 thus allowing the clutch member 47 to rotate freely without giving rotation to the shaft 36.

This clutch 37 is automatically controlled in such a way that when the machine is started it will be thrown into engagement and will give the shaft 36 one rotation thereby to give the carton-feeding device one step forward and to bring a carton into position to be filled, at which time the clutch is automatically disengaged, and when the carton has been filled said clutch will be automatically engaged again thus giving the carton-feeding mechanism another step forward and removing the filled carton from the filling device and placing a second empty carton into position to be filled, said clutch becoming automatically disengaged when the second carton has been properly positioned for filling.

This controlling of the clutch is secured through the medium of a plurality of clutch-releasing members 53[a], 53[b], 53[c], etc. which are in the form of latches pivotally mounted at 54 and each having a nose 55 adapted to engage the upstanding portion 56 of the clutch dog. Any number of these latches or clutch-releasing members may be employed dependent on the number of different operations which it is desired to make use of in controlling the clutch.

In the machine herein illustrated there are two carton-filling devices and there is one of these latches for each carton-filling device so that the clutch is controlled from each filling device. There is also another latch controlled by the means for delivering the empty cartons to the machine and by which the clutch may be rendered inoperative when the supply of cartons is exhausted.

I have also herein shown a fourth latch which is subject to manual control and by which the operator may control the operation of the machine. So long as any one of the clutch-releasing latches are in lowered position, indicated in Fig. 6, and by the position of the clutch-releasing latch 53[b] in Fig. 10, said lowered latch will engage the clutch dog and hold it in its inoperative position, thus holding the clutch disengaged. When all the latches are raised so as to release the dog then the spring 52 will operate automatically to move the dog into clutching position thus causing the clutch to be engaged.

In the construction herein shown when the machine is started in operation the latches 53[a], 53[b], 53[c] are all raised thus allowing the clutch 37 to be automatically engaged and the clutch will then make one rotation thereby giving the carton-feeding mechanism one step forward and bringing an empty carton into position beneath the filling mechanism.

During this movement of the carton-feeding mechanism the carton-filling mechanism is coupled to the driving element and the latch for the carton-filling mechanism is lowered into position shown in Fig. 6 so that the clutch 37 will be disengaged at the end of one revolution. When the carton is filled the lowered latch is automatically raised thus releasing the clutch dog, at which time the clutch will become automatically engaged and advance the carton-feeding mechanism another step.

As stated above there are two carton-filling devices herein shown and the means controlling the operation of each of them are alike so that a description of one will suffice.

It will be remembered that each carton-filling machine is actuated from a shaft 6 and each shaft 6 is clutched to a driving pulley 57 through the medium of a clutch 58 which is actuated by a clutch actuator 59. Each driving pulley 57 is driven from a belt 60 which passes over a pulley 61 fast on the power shaft 31. The pulleys 57 are, therefore, continuously rotated.

The clutches 58 are normally disengaged but are automatically thrown into engagement by means rendered operative by the carton-feeding mechanism so that the starting of the carton-feeding mechanism in operation results in rendering the carton-filling mechanism operative. Each clutch actuator 59 is pivotally mounted at 62 and has rigid with it a rearwardly-extending arm 63 to which is pivotally connected a toggle lever device 64, 65, these two members being pivotally connected together at 66. The member 65 is pivoted to the frame at 67 and has an arm 68 extending therefrom to which is pivoted a latch 69, the latter being acted on by a suitable spring 70. This latch co-operates with a dog 71 to hold the clutch in engagement. The clutch at the right hand of Fig. 5 is shown in its disengaged position with the clutch actuator swung away from the clutch and with the toggle device 64, 65 broken.

The clutch is thrown into engagement by straightening the toggle into the position shown at the left Fig. 5, this resulting in moving the clutch actuator toward the clutch. As the toggle device is thus straightened the latch 69 is brought into engagement with the dog 71 thereby locking the clutch in its engaged position. This straightening of the toggle is accomplished by the following mechanism.

Pivotally mounted on the stud 62, which forms a pivot for the clutch actuator, is a rocking member 72 which carries a thrust pin or member 73 having a shoulder 74 and an extension 75 that rests on a pin 76 extending from the member 64 of the toggle. Assuming the parts are in the position shown at the right in Fig. 5 it will be observed that when the rocking member 72 is swung downwardly into the position shown in Fig. 16 the shoulder 74 will engage the pin 76 and straighten the toggle 64, 65 thus throwing the clutch 58 into engagement, and during this movement the latch 69 will snap over the dog 71 thus locking the clutch in this position.

The two members 72 are actuated from the carton-feeding mechanism and to accomplish this each member has a link 77 pivotally connected thereto which in turn is connected to a crank arm 78 formed on the shaft 36. At each rotation of the shaft 36, therefore, the clutches 58 for operating the carton-filling mechanism will be automatically engaged.

Hence it will be seen that whenever the clutch 37 is rendered operative the consequent rotation of the shaft 36 will operate to give the carton-feeding mechanism a forward step and will also operate through the crank arms 78 and links 77 and rocker members 72 to throw into operation the clutches 58 which control the carton-filling mechanism. These parts are so timed that the filling of the carton begins just as the empty cartons are brought underneath the spouts 5 of the carton-filling mechanism.

The operation of rendering the clutches 58 operative as above described also results in lowering the latches 53^a, 53^b into the position shown in Fig. 6 so that the clutch 37 will be automatically disengaged when it has made one complete revolution, so that the carton-feeding mechanism will not be again operated till the clutch is again engaged.

The apparatus also comprises means for automatically disengaging each clutch 58 as soon as a predetermined amount has been delivered to the carton which is being filled by the corresponding carton-filling mechanism and the releasing of each clutch 58 raises the corresponding latch 53 so that when both cartons have been properly filled the clutch 37 is released and automatically coupled thus causing the machine to perform another cycle of operations.

The connection herein shown between the latches 53^a, 53^b and the clutch actuators 59 comprises a link 79 connected to each latch, and to an arm 80 on a rock shaft 81, there being two rock shafts 81, one for each latch. Each rock shaft has another arm 82 rigid therewith to which is connected a link 83 and the links 83 are connected to arms 84 that are rigid with the clutch actuator 79. These connections are such that when each clutch actuator is moved into the position shown at the left Fig. 5, thereby rendering the clutch 58 operative, the downward movement of the arm 84 operates through the links 83, 79 and rock shaft 81 to lower the corresponding latch 53 into the position shown in Fig. 6 and, therefore, as long as the clutch 58 is operated the corresponding latch 53 is in

position to disengage the clutch 37. On the other hand when the clutch 58 is disengaged the upward movement of the arm 84 will operate to raise the corresponding latch 53 and consequently whenever either clutch 58 is disengaged the corresponding latch 53 is in inoperative position or in position to release the clutch dog 49.

As stated above means are provided whereby each clutch 58 is disengaged automatically whenever the corresponding carton has received a predetermined amount of material and this is secured by providing means governed by the weight of the material in the carton which is adapted to release the latch 69 from the dog 71 as soon as the carton has received such predetermined amount.

Each dog 71 is pivotally mounted at 85 and is acted on by a spring 86 which normally tends to hold it in the position shown in Fig. 5. Each dog has a tail 87 adapted to be engaged by a pivoted latch 88, the latter being connected to the armature 89 of a magnet 90. The latch 88 has a notch adapted to receive the end of the tail 87 and when the magnet is de-energized the weight of the armature and latch holds the latter in interlocking engagement with said tail and so long as this condition obtains the dog 71 will be operative to lock the clutch 58 in engagement when the latch 69 is engaged the dog. When the magnet is energized, however, the armature is raised thereby releasing the latch 88 from the tail 87 of the dog 71.

91 indicates a spring connecting the ends of the toggle members 64, 65 and tending normally to break the toggle thereby to release the corresponding clutch 58. When the clutch is engaged the action of the spring 91 is resisted by the dog 71 but if the latch 88 is raised to release the dog then the spring acts to break the toggle and to disengage the clutch.

Means are herein provided for closing the circuit through each magnet 90 whenever the corresponding carton has received a predetermined weight of material. This is provided for by so constructing the trackway along which the cartons are fed by the carton-feeding arms 10 that the portion 92 thereof on which the cartons rest while they are being filled constitutes a platform of a weighing device, this portion being separate from the other portion of the raceway. This platform 92 is carried on one end of a balance arm 93 pivoted at 94, the other arm 95 thereof having an adjustable weight 96, the position of which determines the weight of the filled carton.

The platform 92 has associated therewith a movable contact 97 of a circuit-closing switch, the other contact 98 thereof being a fixed contact which is supported by the frame. These contacts are so arranged that when the balance weight is in its normal position the contacts are separated but when the carton *m* has received a sufficient amount of material to overbalance the counterweight 96 then the platform will descend thus closing the contacts 97, 98. This closing of the contacts energizes the magnet 90 thereby raising the latch 88 and releasing the dog 71 from the other latch 69 thus allowing the spring 91 to disengage the clutch.

The two contacts 97, 98 are shown as connected to two wires 99, 100 of an electric circuit which is connected to a suitable source of electricity, such for instance as a battery 101. The windings of the magnet 90 are in this circuit so that the closing of the contacts 97, 98 will energize the magnet as will be readily understood.

I have also provided the circuit for each magnet 90 with a second switch which is closed when the corresponding clutch 58 is in engagement but is open when the clutch is thrown out of engagement. Such switch is shown as comprising two contacts 103 insulated from each other and arranged in series in the wire 100 and a bridging contact 103 carried by a block 281 rigid with the arm 68 and adapted to bridge the two contacts 102 when the corresponding clutch is closed as shown at the left in Fig. 5. The purpose of this switch 102, 103 is to provide for breaking the circuit of the magnet 90 as soon as the latter has performed its function of raising the latch 88 and also to obviate any sparking contact between the contacts 97, 98, such as would occur if the circuit were opened at this point. The function of the magnet is simply to release the latch 88 and when it has accomplished this there is no object in having the current continue to flow through the magnet. The provision of the switch 102, 103, therefore, opens the magnet circuit as soon as the magnet has performed its function.

With the construction as above described it will be observed that when the machine is started in operation by releasing the clutch dog 49 the shaft 36 will make one rotation thereby giving the carton-feeding mechanism a forward step which brings an empty carton beneath each of the carton-filling devices. This rotation of the shaft 36 also operates through the crank arms 78 and links 77 to throw the clutches 58 into engagement thereby setting the carton-filling devices in operation.

The throwing of the clutches 58 operates through the links 83, rock shafts 81 and links 79 to lower the latches 53^a, 53^b, into the position shown in Fig. 6, in which they operate to disengage the clutch 37 when it completes its rotation.

As soon as each carton is filled the platform on which it rests is lowered by the weight of the filled carton thus closing the circuit 99, 100 at the contacts 97, 98 and en-

ergizing the magnet which raises the latch 88 and releases the dog 71 thus allowing the corresponding clutch 58 to be disengaged. As soon as either clutch is disengaged then the corresponding latch 53^a or 53^b is raised and when both latches have been raised by the filling of both cartons then the clutch 37 is automatically thrown into engagement again and the above described cycle of operations are repeated.

The clutch 37 is, therefore, selectively controlled by the carton-filling devices and when it has been disengaged after giving the carton-feeding devices one step forward then it will remain so disengaged until all the cartons being simultaneously filled (there being two such cartons in this embodiment of the invention) have received the predetermined amount and as soon as the last carton is full the clutch dog 49 will be automatically released and the clutch will be automatically engaged again.

With this invention, therefore, it is immaterial whether or not the several carton-filling devices operate at the same speed, for as each carton becomes filled the latch corresponding to said carton is thrown into inoperative position and will so remain until all the cartons are filled and all of the carton-filling mechanisms have been brought to rest and the corresponding latches 53^a, 53^b, etc. raised into inoperative position.

Thus the operation of throwing the clutch 37 into engagement is, therefore, selectively controlled by the carton-filling devices.

Where a plurality of carton-filling devices are employed I propose to deliver the empty cartons to the machine by means of a single endless belt and to distribute the empty cartons from this belt to the individual carton-feeding mechanisms and after the cartons have been filled to replace them on the belt again by which they are delivered from the machine. Such endless belt is indicated at 104 and it is herein shown as extending longitudinally of the machine. The empty cartons are fed into the machine at the right hand end Fig. 2 by the moving belt 104, said cartons being guided by suitable guides 105.

107 indicates a stop extending transversely across the belt 104 and situated to be engaged by the cartons, said stop being supported a sufficient distance from the end of the guides 105 to provide a space through which the cartons may be shifted transversely.

106 indicates a carton-transferring member which is mounted to reciprocate transversely of the belt 104 and which operates to shift one carton from the belt 104 laterally into position to be engaged by the arms 10 of one carton-feeding mechanism and to shift the next carton laterally in the opposite direction into position to be engaged by the arms 10 of the other carton-feeding mechanism. This carton-shifting device 106 is movable from the full line position Fig. 2 to the dotted line position and back again and when said member is shifted from the full to the dotted line position the carton against the stop 107 will be moved toward the bottom of the sheet in Fig. 2 into position indicated at *a* where it will be engaged and fed forward by the arms 10 to one of the carton-feeding mechanisms. After this transfer has been made the forward movement of the belt will carry the next carton against the stop 107 so that on the return of the transfer device from the dotted to the full line position Fig. 2 the next carton will be moved in the opposite direction and into position to be engaged by the arms 10 of the other carton-feeding mechanism. The alternate cartons will thus be delivered to one carton-feeding mechanism and the other cartons to the other carton-feeding mechanism.

This transfer device 106 is supported on a bar 108 which is carried by two arms 109, 110. The arm 109 is loosely mounted on a shaft 111 that extends longitudinally of the machine, while the arm 110 is fast on a corresponding shaft 112 on the other side of the machine. The shaft 112 has another arm 113 rigid therewith which is connected by a link 114 with an arm 115 fast on a rock shaft 116, the latter having an arm 117 provided with a roll 118 operating in a cam groove 119 formed in a cam 120 that is fast on the shaft 36. At each rotation of the shaft 36, therefore, the rock shaft 116 will be oscillated thus operating through the arm 115, link 114 and arm 113 to rock the shaft 112 and consequently to reciprocate the bar 108 carrying the transfer device 106.

As stated above the filled cartons are delivered back onto the belt 104 again and this is accomplished by two pushers 121 and 122 which are mounted for reciprocation transversely of the machine from the full to the dotted line positions Fig. 2 and which by such reciprocations transfer the filled cartons transversely back onto the belt 104 again. The pusher 121 is actuated from the shaft 112, the latter having an arm rigid therewith which is pivotally connected to the shank 124 of the pusher so that as the shaft 112 oscillates the pusher 121 will be reciprocated. The pusher 122 is also provided with a shank 125 which is pivotally connected to an arm 126 on the rock shaft 111 and the latter rock shaft has an arm 127 which is connected by a link 128 to an arm 129 fast on the rock shaft 116. With this construction the two pushers 121, 122 will operate simultaneously but in opposite directions and they are offset from each other in the direction of the length of the machine so that the carton which is acted on by the pusher 121 will be delivered onto the belt 104 in advance of the carton which is acted on by the pusher 122.

I have also provided a stop mechanism

which co-operates with the empty cartons being fed into the machine by the incoming end of the belt 104 and which will operate to stop the machine automatically in case there is an absence of cartons coming into the machine. Such stop mechanism comprises a feeler or detector 130 normally occupying a position in the path of the incoming carton *m*. This feeler is carried on a stem 131 which is rigid with a rock shaft 132 journalled in a suitable fixed support 133.

The rock shaft has an arm 134 thereon carrying a bridging contact 135 at its end, said bridging contact being adapted to enter between two separated contacts 136. The two contacts 136 are connected to two wires 137, 138 leading to a suitable source of electric energy, the wire 138 also including the windings of the magnet 139. The armature 140 of this magnet 139 is connected by a link 141 to an arm 142 fast on a rock shaft 143, the latter having another arm 144 rigid therewith which is connected by a link 145 to an arm 146 rigid with the clutch-releasing latch 53^d.

As stated above the feeler or detector 130 is normally in the path of the travel of the incoming cartons *m* and when in this position the contact 135 will be separated from the contact 136 as shown in Fig. 6 with the result that the magnet 139 will be de-energized and its armature 140 will be lowered. When this condition obtains the latch 53^d is in its lower position shown in Fig. 6 and is in position to hold the clutch dog 49 and the clutch 37 in its inoperative position.

The above condition is that which would exist if no cartons are being fed in on the belt 104. If now a carton is brought in by the belt 104, as shown in Fig. 6, said carton will engage the feeler 130 and swing it to the right thus closing the contacts 135, 136 and energizing the magnet 139. The resultant raising of the armature 140 will rock the rock shaft 143 sufficiently to raise the latch 53^d from engagement with the clutch dog 49. When, therefore, there are no cartons being fed into the machine the latch 53^d will hold the clutch 37 inoperative but as soon as cartons are fed into the machine then this latch 53^d becomes inoperative and will remain so so long as the supply of cartons is continuous.

The energizing of magnet 139 not only raises the latch 53^d as above described but also withdraws the feeler 130 from the path of the cartons and holds it thus withdrawn. The support 133 in which the rock shaft 132 is journalled is carried by a tubular rock shaft 147 through which the wires 137, 138 extend and this tubular rock shaft has an arm 148 rigid therewith which is connected to the rock shaft 143 by a link 149 on an arm 150.

The turning of the rock shaft 142 by the energizing of the magnet 139, therefore, operates to swing the arm 150 downwardly slightly thereby acting through the link 149 and arm 148 to turn the rock shaft 147 into a position to withdraw the feeler 130 laterally from the path of the cartons sufficiently to allow the cartons to pass. The frictional engagement between the feeler 130 and the cartons will, however, maintain the contacts 135, 136 closed so long as cartons are being brought in on the belt 104 but whenever there are no cartons beings delivered and the cartons in the belt 104 have passed out of engagement with the feeler 130 the latter will swing into the position shown in Figs. 6 and 7 thus opening the circuit of the magnet 139, which will result in the corresponding latch 53^d being lowered into position to disengage the clutch 37.

It will be observed, therefore, that this clutch 37 which controls the operation of the machine is in turn controlled both by the carton-filling mechanism and by the carton-supplying mechanism. It may also be controlled manually and for this purpose I have provided another latch 53^c which is connected by a link 151 to a pivotally mounted controlling lever 152. When the machine is running normally this lever 152 will be positioned to hold the latch 53^c raised but if it is desired to stop the machine the lever 152 may be turned to lower the latch into its operative position.

In order that there may be an accurate weighing of the separate cartons it is essential, of course, that the cartons should be out of engagement with both the arms 10 and the guide rails 9 during the weighing operation, and this is provided for by means which give the arms 10 a slight back ward movement and which gives the guide rails 9 a separating movement thereby to withdraw both the arms and the side rails from contact with the cartons at the time that the weighing is being accomplished.

In order to give the arms 10 such retracting movement the crank arm 25 is so proportioned relative to the spacing of the notches 20 that at each rotation of said crank arm the sprocket chain 11 will be carried forward a distance slightly greater than that necessary for feeding the cartons from one station to the next, and the parts are so arranged that the dog 21 will drop into the notch 20 just before the arm 10 has completed its return movement.

With this construction the arm 23 will be coupled to the sprocket wheel 13 just before the return movement is completed so that during the remainder of said return movement the sprocket wheel 13 will be moved backwardly slightly, such backward movement being sufficient to remove the arms 10 from contact with the carton being filled. Said cartons are, therefore, free from contact with any part and an accurate weighing will result.

This is shown best in Figs. 13 and 14. In Fig. 13 the dotted line position of the dog 21 indicates the position corresponding to Fig. 1 and shows the position of the parts just

before the sprocket chain 11 is given a forward step. Just before the crank 25 completes its half revolution into the position shown in Fig. 13 and the stop 29 engages the tail 30 of the dog and releases the latter from the notch 20, said dog being held released while the crank 25 is passing the dead center. The shifting angular position of the link 24 in passing a dead center and beginning the backward movement will hold the dog withdrawn from the notch until after the arm 23 has been carried backwardly to a point where the dog is beyond the notch 20 so that when the dog is finally released by the stop 29 then during the further backward movement into the position shown in Fig. 1 said dog will rest against the periphery of the notched disk 19 and will drop into the next notch automatically.

As stated above the parts are so timed that the dog will drop into the notch just before the arm 23 reaches the backward limit of its movement. This is illustrated in Fig. 14, wherein the full lines show the dog 21 just about ready to drop into the notch, which action occurs before the crank 25 has reached the dead center, so that on the bringing of the crank 25 from the full to the dotted line position Fig. 14 the disk 19 and the sprocket chain 11 and carton-feeding arms will be moved backwardly into the dotted line position. This backward movement separates the arms 10 from the carton *m* being filled as shown in Fig. 15, wherein the full lines indicate the relative position of the arms 10 and carton *m* when the arms have delivered a carton to the carton-filling mechanism and the dotted lines show the position of the arms after the slight backward movement of the chain 11. With this construction, therefore, the arms 10 feed the cartons to the filling mechanism and then back off slightly so they have no contact with the carton while it is being filled and weighed.

For giving the guide rails 9 their separating movement I employ the mechanism shown in Fig. 20. One rail 9 of each pair is secured to a cross bar 160 and the other guide rails are secured to another cross bar 161, these cross bars being slidably mounted in the frame 1. The two cross bars are provided with rack teeth 162 which engage opposite sides of a pinion 163 that is fast on a rock shaft 164. This rock shaft has an arm 165 extending therefrom which is adapted to be engaged by an arm 166 rigid with the yoke 23. The construction is such that just as the dog 21 drops into the notch 20 during the backward movement of the yoke 23 the arm 166 will engage the arm 165 so that during the final backward movement the pinion 163 will be turned thereby to separate the guide rails 9, this action occurring at the same time that the arms 10 are given their retracting movement. Thus during the weighing operation the carton is entirely free from contact with either the guide rails or the arms 10 and a correct weighing can be accomplished.

I have herein shown the shaft 33 as formed in two sections connected by a friction clutch 153. This clutch is in the nature of a safety device and is intended to be of sufficient strength to operate the machine under ordinary conditions but it is constructed so that it will slip in case any undue resistance is encountered. If, therefore, for any reason the packages should jam in the machine the clutch 153 will slip and prevent any breakage of the parts.

The machine is also provided with means for returning the balanced platform 92 to its elevated position after the weighing has been accomplished and the filling mechanism brought to rest. This is provided for by a cam 154 on the shaft 36 which co-operates with a lever 155 pivoted on the shaft 116, said lever having a link 156 pivoted thereto which is connected to an arm 157 on a rock shaft 158, the latter carrying a resetting arm 159 that is adapted to engage the top of the balance arm 95 and lower the latter thereby raising the platform 92. The cam 154 is proportioned so that during the weighing operation the high portion of the cam acts on the lever 155 thus holding the resetting arm 159 raised but after the weighing operation has been completed the low portion of the cam 154 comes into operative position and the weight of the lever 155 will swing the latter downwardly thus bringing the arm 159 into position to reset the platform 92.

While I have illustrated herein a selected embodiment of my invention I do not wish to be limited to the constructional features shown.

I claim:

1. In a carton-filling machine, the combination with a carton-filling mechanism, of carton-feeding mechanism constructed to feed empty cartons to the carton-filling mechanism and to deliver filled cartons from said mechanism, driving means, means to operatively connect the driving means to the carton-feeding means, means rendered operative when the driving means is connected to the carton-feeding means to connect the carton-filling means to said driving means, and means controlled by the weight of a carton as it is filled to disconnect the carton-filling means from the driving means.

2. In a device of the class described, the combination with carton-filling means, of carton-feeding means constructed to feed empty cartons to the carton-filling means and to deliver filled cartons from said carton-filling means, driving means, a clutch device to operatively connect the driving means to the carton-feeding means, a second clutch device to operatively connect the driving means to the carton-filling means, means rendered op-

erative when the first-mentioned clutch is thrown into engagement to render the second-mentioned clutch operative, and means controlled by the weight of the carton as it is filled to disconnect said second-mentioned clutch.

3. In a device of the class described, the combination with carton-filling means, of carton-feeding means constructed to feed empty cartons to the carton-filling means and to deliver filled cartons from said carton-filling means, driving means, a clutch device to operatively connect the driving means to the carton-feeding means, a second clutch device to operatively connect the driving means to the carton-filling means, means rendered operative when the first-mentioned clutch is thrown into engagement to render the second-mentioned clutch operative, and means operating independent of the first-mentioned clutch for disconnecting the second-mentioned clutch when the carton has received a predetermined weight.

4. In a carton-filling machine, the combination with carton-filling mechanism, of carton-feeding mechanism constructed to feed empty cartons to the carton-filling mechanism and to deliver filled cartons from said mechanism, driving means, means to operatively connect the driving means to the carton-feeding means, means rendered operative when the driving means is connected to the carton-feeding means to connect the carton-filling means to said driving means, and electro-mechanical means controlled by the weight of a carton as it is filled to disconnect the carton-filling means from the driving means.

5. In a device of the class described, the combination with carton-filling means, of carton-feeding means comprising an intermittently-moving endless chain member having carton-feeding arms, driving means, a clutch to connect the driving means to the carton-feeeding means, a second clutch to connect the driving means to the carton-filling means, a latch to hold the second clutch in engagement, and means controlled by the weight of a carton as it is filled to disconnect said latch.

6. In a device of the class described, the combination with carton-filling means, of carton-feeding means, driving means, a clutch device for connecting the driving means to the carton-feeding means, a second clutch device for connecting the driving means to the carton-filling means, means rendered operative when the carton-feeding means is coupled to the driving means through the first-mentioned clutch to throw the clutch for the carton-filling means into engagement, a latch for holding said second clutch in engagement, means to release the latch when the carton has received a predetermined amount of material, and automatically-operative means to disengage said last-named clutch when the latch is released.

7. In a device of the class described, the combination with carton-filling means, of carton-feeeding means, driving means, a clutch device for connecting the driving means to the carton-feeding means, a second clutch device for connecting the driving means to the carton-filling means, means rendered operative when the carton-feeding means is coupled to the driving means through the first-mentioned clutch to throw the clutch for the carton-filling means into engagement, a latch for holding said clutch in engagement, electrical means to release the latch when the carton has received a predetermined amount of material, and automatically-operative means to disengage said last-named clutch when the latch is released.

8. In a device of the class described, the combination with carton-filling means, of carton-feeding means, driving means, driving connections between said driving means and the carton-feeding means which when set in operation give the carton-feeding means one forward step and then become inoperative, means rendered operative by said driving connections for operatively connecting the carton-filling means to the driving means, means controlled by the weight of the carton as it is filled to disconnect the driving means from the carton-filling means, and means to render the driving connections between the driving means and carton-feeding means operative again when the carton-filling means is disconnected from the driving means.

9. In a device of the class described, the combination with carton-filling means, of carton-feeding means, driving means, a clutch for connecting the driving means with the carton-feeding means, a second clutch for connecting the driving means with the carton-filling means, means controlled by the weight of a carton as it is filled to disconnect said carton-filling clutch, and means to render the carton-feeding clutch operative when the carton-filling clutch is disengaged.

10. In a device of the class described, the combination with carton-filling means, of carton-feeding means, driving means, a one-revolution clutch for connecting the driving means to the carton-feeding means, a second clutch for connecting the driving means to the carton-filling means, means for automatically throwing said second clutch into engagement when the driving means are coupled to the carton-feeding means through the one-revolution clutch, means to disengage said second clutch when the carton has received a predetermined amount, and means operated by the disengagement of said last-named clutch to render the one-revolution clutch operative again.

11. In a device of the class described, the combination with carton-filling means con-

structed to force material positively into a carton, carton-feeding means, driving means, a clutch device for connecting the driving means to the carton-feeding means, means to operatively connect the driving means with the carton-filling means when said clutch is operative, means to disconnect said driving means from the filling means when the carton has received a predetermined weight, and to render said clutch again operative when the driving means is disconnected from the carton-filling means.

12. In a device of the class described, the combination with a plurality of carton-filling devices, carton-feeding means to feed empty cartons to each carton-filling device singly, driving means, means to connect the carton-feeding means to the driving means, other means for operatively connecting the carton-filling means with the driving means, means to disconnect each carton-filling means from the driving means when the corresponding carton has received a predetermined amount, and means for rendering operative the connections between the driving means and the carton-feeding means only when all the carton-filling devices are disconnected from the driving means.

13. In a device of the class described, the combination with a plurality of carton-filling devices, of carton-feeding means to feed empty cartons to each filling device singly, driving means, a clutch to connect the carton-feeding means to the driving means, a separate clutch for connecting each carton-filling device to the driving means, means to render both of the last-named clutches operative when the first-named clutch is thrown into operation, means to render each of said last-named clutches inoperative when the corresponding carton has received a predetermined amount of material, and means to render operative the clutch for the carton-feeding means only when all of the clutches for the carton-filling devices have been disconnected.

14. In a device of the class described, the combination with a plurality of carton-filling devices, of carton-feeding means to feed empty cartons singly to the carton-filling devices, driving means, a clutch for rendering the driving means operative, a clutch for each of the carton-filling devices, means common to all of said last-named clutches to render them operative when the clutch for the carton-feeding device is rendered operative and independent means to render inoperative each of the clutches for the carton-filling devices when the corresponding carton has received a predetermined amount.

15. In a device of the class described, the combination with a plurality of carton-filling devices, of carton-feeding means to feed empty cartons singly to the carton-filling devices, driving means, a clutch for rendering the feeding means operative, a clutch for each of the carton-filling devices, independent means to render inoperative each of the clutches for the carton-filling devices when the corresponding carton has received a predetermined amount, means to render the clutch for the carton-feeding means operative when the last of the clutches for the carton-filling devices has been rendered inoperative, and other means to render operative all of the clutches for the carton-filling devices.

16. In a device of the class described, the combination with a plurality of carton-filling devices, of carton-feeding means to feed cartons to each of the carton-filling devices, driving means, a one-revolution clutch for connecting the driving means to the carton-feeding means, the latter being constructed so that during each revolution of the clutch an empty carton is fed to each carton-filling device and a filled carton is delivered therefrom, means rendered operative when the one-revolution clutch is engaged to connect each carton-filling device to the driving means, means for disconnecting each carton-filling device from the driving means when the corresponding carton has received a predetermined amount, and means operative only when all of the clutches for the carton-filling devices have been disconnected to render the clutch for the carton-feeding means operative again for the next cycle of operations.

17. In a carton-filling machine, the combination with a carton-filling device, of a carton-feeding element, means to move said element forward with a step by step or intermittent movement, and to give it a slight backward movement after each forward step, and a weighing device on which each carton is supported while it is being filled, said backward movement of the carton-filling element freeing it from contact with the carton during the weighing operation.

18. In a carton-filling machine, the combination with a carton-filling device, of a carton-feeding member having pushers to engage the cartons and feed them forward, means to move said member forward with a step by step movement and to give it a slight backward movement after each forward step, and a weighing device on which each carton is supported while it is being filled, said backward movement freeing the pushers from the cartons during the weighing operation.

In testimony whereof, I have signed my name to this specification.

CHAS. L. BOND.