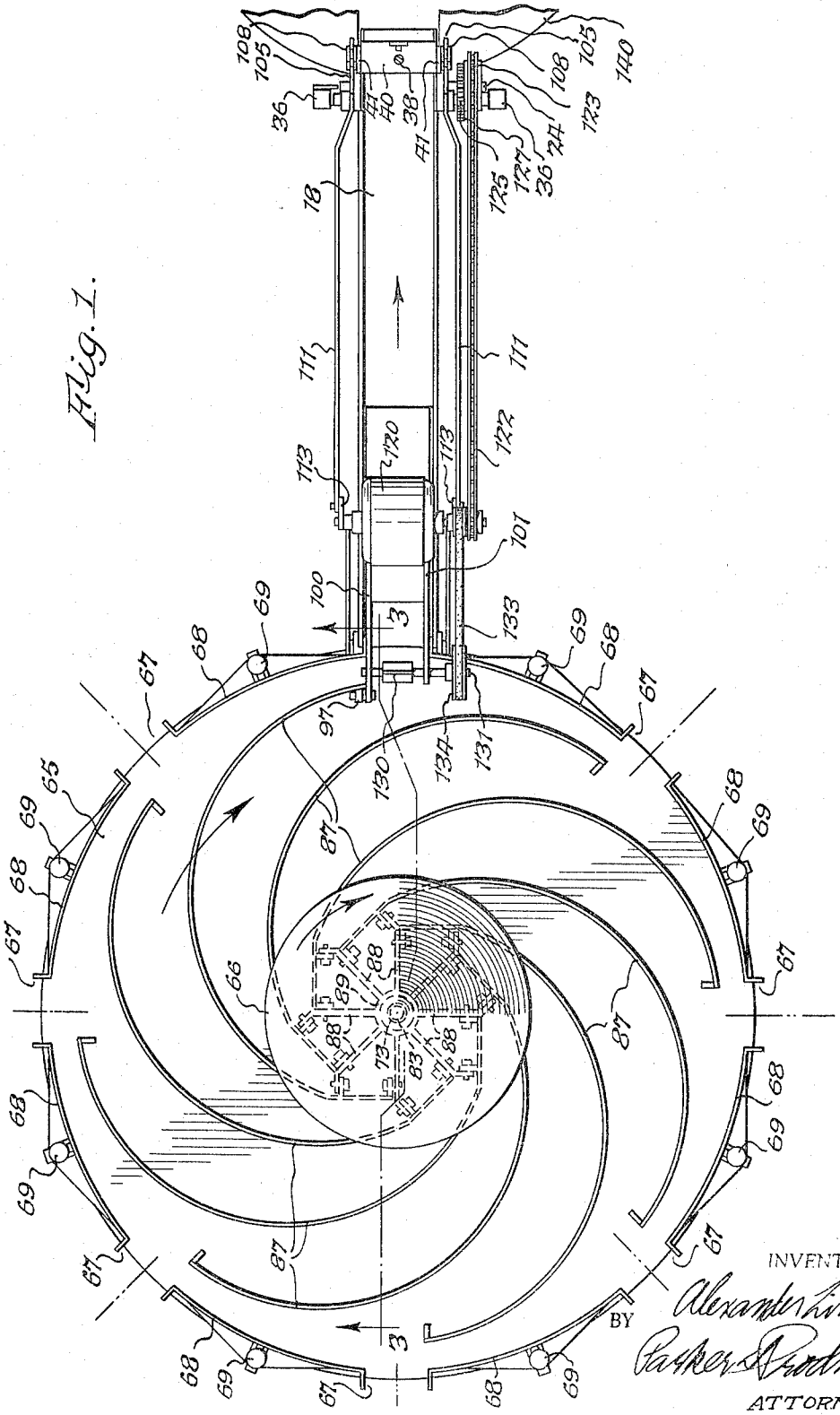
Dec. 6, 1966 A. LITCHARD 3,289,710

CONTAINER FILLING MACHINE

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Fig. 1.



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CONTAINER FILLING MACHINE

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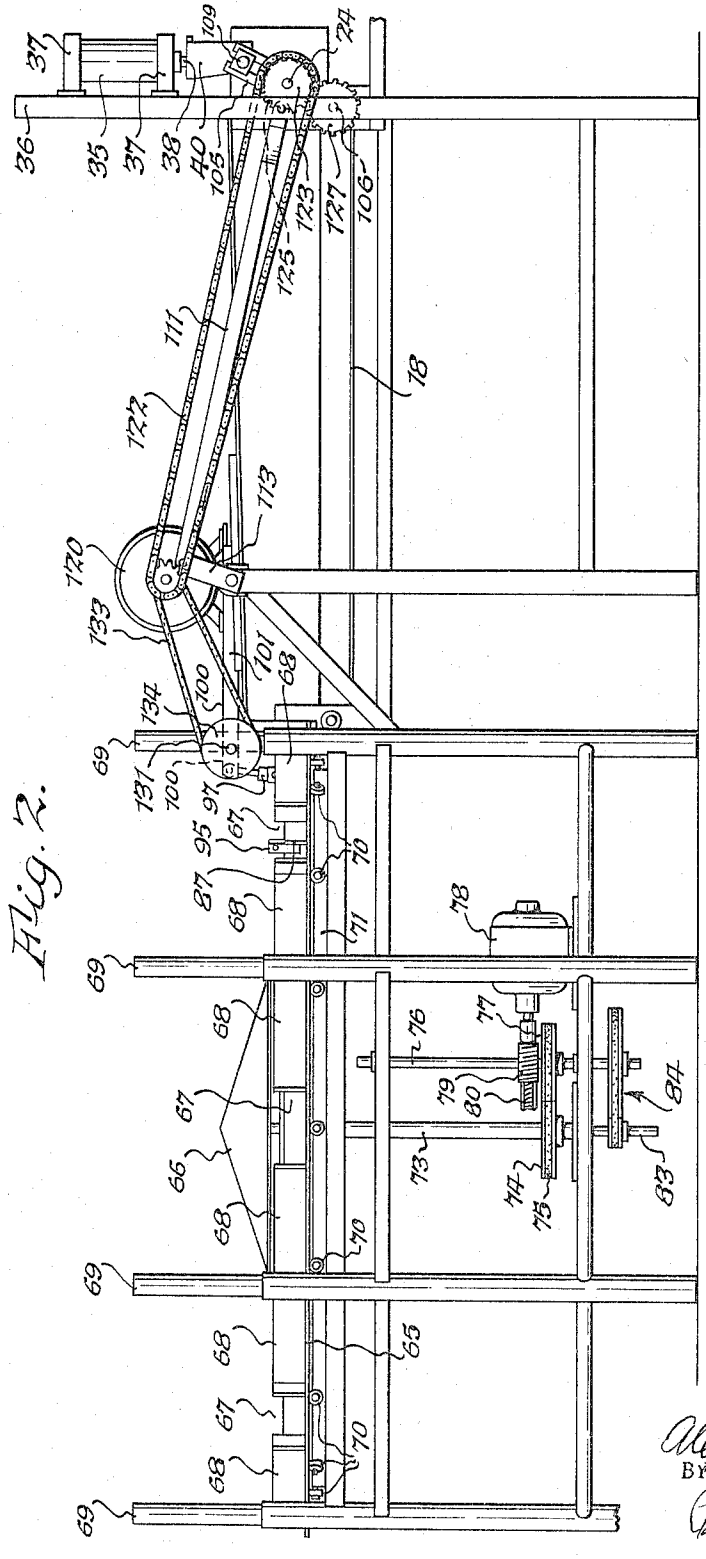


Fig. 2.

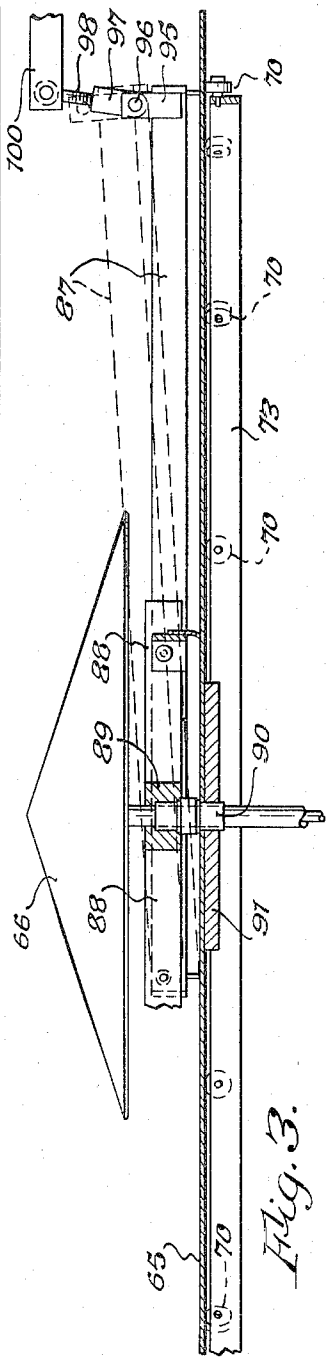


Fig. 3.

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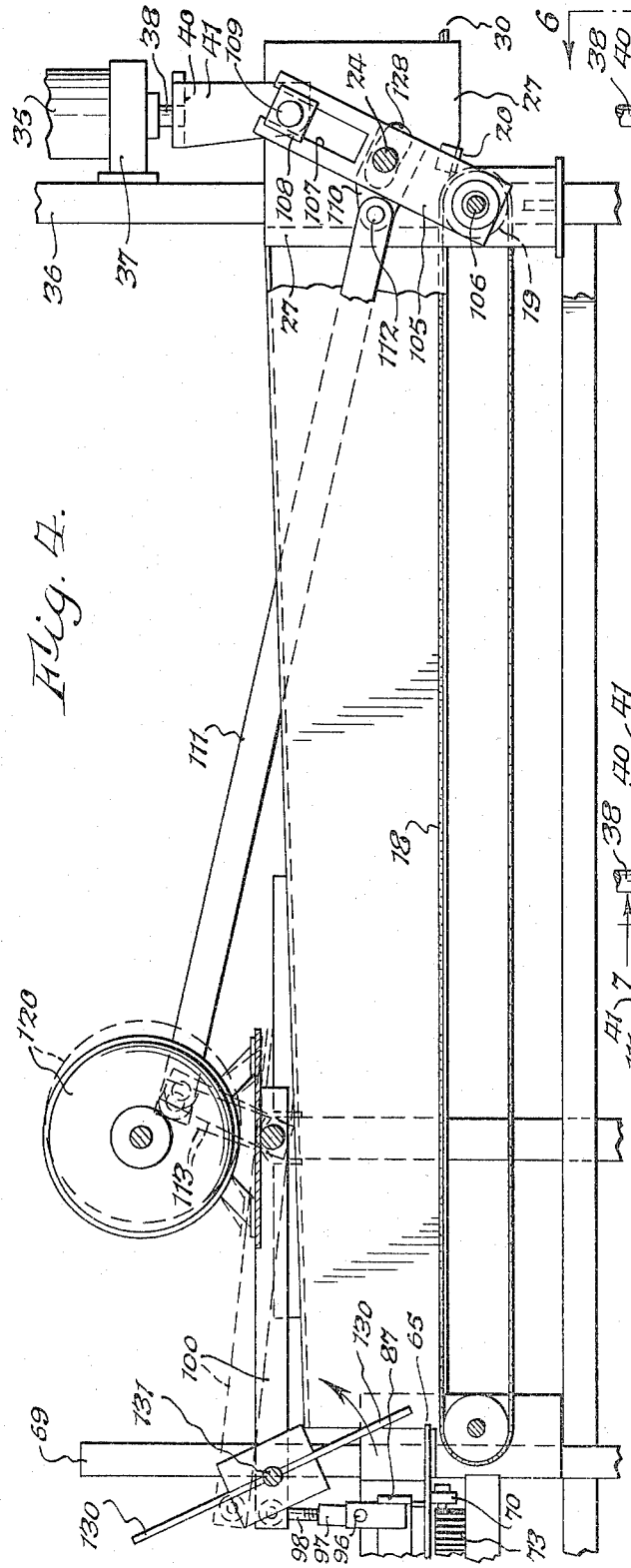


Fig. 4.

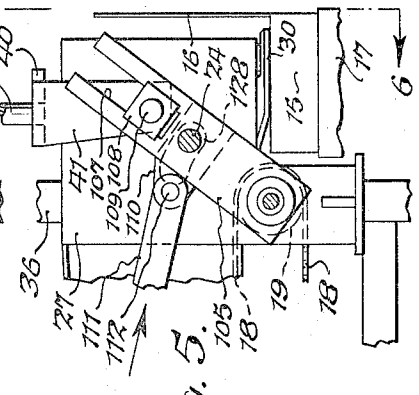


Fig. 5.

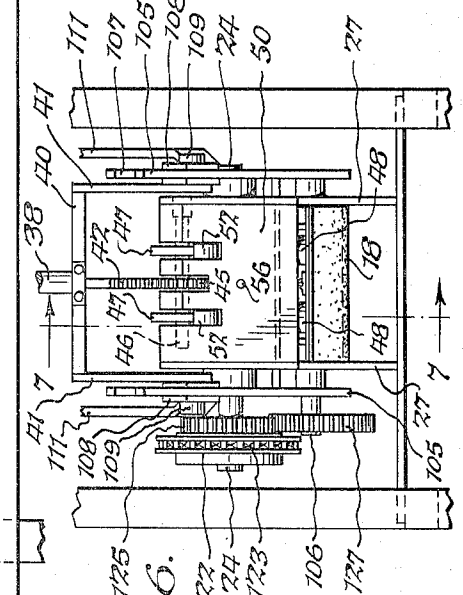


Fig. 6.

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CONTAINER FILLING MACHINE

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Fig. 6.

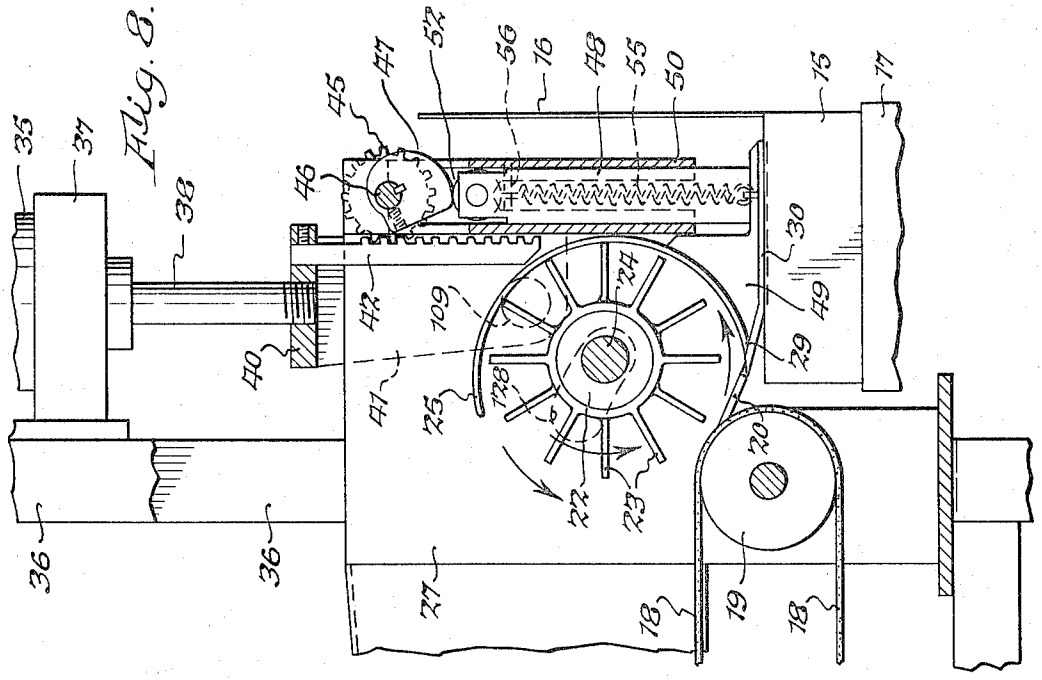
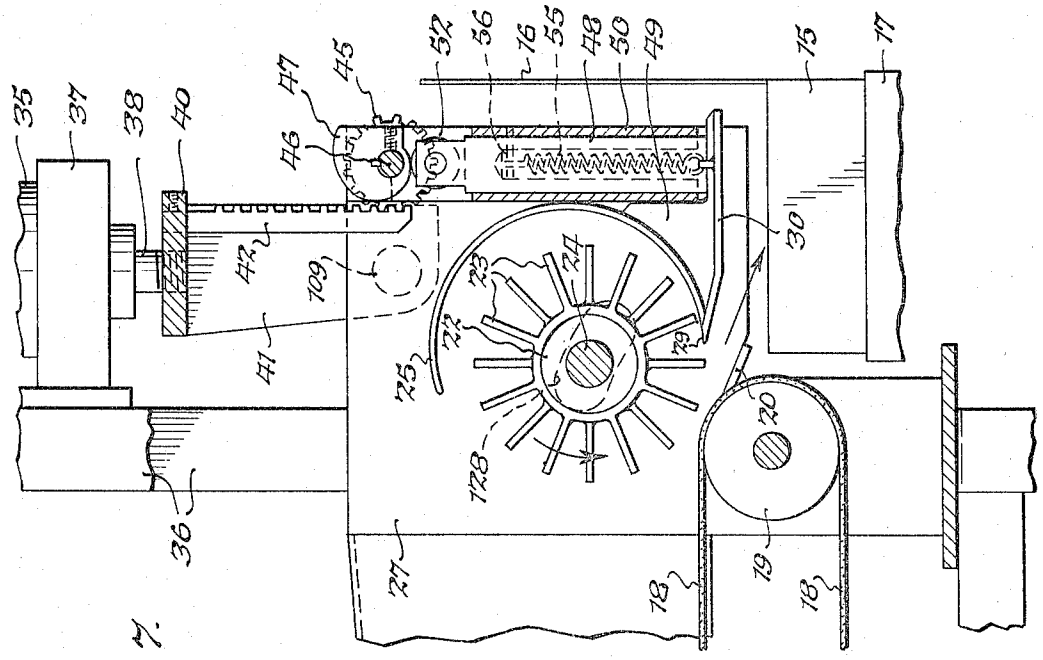


Fig. 7.



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United States Patent Office

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Patented Dec. 6, 1966

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3,289,710

CONTAINER FILLING MACHINE

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9 Claims. (Cl. 141—116)

This invention relates to improvements in machines for filling containers, such as cardboard boxes, with materials to be packed therein.

One of the objects of this invention is to provide a machine which is capable of operating at high speed and of large capacity.

It is also an object to provide a machine of this kind of improved construction for quickly stopping the feeding of material to each container when the desired weight of material has been fed to the same.

Another object is to provide a machine of this type having belts for feeding material to the containers and in which the feeding of material to a belt is also interrupted when a discharge of material from the belt to a container is interrupted.

A further object is to provide a construction by means of which a receptacle for the material is provided to feed the material to a plurality of belts, and in which the feed of material to any belt is interrupted when the discharge of material from the belt is interrupted.

A further object is to provide means of improved construction for discontinuing the feed of material to a container when the same has been filled to the desired extent.

In the accompanying drawings which illustrated by way of example one embodiment of my invention:

FIG. 1 is a top plan view of a container filling machine embodying this invention.

FIG. 2 is an elevation thereof.

FIG. 3 is a sectional elevation of a part of the machine on an enlarged scale on line 3—3, FIG. 1.

FIG. 4 is a fragmentary elevation of a part of the machine.

FIG. 5 is a fragmentary view similar to a part of FIG. 4, but showing the mechanism in a different position.

FIG. 6 is an end view thereof as indicated by the line 6—6, FIG. 5.

FIG. 7 is a sectional elevation thereof on a larger scale on line 7—7, FIG. 6.

FIG. 8 is a view similar to FIG. 7, but showing the parts of the mechanism in different positions.

In the construction illustrated by way of example, the machine is designed to fill containers in the form of boxes or cartons 15 having a top or cover 16 in open position, FIGS. 5, 7 and 8. The boxes or cartons are supported on a scale having a platform 17. The scale may be of any suitable type constructed to actuate a circuit when the carton 15 supported thereon reaches the desired weight. The scale-actuated operating mechanism is not shown in detail since mechanisms of this kind are well known and do not of themselves constitute a part of this invention.

The feeding of material to the carton or container is by means of an endless belt 18 passing over a pulley 19 adjacent to the carton. The material to be discharged into the carton is removed from the discharge end of the belt by means of a scraper 20 of any desired construction, one end of which contacts with the belt and the other end of which terminates over the carton, and the material is removed from the belt and discharged

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into the container by means of a roll 22 having a number of combs or brushes 23 mounted on its periphery. These combs or brushes are preferably made of rubber or other resilient material and their outer ends extend into proximity to the feed belt 18 so that when the roll 22 is rotated by rotation of its shaft 24, the outer ends of the brushes will contact the material on the belt and throw it into the carton or container 15. The shaft 24 may be rotated in any suitable manner.

The roll 22 and the combs or brushes 23 mounted thereon are arranged within a cover or shield 25 arranged between two stationary plates or frame members 27 on which the shaft of the pulley 19 is journalled. The partly cylindrical cover 25 is movable toward and from the discharge end of the scraper 20 to interrupt the supply of material to the box or carton. The lower end 29 of the cover constitutes the cutoff device which is movable from the position shown in FIG. 7 in which the rotary brushes and belt 18 feed the material to the carton, into the position shown in FIG. 8, in which the cutoff part 29 of the housing extends to the end of the scraper 20 and forms substantially a continuation thereof and thus receives material from the scraper. This material is fed by the rotary brushes into the interior of the cover 25 and moved around the interior of the same by the brushes and discharged back through the open part of the cover to the belt 18. The lower end of the cover also has a cutoff plate 30 secured thereto which forms an extension of the cutoff edge of the cover and moves downwardly into the position shown in FIG. 8 to flatten or compact the material supplied to the carton.

The movement of the cover 25 into and out of position to interrupt the feed of material to the box or carton may be effected in any desired manner, and in the construction shown for this purpose I have provided a pneumatic cylinder 35 mounted on a stationary column or frame member 36, for example, by means of the cylinder heads 37. This column constitutes a part of the supporting frame of the machine. Within this cylinder is a plunger 38 connected with a frame or yoke 40 having downwardly extending arms 41 and also provided with a rack 42.

The rack 42 serves to raise and lower the cutoff plate 30 and for this purpose in the construction shown, the rack meshes with a gear 45 mounted on a shaft 46 suitably journalled on a stationary side wall 27. This shaft has mounted thereon two cams 47 which act on upwardly extending columns 48 secured to the cutoff plate 30 through a bracket 49 which is also secured to the cover 25. These upwardly extending columns 48 are guided for vertical movement in a rear wall 50 connected to the two side plates 27. The columns have rollers 52 mounted on the upper ends thereof in position to contact with the cams 47 so that these cams through the columns 48 move the cutoff plate and the cover 25 downwardly from the position shown in FIG. 7 to that shown in FIG. 8. The rollers 52 slide in slots in the upper portion of the rear wall 50.

Upward or return movement of the cutoff plate and cover 25 may be effected in any suitable manner, for example, by means of a spring 55 having its lower end connected with the cutoff plate and its upper end with a stationary pin or support 56 mounted in the rear wall 50.

In the operation of this part of the mechanism, when the box or carton 15 has acquired the desired weight, suitable means are provided for admitting fluid to the cyl-

inder 35 which moves the rack 42 downwardly, thus turning the cams 47 to force the upright columns 48 and cutoff plate 30 downwardly into the position shown in FIG. 8, in which material which is being fed to the discharge end of the conveyor belt is deflected from the scraper 20 to the cutoff part 29 of the cover and thus is moved upwardly into the cover by the brushes 23 and then discharged through the open part of the cover back to the conveyor belt 18.

When an empty box or carton has been placed on the scale platform 17, the movement is reversed, the pressure being provided to the opposite end of the cylinder 35 and the rotation of the gear 45 reversed so that the cams permit the springs to return the cutoff plate and the cover 25 to their upper positions shown in FIG. 7, in which the material from the upper run of the conveyor belt is again discharged across the scraper 20 into the empty carton or box. It will be noted that by moving the cover downwardly relatively to the brush when the cover takes material from the belt, the brush is closer to the cover, thus facilitating the movement of material by the brush within the cover to the belt.

The feeding of material to the belt 18 for discharge into a box or carton may be effected in any desired manner, and in the construction illustrated by way of example, I have shown a bin or receptacle into which the material is deposited. This bin has a rotating bottom 65 from which the material is fed to belts 18 through a series of openings 67 at the peripheral portion of the bottom. The particular bin or container shown is provided with eight discharge outlets 67 each of which supplies material to a belt 18. Only once such belt and the mechanism connected therewith is shown in FIG. 1 and herein described since the others are identical. The spaces between the outlet opens 67 are provided with walls or fences 68 which are stationarily mounted on posts 69 which constitute a part of the frame of the machine. These fences prevent material from being discharged from the rotating plate 65 except through the discharge openings 67.

The material to be boxed and weighed is dropped on a rotating, conical-shaped distributor 66 located above the middle of the bin which rotates at a speed considerably greater than that of the bottom 65 of the bin, so that the material dropped thereon is thrown outwardly by centrifugal force.

The bottom 65 of the bin or container, which is preferably approximately horizontal, is preferably supported at intervals by rollers or wheels 70 mounted on a circular supporting rail 71 and extending above this rail to a sufficient extent to engage the undersurface of the bottom 65 of the bin. Rotation is transmitted to the bottom of the bin through a hollow shaft 73 which, as shown in FIG. 2, has a pulley 74 mounted thereon which is rotated by means of a belt 75 which receives rotation from a pulley 77 fixed to a drive shaft 76 mounted on the frame of this machine. This shaft is driven by a motor 78 through a worm 79 and a worm gear 80. This hollow shaft 73 may be secured to the rotating platform 65 of the bin in any usual or suitable manner.

Within the hollow shaft 73 is another shaft 83 which connects with a conical distributing member 66. This shaft 83 is also driven through a belt drive 84 from the drive shaft 76 at a speed materially higher than the speed of the bottom 65 of the bin. Consequently material which is dropped on the top of the conical distributor 66 is discharged partly by the inclined conical face of the distributor and partly because of centrifugal force to parts of the bin bottom 65.

To ensure that the material is distributed to the edge portion of the rotating bottom 65 to be discharged through the openings 67, I have provided for each discharge opening 67 a spirally shaped spreader 87. One of these spreaders is provided for each discharge opening 67 and the spreaders are held stationary with reference to the rotation of the bin bottom and are mounted to enable the outer portions thereof to be moved out of their operative positions in the event that no material is to be delivered to any of the belts 18. These spreaders 87 are pivotally mounted at their inner ends on arms 88 radiating outwardly from a hub 89 mounted on a tube or bearing 90 through which the shaft 83 passes and which is mounted in a frame member 91. Each of the spreaders is pivotally supported on two of the radiating arms 88. This pivotal mounting is such that each spreader may swing about its pivotal support to a limited extent upwardly from its operative position to permit the material to pass under the spreader without being deflected outwardly. The lower edges of the spreader are preferably provided with soft, non-metallic strips or, if desired, the spreaders themselves may be made of such material to avoid excessive friction with the revolving bottom plate 65.

It has been found very desirable to control the loading of the belts approximately in accordance with the amount of material withdrawn from the belts so as to avoid excessive accumulation of material on the belts. For this purpose each spreader is provided at the outer end thereof with means for lifting it upwardly into approximately the broken line position shown in FIG. 3, thus permitting material to pass under the spreader without being deflected radially to any appreciable extent to the belt with which the spreader cooperates. For this purpose, in the construction shown, each spreader is provided at the outer end thereof with an upwardly extending strip 95 having a hole near the upper end through which a pin 96 extends, this pin forming a connection between the strip 95 and a socket member 97 adjustably connected with a screw threaded stem or bolt 98 with a lifting member or arm 100.

In order to raise the outer end of a spreader at the same time that the supply of material to a box or carton is interrupted by the cutoff plate 30, the following construction may be employed. The downwardly extending arms 41 of the yoke 40 which are raised and lowered by fluid pressure in the cylinder 35, are connected at their opposite ends to levers 105 pivotally mounted to swing about a fixed axis, such for example as the shaft 106 on which the pulley 19 of the feed belt 18 is mounted. These levers are provided at their upper ends with slots 107 inclined to the horizontal, and each of the arms 41 is provided adjacent to its lower end with a slide 108 which is movable in the slot 107. Each arm 41 has a pivot or pin 109 pivotally connected with a slide 108 which is movable lengthwise of the slot 107 in the lever 105. Consequently as the slide member moves vertically downwardly, each lever 105 will be swung to its pivotal connection with the shaft 106 from the position shown in FIG. 4 to that shown in FIG. 5.

Each lever 105 has a strap 110 secured thereto to which a link 111 is pivotally connected at 112. The two links 111 are connected at their other ends to arms 113 pivoted on a frame member of the machine and secured to the lifting member 100 and an arm 101 extending parallel thereto. Consequently, it will be obvious that when the levers 105 are swung into the position shown in FIG. 5, in which the cutoff plate receives material from the belt 18 instead of having it discharged to a box, the lifting member 100 and the arm 101 will be moved upwardly into the broken line position shown in FIG. 4, in which the spreader suspended therefrom will be lifted to interrupt the flow of material to the belt 18.

Motion may be supplied to the belt 18 in any suitable manner, for example, the motor 120 is mounted on the lifting member 100 and is consequently movable therewith, FIG. 2. The shaft of this motor has a sprocket wheel mounted thereon which drives a sprocket chain 122 connected to a sprocket wheel 123, FIG. 6, to which a gear 125 is secured. The sprocket wheel and gear 125 are secured to the shaft 24 on which the roll 22 and brush 23 are secured, this shaft being journalled in the

two levers 105. The gear 125 meshes with a gear 127 secured on the shaft 106 which drives the belt 18.

The mounting of the drive shaft 24 of the roll and brush has several advantages. In the first place it maintains the sprockets over which the sprocket chain 122 passes at approximately equal distances apart in both positions, thus avoiding slack in the chain. In the second place, by shifting the axis of rotation of the brush 23 from the position shown in FIG. 7 to that shown in FIG. 8, it will be obvious that the brush can best feed the material from the belt 18 over the scraper 20 into the box or carton to the position shown in FIG. 7, while in the position shown in FIG. 8, the brush can better feed the material from the scraper 20 into the cover 25 for return to the feed belt 18.

In order to permit movement of the shaft 24, the side walls 27 between which the brush operates are provided with arc-shaped openings 128 through which this shaft extends, which openings are substantially covered by the roll 22.

In order to ensure the feeding of material to the receiving end of the belt 18, two or more paddles 130 are preferably provided with the ends of the paddles extending into proximity to the rotatable bottom 65 of the bin. These paddles are mounted on a shaft 131 rotatably supported on the lifting member 100 and the arm 101 and also driven from the motor 120, for example, by means of a belt 133, FIG. 2, which operates on a pulley 134 secured to a shaft 131 rotatably mounted on the lifting member 100 and arm 101. Consequently the motor 120 transmits rotation to the paddles 130, and when the link 111 shifts the lifting member 100 and arm 101, the paddles 130 will also be raised to avoid passing material from the revolving base 65 of the bin to the belt 18. The lifting of the paddles 130 into their inoperative positions is accomplished by the motion of the motor 120 through the same angle so that the belt 133 will be maintained at the proper tension.

By means of the machine described, the feed of material to the boxes or containers is automatically controlled so that excessive material on the feed belts 18 is avoided, regardless of the rate at which material is fed to the receiving bin. The feeding and removal of the boxes or containers to and from the scale platform 16 may be accomplished in any well known manner, for example, by passing the same along a track 140, FIG. 1.

It will be understood that various changes in the details, materials and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

1. A container filling machine including a belt for carrying material to its discharge end for deposit in a container,
- a cutoff part on said machine movable into position to remove material from said belt when the container is filled to the desired extent and for returning the removed material to said belt,
- a bin at the receiving end of said belt in which material is deposited and having a discharge opening for passage of material to said belt,
- a connection between said cutoff part and the receiving end of said belt for interrupting the passage of material from said discharge opening of said bin to said belt when the discharge of material from said belt is interrupted, said bin having a revolving bottom for carrying the material to the receiving end of said belt,
- and a spreader over said bottom for deflecting material to a discharge opening of said bin,
- said connection including means for raising said spreader out of contact with the material on said revolving bottom for interrupting the passage of material to the receiving end of said belt when the discharge of material from said belt to a container is interrupted.

2. A container filling machine including a bin of substantially circular form having a revolving bottom and a plurality of discharge outlets at its periphery,
- a belt for each discharge outlet having its receiving end positioned to receive material from an outlet,
- a cutoff device at the discharge end of said belt for interrupting the discharge of material to a container when the container has been filled,
- means for moving said cutoff device into and out of position to receive material from said belt,
- a linkage between said moving means and said bin for interrupting the discharge of material from said bin to the receiving end of said belt when said cutoff device interrupts the discharge of material to a container,
- a plurality of spreaders over said bottom for deflecting material to the discharge openings of said bin,
- and means for raising said spreaders out of contact with the material on said revolving bottom for interrupting the passage of material to the receiving enl of said belt when the discharge of material from said belt to a container is interrupted.

3. A container filling machine according to claim 2 and including means associated with said cutoff plate for returning material to said belt when a container has been filled.

4. In a container filling machine including a belt for carrying material to its discharge end,
- a rotary brush mounted above the discharge end of said belt for brushing material from said belt into a container,
- a partly cylindrical cover for said brush,
- and means for moving said cover into and out of a position to interrupt the flow of material to a container by removing material from the discharge end of said belt,
- said means also moving said cover into closer proximity to said brush for feeding material received by said cover back to said belt.

5. A container filling machine according to claim 4 and including means for also moving said brush into closer proximity to said cover.

6. A container filling machine according to claim 4, in which said cover moving means include
- a pair of levers on which said rotary brush is journalled, said levers being connected to said cover moving means for moving said brush closer to said cover when said cover is moved into position to receive material from said belt.

7. A container filling machine according to claim 6 and including a bin at the receiving end of said belt for supplying material thereto,
- means for controlling the supply of material from said bin to said belt,
- and linkage connected with said levers for actuating said controlling means to interrupt the supply of material from said bin to said belt when said cover is in position to receive material from said belt and for supplying material to said belt when material is being supplied to a container.

8. A container filling machine according to claim 7 and including
- paddles for sweeping material from said bin to the belt,
- and means actuated by the swinging of said levers to move said cover into position to receive material from said belt which raise said paddles above the material in said bin to avoid feeding of material to said belt when said cover removes material from the discharge end of said belt.

9. In a container filling machine including a belt for carrying material to its discharge end,
- a rotary brush mounted above the discharge end of

said belt for brushing material from said belt into a container,

a partly cylindrical cover for said brush,

a cutoff plate rigidly connected with said cover,

power actuated means for moving said cover cutoff plate into position to receive material from the discharge end of said belt when a container is filled to feed the material so received to the interior of said cover into position to be carried by said brush back to said belt,

a pair of levers on which said brush is journalled,

and connections between said power actuated means and said levers to swing said levers into closer proximity to said cover.

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