Nov. 25, 1952 C. B. McHALE ET AL 2,619,271

BAG HOLDING AND PACKAGING MACHINE

Filed June 5, 1947 6 Sheets-Sheet 1

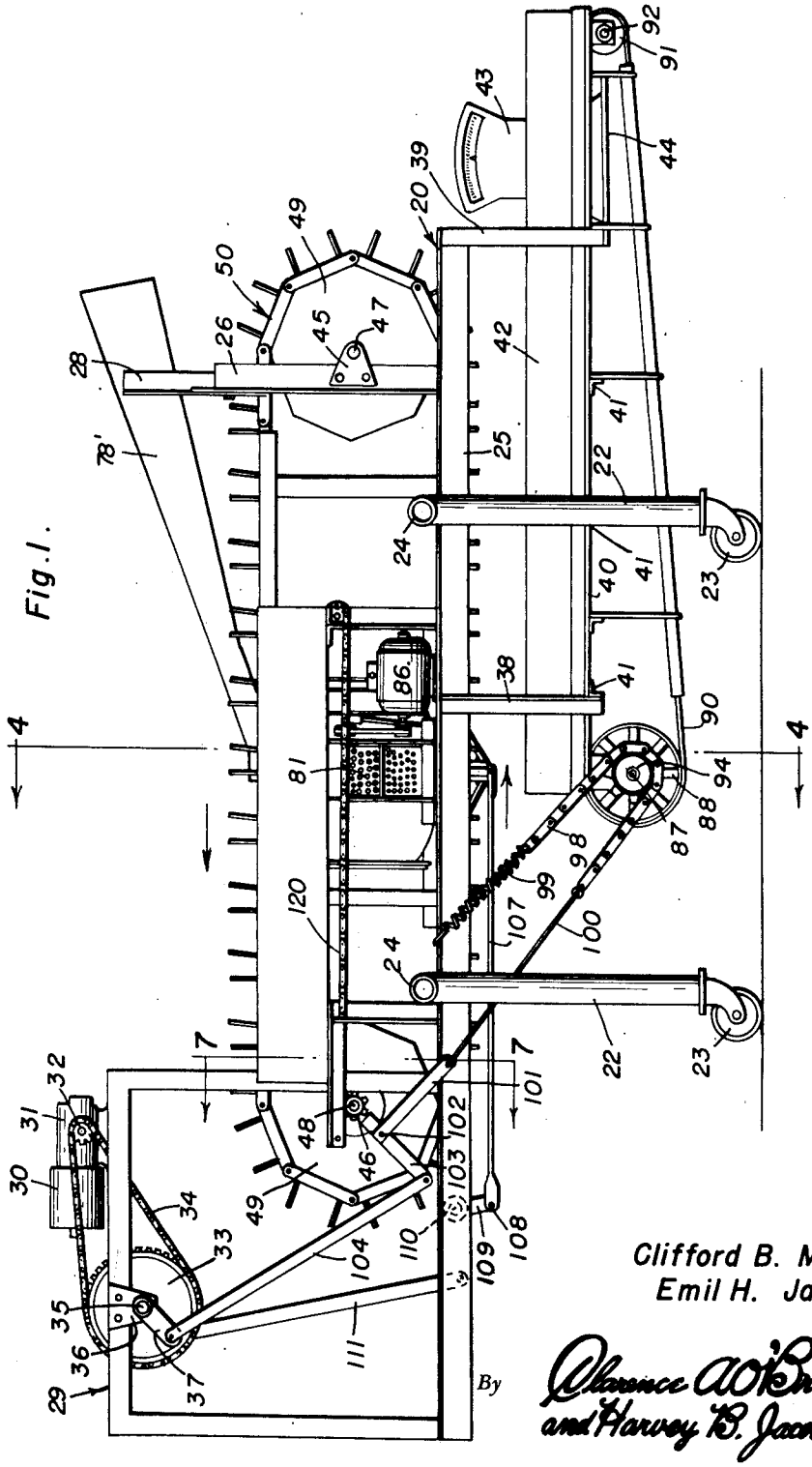


Fig. 1.

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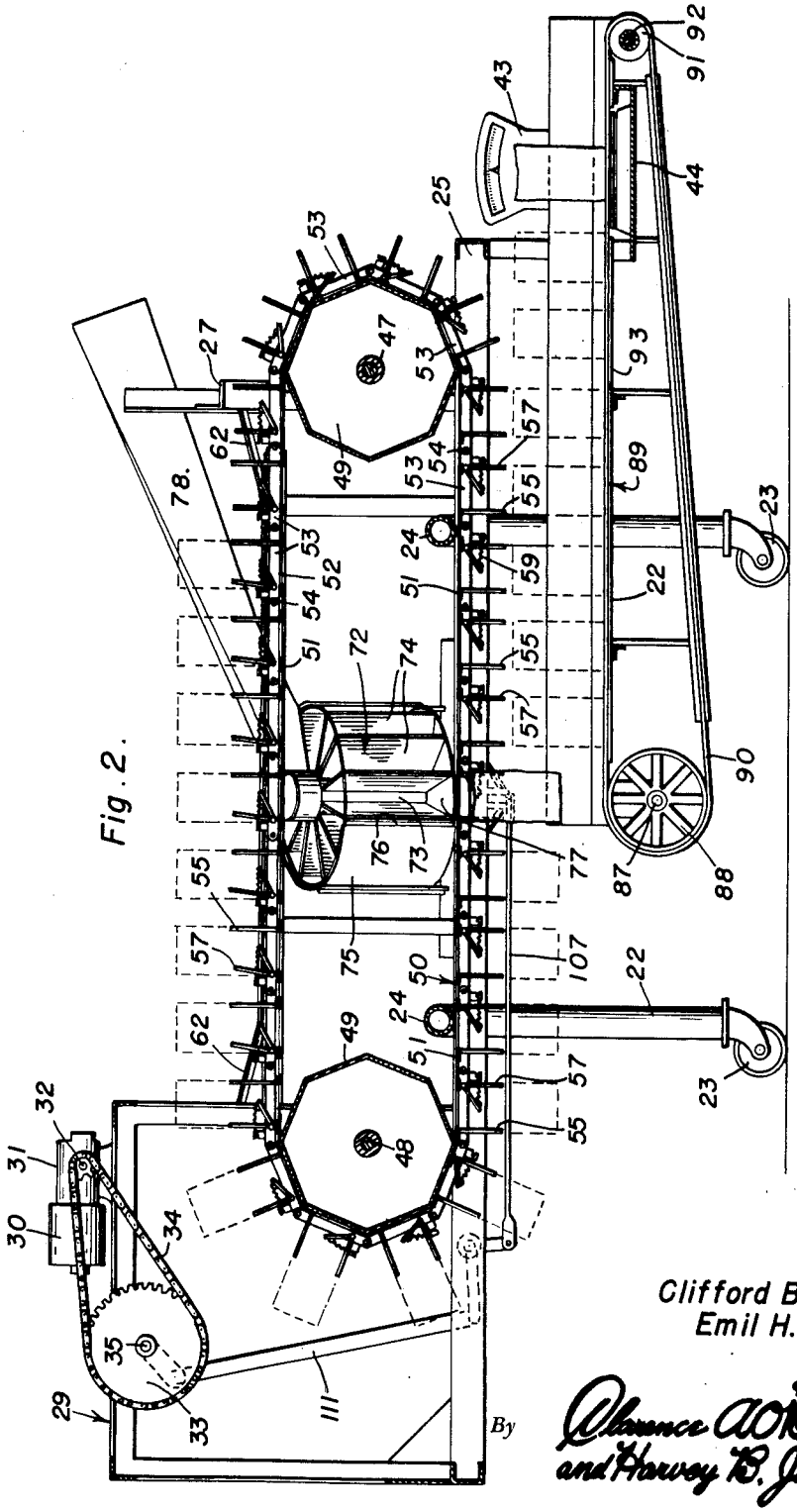


Fig. 2.

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BAG HOLDING AND PACKAGING MACHINE

Filed June 5, 1947 6 Sheets-Sheet 3

Fig. 4.

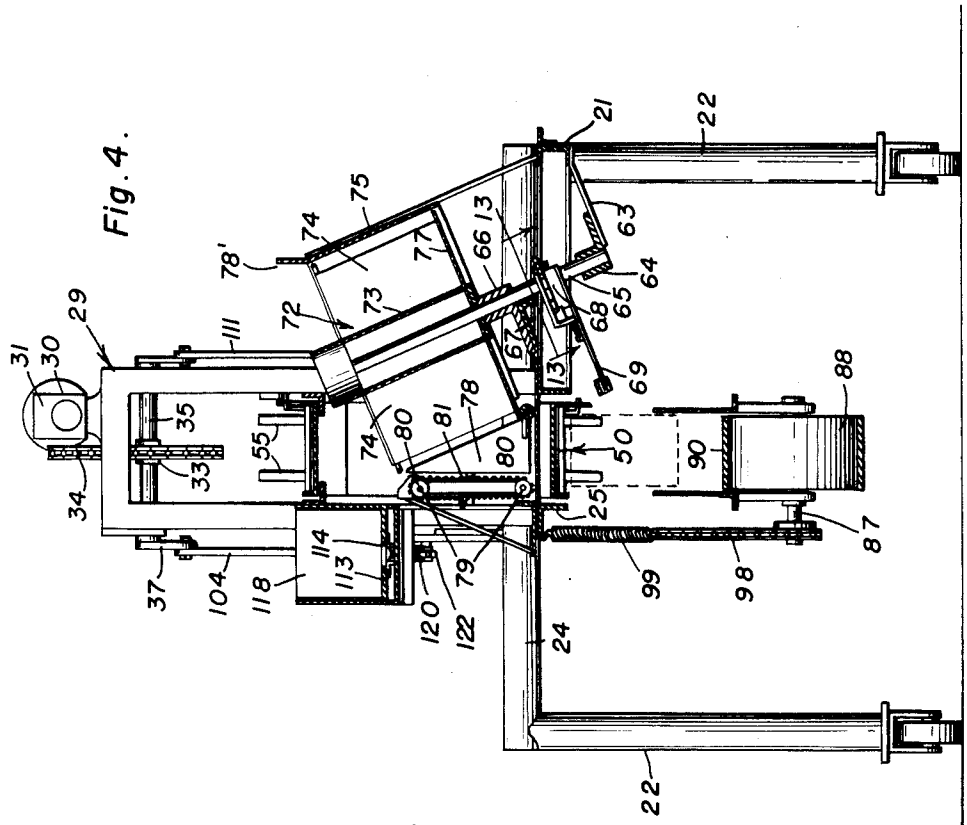
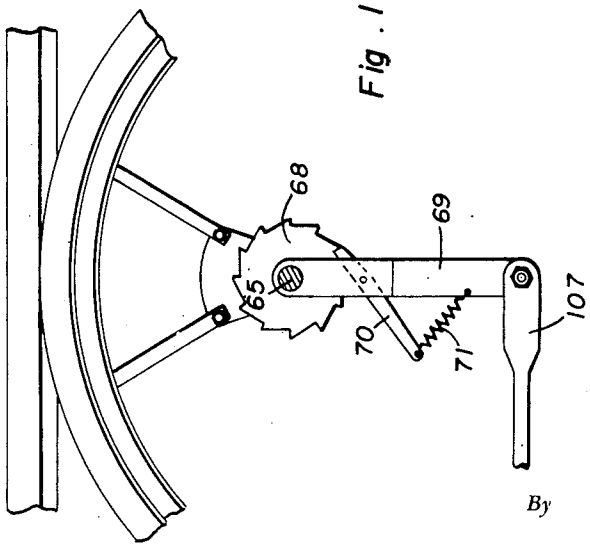


Fig. 13.



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BAG HOLDING AND PACKAGING MACHINE

Filed June 5, 1947 6 Sheets-Sheet 4

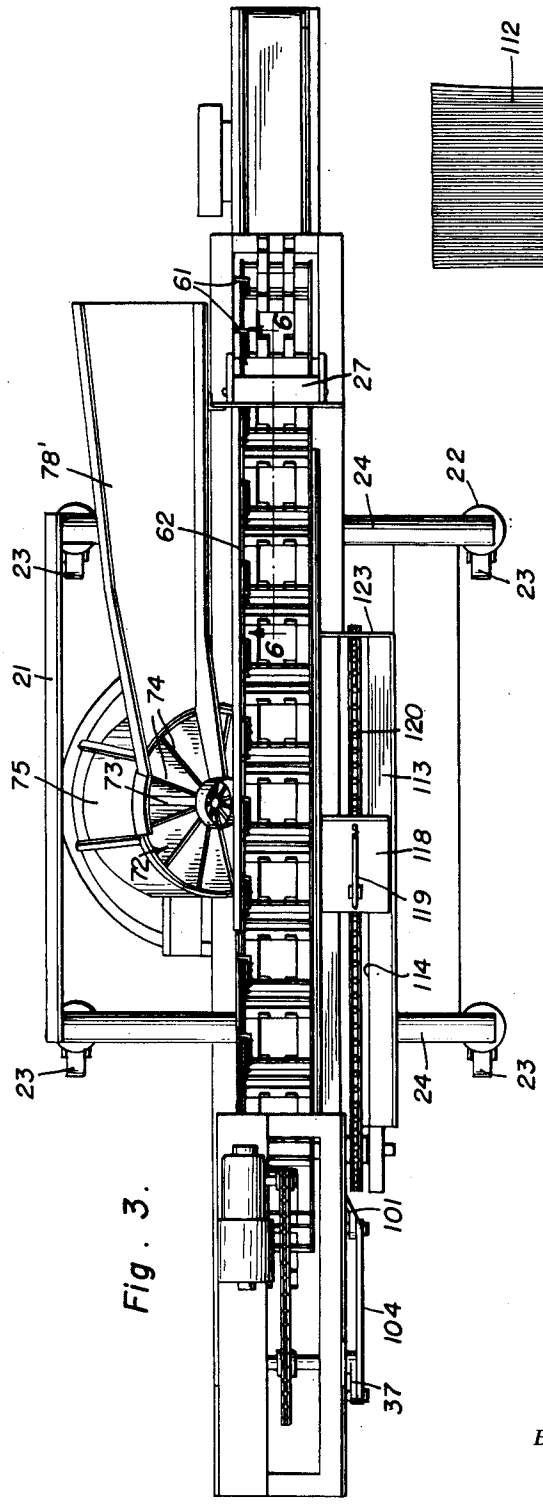


Fig. 3.

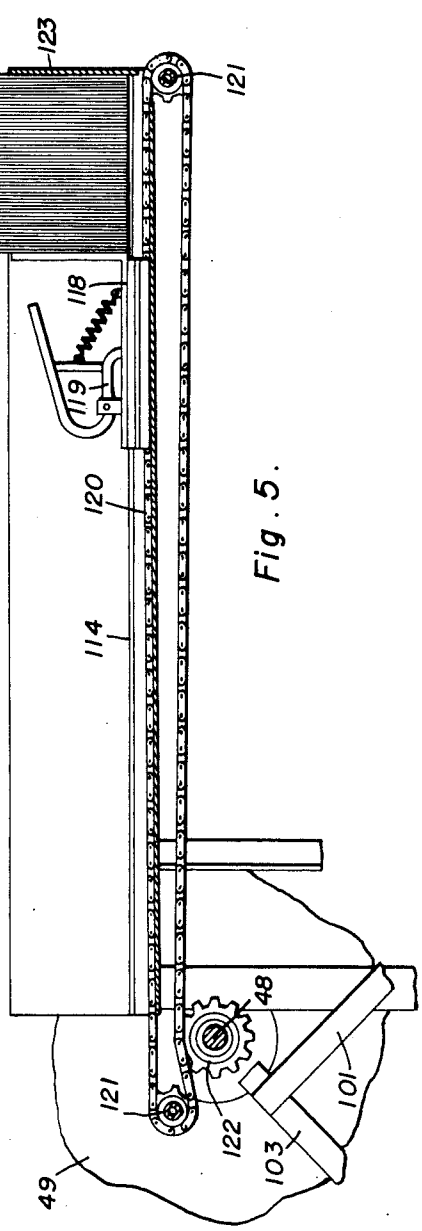


Fig. 5.

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Nov. 25, 1952 C. B. McHALE ET AL 2,619,271

BAG HOLDING AND PACKAGING MACHINE

Filed June 5, 1947 6 Sheets-Sheet 5

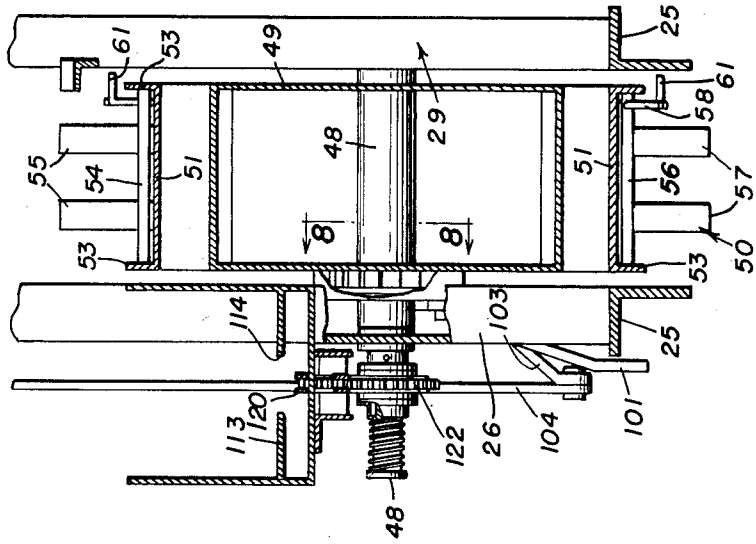


Fig. 7.

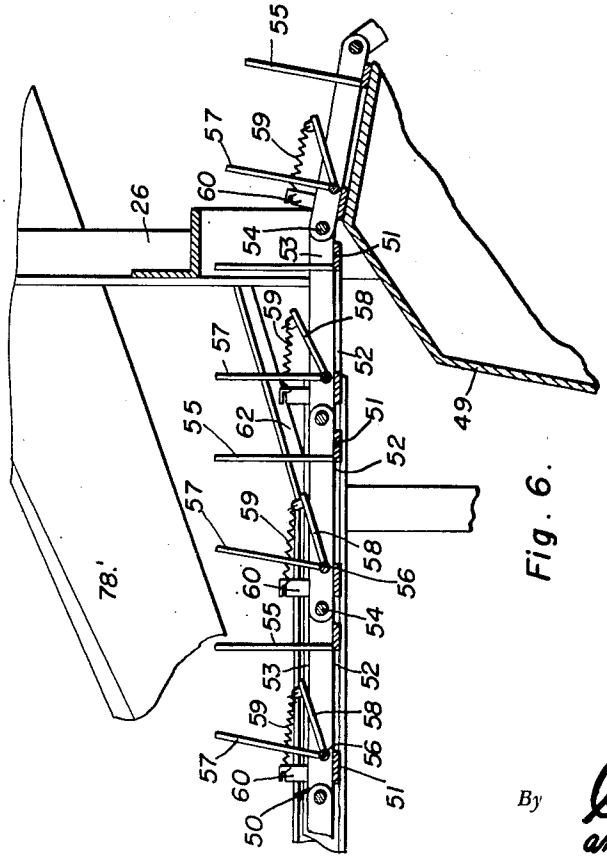


Fig. 6.

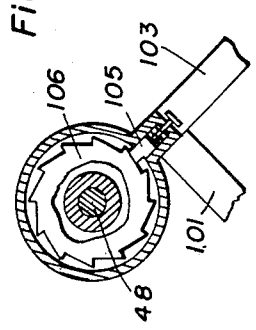


Fig. 8.

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BAG HOLDING AND PACKAGING MACHINE

Filed June 5, 1947 6 Sheets-Sheet 6

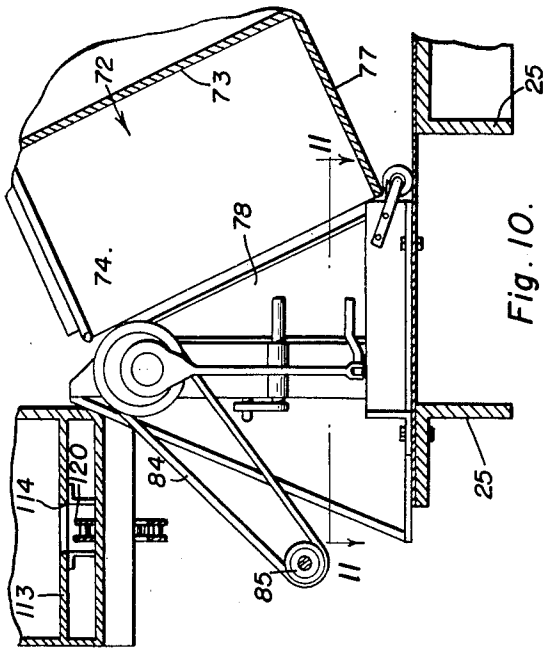


Fig. 10.

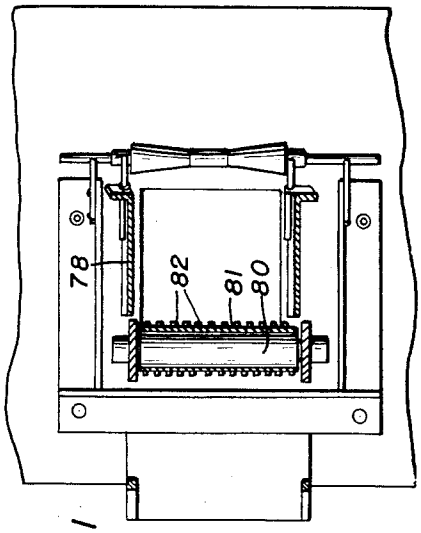


Fig. 11

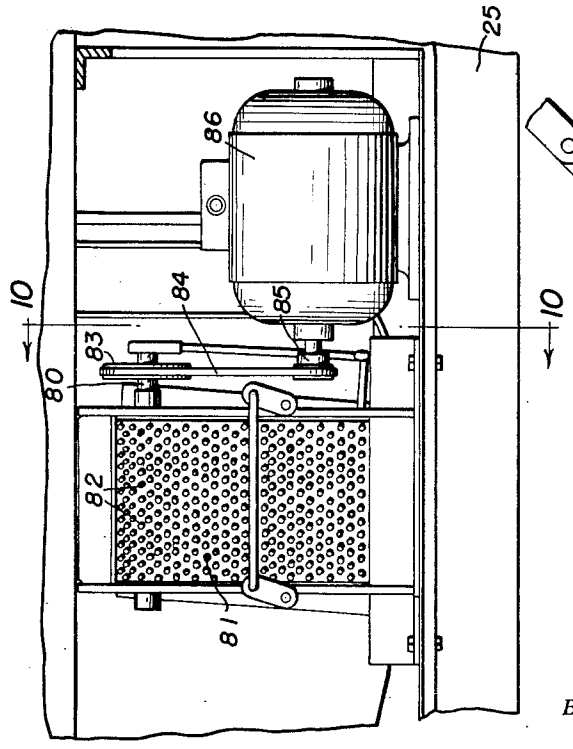


Fig. 9.

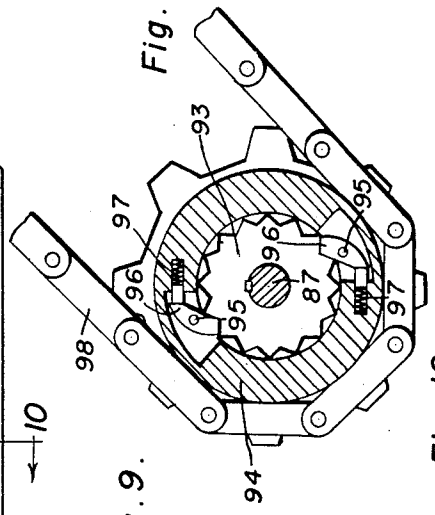


Fig. 12.

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Patented Nov. 25, 1952

2,619,271

UNITED STATES PATENT OFFICE

2,619,271

BAG HOLDING AND PACKAGING MACHINE

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Application June 5, 1947, Serial No. 752,618

4 Claims. (Cl. 226—59)

1

This invention relates to a packaging machine and more particularly to a machine for packaging produce such as potatoes, apples, oranges, and the like, and has for its primary object to dispense with much of the hand labor involved in introducing articles of merchandise, such as those mentioned above, into sacks ready for distribution.

Another object is to introduce a measured quantity of the articles to be packaged into a sack of suitable capacity and then to weigh the package and subsequently tie and distribute it.

A still further object is to deposit the articles promiscuously in a chute down which they flow to the measuring feeder and to loosen the articles and prevent their clogging in the feeder during their discharge therefrom.

The above and other objects may be attained by employing this invention which embodies, among its features, a sack conveyor adapted to advance empty sacks in succession toward a sack-filling station, means on the conveyor to hold a group of sacks in upright position with the upper, open ends extended, a feeder at the sack-filling station successively to discharge measured charges of the articles to be packaged into the extended open upper ends of the sacks and means to release the filled sacks from the conveyor as they recede from the sack-filling station.

Other features include a package conveyor upon which the filled sacks are deposited upon their release from the sack conveyor, means on the sack conveyor for supporting sacks with their open ends extended, and a weighing scale over which the package conveyor travels and by which the weight of the contents of each individual sack deposited thereon may be determined.

Still other features include a group of orifice plates linked together to form a sack conveyor, means on each plate to support a sack with its open end extended and in alignment with the orifice therein and a feeder beneath which the sacks supported on the conveyor are moved, and means associated with the feeder for loosening the articles contained therein during their discharge therefrom.

In the drawings,

Figure 1 is a side view of a packaging machine embodying the features of this invention,

Figure 2 is a longitudinal sectional view through the packaging machine illustrated in Figure 1,

Figure 3 is a top plan view of the packaging machine,

2

Figure 4 is a transverse sectional view taken substantially along the line 4—4 of Figure 1,

Figure 5 is an enlarged longitudinal sectional view through the sack-holding and feeding device,

Figure 6 is an enlarged fragmentary sectional view through the sack conveyor,

Figure 7 is an enlarged sectional view taken substantially along the line 7—7 of Figure 1,

Figure 8 is a fragmentary sectional view taken substantially along the line 8—8 of Figure 7 on a somewhat enlarged scale,

Figure 9 is a fragmentary enlarged view of the machine showing the article loosening apron and the drive mechanism therefor in detail,

Figure 10 is a sectional view taken substantially along the line 10—10 of Figure 9,

Figure 11 is a horizontal sectional view taken substantially along the line 11—11 of Figure 10,

Figure 12 is an enlarged sectional view through the drive ratchet for the sack feeder, and

Figure 13 is a fragmentary enlarged view of the main drive ratchet.

Referring to the drawings in detail, a main frame, designated generally 20, comprises a side rail 21 which is supported on suitable legs 22 preferably equipped with caster wheels 23. These legs are joined at their upper ends by transversely extending cross bars 24, and extending between the cross bars in spaced parallel relation are side bars 25 of a conveyor to be more fully hereinafter described. Rising from the side bars 25 near one end are standards 26 which are joined at their upper ends by a cross bar 27 carrying, adjacent one end, an upright 28. A frame designated generally 29 is mounted on the side bars 5 adjacent the end remote from that near the standards 26, and mounted on this frame is a suitable drive motor 30 which is coupled to a speed reduction gearing 31 carrying a drive sprocket 32 which has driving connection with a main drive sprocket 33 through the medium of an endless chain 34. This drive sprocket 33 is fixed to a crank shaft 35 mounted in suitable bearings 36 at the upper end of the frame and carries at opposite ends crank arms 37 and 37', the purpose of which will be more fully hereinafter explained. Depending from the side bars 25 at a point substantially midway between opposite ends thereof are hangers 38 which cooperate with hangers 39 adjacent the ends of the side bars 25 opposite that carrying the frame 29, and carried by the lower ends of the hangers 38 is a table 40 which is provided at spaced intervals with transversely extending stiffening angles 40.

As illustrated, the table 40 projects beyond the ends of the side bars 25 to which the hangers 39 are attached, and extending along opposite sides of the table are side boards 42 which act as guides for the filled sacks, as will be more fully hereinafter explained. The end of the table which projects beyond the hangers 39 is recessed to receive the platform of a weighing scale 43 which is supported on a sub platform or table 44 suspended from the underside of the table 40.

Mounted in suitable bearing brackets 45 and 46, respectively, carried by the standards 25 and the frame 29, respectively, are transversely extending shafts 47 and 48. Mounted on each shaft 47 and 48 for rotation therewith is an octagonal drum 49 over which the sack conveyor, designated generally 50, is trained.

The sack conveyor 50 above referred to comprises a plurality of plates 51 each of which is formed with a centrally located orifice 52 of rectangular configuration. Welded or otherwise attached to opposite sides of each plate 51 are links 53, pierced at opposite ends with aligning openings for the reception of hinge pins 54 by which the plates may be joined together to form a continuous conveyor chain. Welded or otherwise attached to each plate adjacent one end of its respective orifice 52 are spaced parallel supporting arms 55 which extend perpendicular from the face of the plate to which they are attached. Pivoted, as at 56, to each plate 51 adjacent the edge of the orifice 52 therein opposite that adjacent which the arms 55 are attached is a pair of spaced parallel swinging arms 57 which are adapted to move toward or away from the arms 55 in uniseon. A lever arm 58 extends from the pivot 56 of the arms 57, at one side of its respective orifice plate, and fixed adjacent the free end of the lever arm 58 is one end of a retractile coil spring 59, the opposite end of which is anchored to an anchor post 60 so that the arms 57 are yieldingly urged away from the arms 55. Carried by each arm 58 and extending laterally beyond the side edge of the conveyor 50 formed by the orifice plates 51 is a finger 61 (Fig. 7) by means of which the arm 58 is moved to advance the arms 57 toward the arms 55 against the influence of the springs 59. These fingers are adapted to engage a cam rail 62 which extends between the standards 26 and the frame 29 along one side of the machine and adjacent the upper run of the conveyor 50. It will thus be seen that for the major length of the upper run of the conveyor 50 the free ends of the arms 57 will be moved toward the free ends of the arms 55 against the influence of the springs 59. In this way, sacks may be placed in an inverted position on the upper run of the conveyor 50 with the arms 55 and 57 of each orifice plate entering the open end of an inverted sack. As the sack is moved along the conveyor and beyond the end of the cam rail 62, the fingers 57 are permitted to move under the influence of the springs 59 in order to extend the mouth of the sack and support the sack by friction on the arms 55 and 57 as its becomes righted in passing around the octagonal drum 49 on the shaft 48 adjacent the drive end of the machine.

Supported on the side bar 21 intermediate the ends thereof is a bracket 63 which projects inwardly toward the conveyor 50. This arm 63 extends downwardly and carries at the end opposite that attached to the rail 21 a socket 64 in which a post 65 is mounted. A similar bracket 66 is attached to a supporting rail 67 which extends parallel to the side rail 21 between the side rail and the conveyor 50. The openings through the sockets 64 and 66 align with one another, and the axes thereof incline at an angle to the vertical, so that the shaft 65 inclines upwardly and inwardly toward the longitudinal axis of the conveyor 50. The shaft 65 has secured thereto between the brackets 64 and 66 a suitable ratchet wheel 68, and mounted for oscillation about the shaft 65 adjacent the ratchet wheel 68 is a lever arm 69 carrying a dog 70, one end of which is adapted to engage the periphery of the ratchet wheel 68 while one end of a retractile coil spring 71 is coupled to the opposite end of the latch dog. The end of the spring remote from that coupled to the latch dog is connected to the lever arm 69 so that as the lever arm is oscillated about the axis of the shaft 65, the ratchet wheel 68 will be turned in one direction.

Secured to the shaft above the uppermost socket 66 is a rotary unit designated generally 72 which comprises a tubular core 73 fixed to the shaft for rotation therewith. Extending radially from the core 73 are radially spaced partition walls 74, and surrounding the rotary element 72 is a jacket 75 of substantially cylindrical form. This jacket 75 lies concentric with the axis of the shaft 65, and is formed with a discharge opening 76 which is located over the conveyor 50. A suitable bottom 77 closes the lower ends of the compartments formed by the radial walls 74, and rotates with the walls 74 and core 73. Mounted directly above the uppermost end of the rotary feeder element 72 is the discharge end of an article chute 78' so that articles deposited in the chute will move downwardly and drop by gravity into the uppermost compartment formed between the radiating walls 74.

In order to facilitate the discharge of the articles from the compartments of the rotary element 72, we provide a guide funnel 78 comprising a pair of spaced parallel wings, between the upper and lower ends of which extends shafts 79 carrying rollers 80 over which an endless belt 81 is trained. This endless belt is provided with spaced knobs 82 which project outwardly therefrom, and the belt forms the end wall which closes the end of the funnel 78 opposite that facing the rotary feeder 72. The uppermost drive shaft 80 of the endless belt 81 extends beyond one end of the funnel and has connected thereto a drive pulley 83 which has driving connection through the medium of an endless drive belt 84 with the drive pulley 85 carried on one end of the drive shaft of an electric motor 86. It will thus be seen that with the motor 86 in operation, the belt 81 will be driven so that the contents of the compartments of the feeder 72 are discharged through the opening 76 in the wall 75, they will contact the lugs 82 on the belt 81 so as to be agitated and thereby loosened for discharge into a sack through an orifice 52 in the conveyor 50.

Mounted for rotation directly beneath the sack filling station, i. e., the discharge opening 76 on a shaft 87, is a drive pulley 88 of a package conveyor, designated generally 89. This package conveyor comprises an endless belt 90 which is trained over the drive pulley 88 and an idler pulley 91 which is mounted for rotation about a shaft 92 extending transversely of the machine at a point beyond the shaft 47 of the drum 49. The upper run of the bolt 90 runs over the table 40 previously described which forms a support therefor. As illustrated, the upper run of the

belt 90 passes over the platform of the scale 43 so that filled sacks deposited on the package conveyor 89 will pass across the scale platform before they are discharged from the machine. In this way, the weight of the packages may be determined.

In order to drive the drive pulley 33 and the shaft 37 thereof, we mount adjacent one end of the shaft a ratchet wheel 93 around which a sprocket 94 rotates. This sprocket carries at diametrically opposite points pivots 95 upon which dogs 96 are mounted for engagement with the teeth of the ratchet wheel 93. These dogs are yieldingly urged into engagement with the teeth of the ratchet wheel 93 by means of compression coil springs 97, so that when the sprocket wheel 94 is rotated in one direction, the ratchet wheel 93 will be driven, but when the sprocket is rotated in the opposite direction, the ratchet wheel 93 will remain at rest.

Trained around the sprocket 94 is a chain 98, one end of which is connected to one end of a retractile coil spring 99, the opposite end of which is coupled to a side rail 25 near the frame 29. The opposite end of the chain 98 is connected by means of a flexible member 100 to a pull rod 101 which is pivoted at 102 to a lever arm 103 which is mounted to oscillate about the shaft 48. The end of the lever arm 103 opposite that mounted on the shaft 48 is connected by means of a link 104 to the end of the crank arm 37 opposite that coupled to the shaft 35. It will thus be seen that as the drive wheel 33 is rotated, the link 104 will oscillate the arm 103, thus alternately exerting pull on the flexible member 100, and the end of the chain 98 connected therewith. In this way, the sprocket 94 will be rotated about the axis of the shaft 37 first in one direction under the influence of the pull on the flexible member 100, and then in the opposite direction under the influence of the spring 99. In this way, the belt 90 is advanced with a step-by-step motion longitudinally along the upper side of the table 93 toward the weighing scale 43. As illustrated in Figure 8, the end of the lever arm 103 which rocks about the shaft 48 is provided with a spring-pressed latch dog 105 which is adapted to engage the teeth of a sprocket wheel 106 carried by the shaft 48, so that as the arm 103 oscillates, the shaft 48 will be driven in one direction, with a step-by-step motion so as to advance the conveyor 50 with a step-by-step motion in the direction of the arrows. Coupled to the lever arm 69 is one end of a link 107, the opposite end of which is pivoted, as at 108, to one arm of a bellcrank lever 109 which is pivoted at 110 to the side rail 25 opposite that to which the spring 99 is coupled. The opposite arm of the bellcrank lever 109 is pivotally connected to one end of a link 111, the opposite end of which is pivotally connected to the crank arm 37' mounted on the end of the shaft 35 opposite the crank arm 37. It will thus be seen that as the drive wheel 33 is rotated, the link 107 will be reciprocated so as to alternately exert pull on the lever arm 69 and drive the shaft 65 with a step-by-step motion.

In order conveniently to hold sacks 112 (Fig. 5) in a position for an operator to supply them to the conveyor 50, we provide a platform 113 having a longitudinal slot 114 (Fig. 7) through which a suitable follower 118 projects. This follower slides longitudinally in the slot 114 and is provided with a hand-actuated clutch pin 119 which is adapted to engage between the links of an endless conveyor chain 120. This chain is trained over guide sprockets 121 mounted adjacent opposite ends of the platform 113, and engaging the lower run of the conveyor chain 120 is a sprocket wheel 122 which is mounted on the shaft 48 to be driven in unison therewith. It will thus be seen that the empty sacks stacked on the platform 113 will be compressed by the follower 118 against an end wall 123, and held in a position easily to be removed by an operator and mounted on the supporting arms 55 and 57 of the conveyor 50.

In use, it will be understood that a sack is selected from the group of sacks 112 on the sack holder and, after having been opened, is inverted so that the fingers or arms 55 and 57 of an orifice plate 51 enter the open mouth of the sack on the upper run of the conveyor 50. As the conveyor is advanced around the drum 49 on the shaft 48, the fingers 61 controlling the arm 57 on the respective orifice plates pass beyond the end of the cam rail 62, thus allowing the spring 59 of the respective orifice plates to move the arms 57 to hold the sack extended. In its extended position, the sack moves with the conveyor around the drum 49 on the shaft 48 until it is righted, and in this position, it is advanced toward the feeder 72. The articles to be packaged are deposited in the chute 78' and flow downwardly therein to the discharge end thereof where they enter a compartment of the feeder. Oscillation of the arm 69 by means of the link 107 causes the feeder to be rotated so that the filled compartment is eventually moved into alignment with the discharge 76, and the contents of the compartment are discharged through the opening 76 and the orifice 52 in an orifice plate 51 which aligns with the feeder, to be deposited in the bag or sack supported on arms 55 and 57 on the respective orifice plate. The discharge of the articles is aided by setting the motor 86 into operation so as to drive the apron 81 and loosen the articles in order readily to discharge them from the compartment in the feeder. As soon as the bag or sack has received its charge of articles, it moves by gravity in a vertical path onto the belt 90 of the package conveyor. The package is then advanced in a step-by-step motion on the belt 90 toward the weighing scale 43, eventually to pause on the platform thereof for a period of time sufficient to enable the weight to be determined accurately. Articles are removed from over-weight packages, and added to under-weight packages until the desired weight is attained. The packages are then removed and sealed and are ready for distribution in the ordinary manner.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

1. In a packaging machine a bag extending and advancing conveyor comprising a group of juxtaposed orifice plates pivoted together at adjacent edges to form an endless carrier which moves in a closed path about spaced parallel axes lying in a common horizontal plane, a pair of bag engaging fingers fixed to each orifice plate adjacent the orifice therein, said fingers projecting perpendicularly from the outer sides of the

plates, a pair of bag engaging and extending fingers pivoted to the outer side of each orifice plate on the side of the orifice therein remote from the fixed fingers, a lever arm coupled to the pivoted fingers for moving said fingers in unison, yielding means coupled to the lever arm and to its respective orifice plate to urge the free ends of the pivoted fingers away from the fixed fingers, a cam rail mounted adjacent the carrier, means on each lever arm for engaging the cam rail and moving its respective pivoted fingers against the effort of its respective yielding means and means mounted between the spaced horizontal axes for feeding articles through the orifice plates and into bags held by the fingers.

2. In a packaging machine, a bag extending and advancing conveyor comprising: A group of orifice plates pivotally connected together at juxtaposed edges to form an endless carrier which moves in a closed path about spaced parallel axes, first plural means fixedly mounted on said plates and extending therefrom for engagement with a bag, second plural means pivotally mounted on said plates and adapted to extend and engage the bag at points remote from the engagement points of said first plural means, means for yieldingly urging said second plural means to a bag extending position, and means for positively positioning said second plural means in a bag receiving position when said plates are on one side of said path, said orifice plates having orifices overlying the open ends of the bags whereby the article to be packaged can be dispensed therethrough.

3. In a packaging machine, a bag extending and advancing conveyor comprising: A group of orifice plates pivotally connected together at juxtaposed edges to form an endless carrier which moves in a closed path about spaced parallel axes, first plural means fixedly mounted on said plates and extending therefrom for engagement with a bag, second plural means pivotally mounted on said plates and adapted to extend and engage the bag at points remote from the engagement points of said first plural means, means for yieldingly urging said second plural means to a bag extending position, said urging means including a lever arm coupled to said second plural means for simultaneous movement thereof, yielding means coupled to the lever arm and to its respective orifice plate for pivotally urging said second plural means to a position away from said first plural means for supporting a bag, said orifice plates having orifices overlying the open ends of the bags whereby the article to be packaged can be dispensed therethrough.

4. In a packaging machine, a bag extending and advancing conveyor comprising: A group of orifice plates pivotally connected together at juxtaposed edges to form an endless carrier which moves in a closed path about spaced parallel axes, first plural means fixedly mounted on said plates and extending therefrom for engagement with a bag, second plural means pivotally mounted on said plates and adapted to extend and engage the bag at points remote from the engagement points of said first plural means, means for yieldingly urging said second plural means to a bag extending position, said urging means including a lever arm coupled to said second plural means for simultaneous movement thereof, yielding means coupled to the lever arm and to its respective orifice plate for pivotally urging said second plural means to a position away from said first plural means for supporting a bag, and means for positively positioning said second plural means in a bag receiving position when said plates are on one side of said path, said orifice plates having orifices overlying the open ends of the bags whereby the article to be packaged can be dispensed therethrough.

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