

Feb. 16, 1971

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3,563,002

GROCERY PACKAGING APPARATUS

Filed March 5, 1969

5 Sheets-Sheet 1

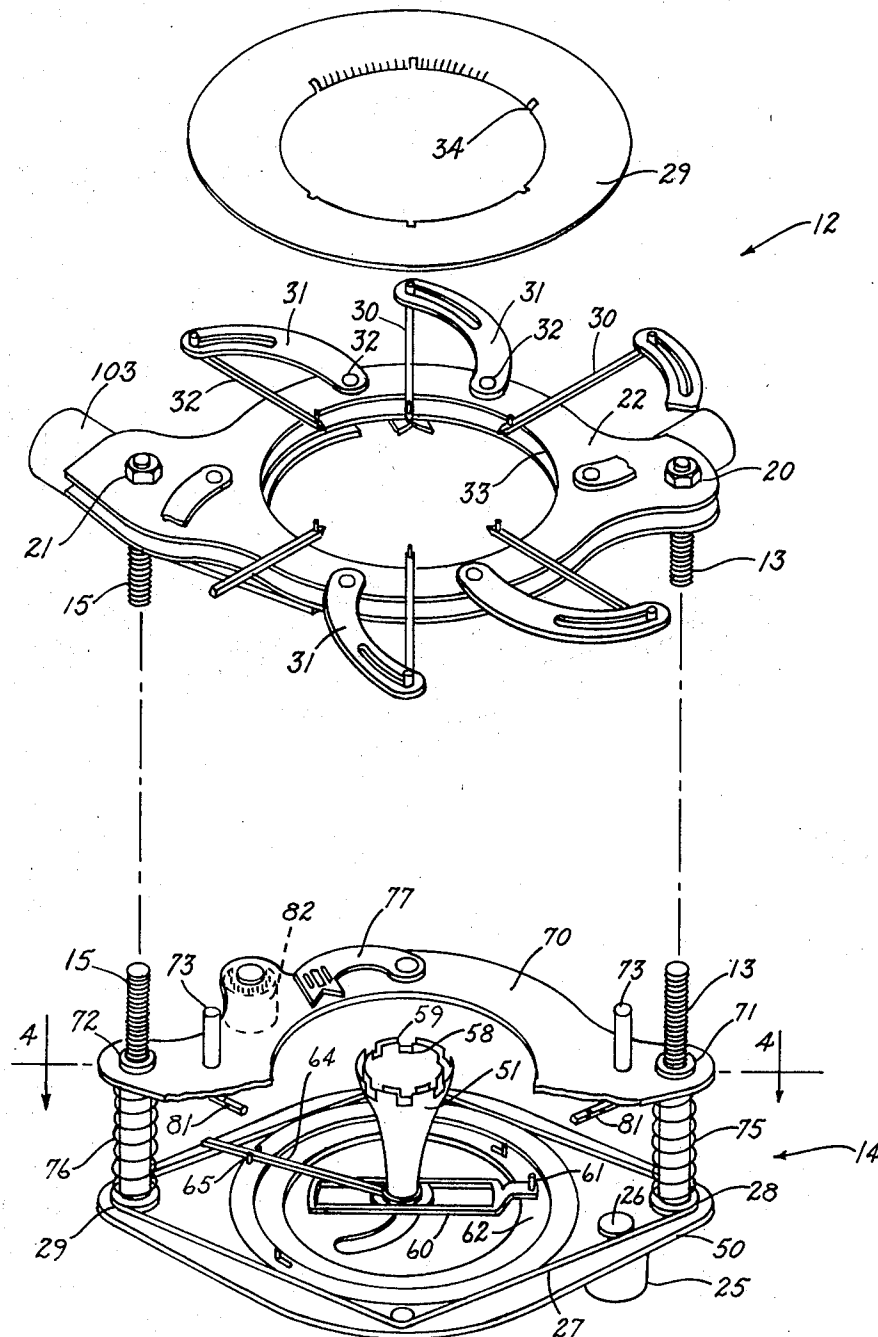


Fig. 1

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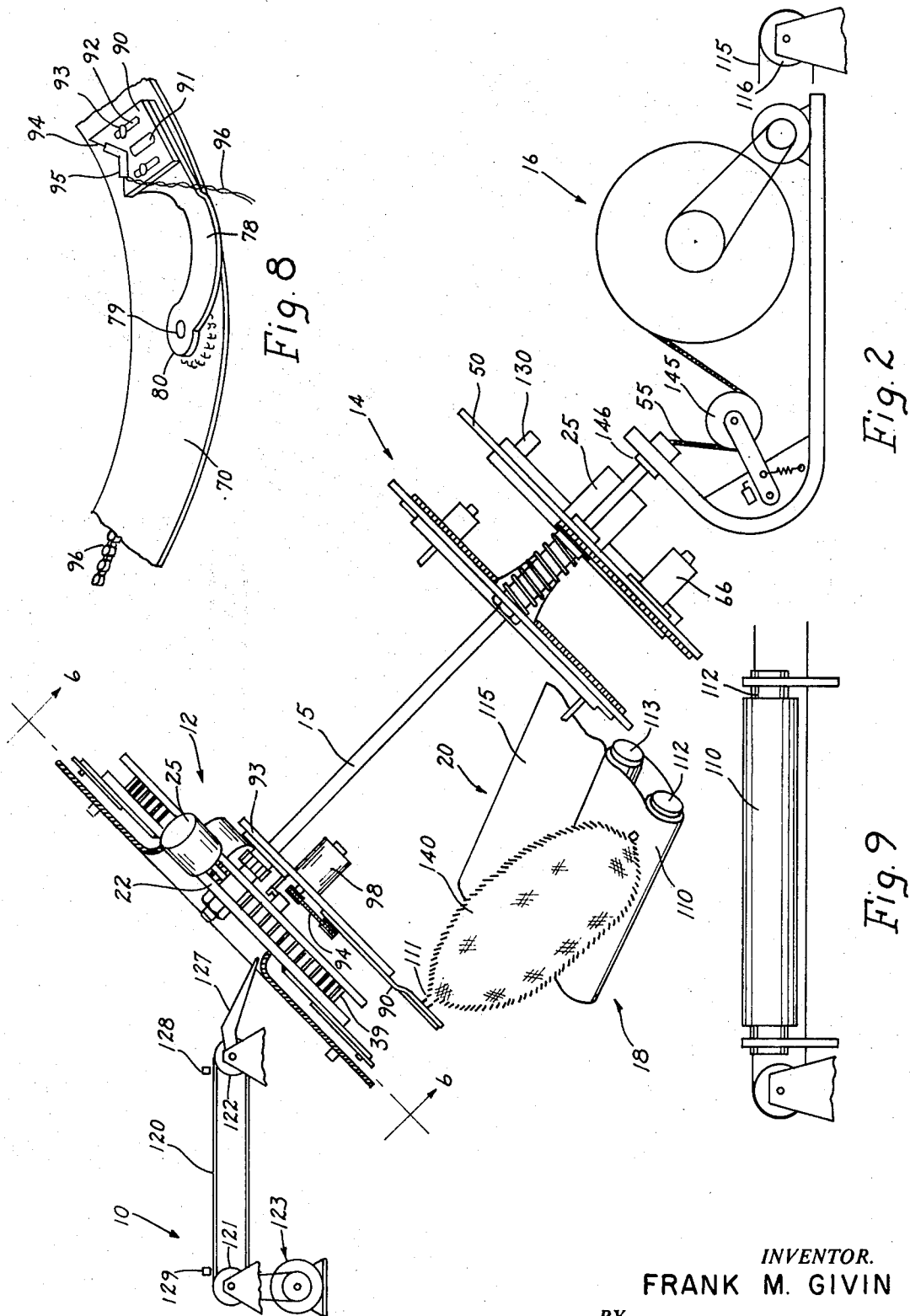
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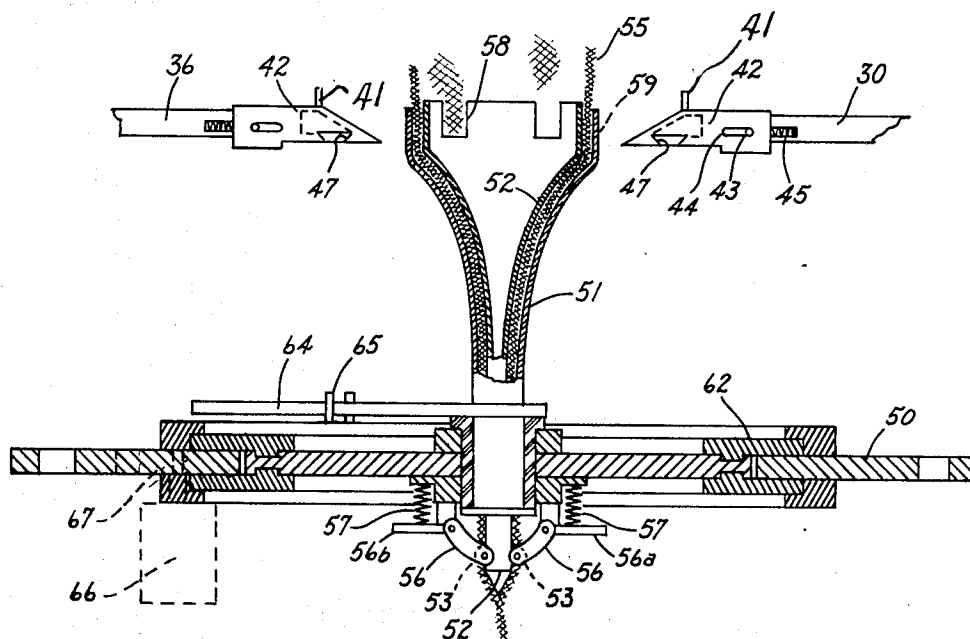


Fig. 3

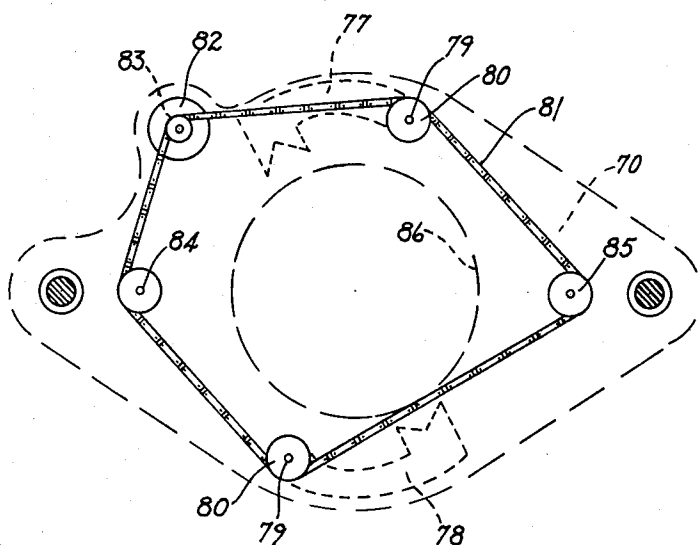


Fig. 4

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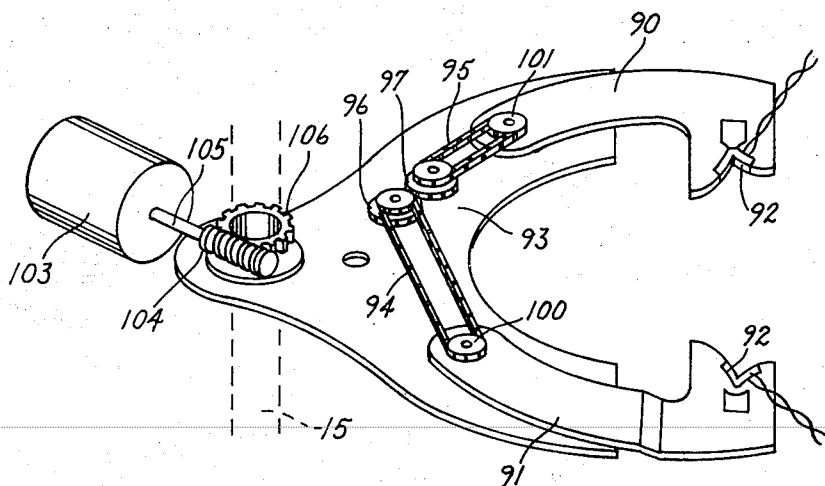


Fig. 5

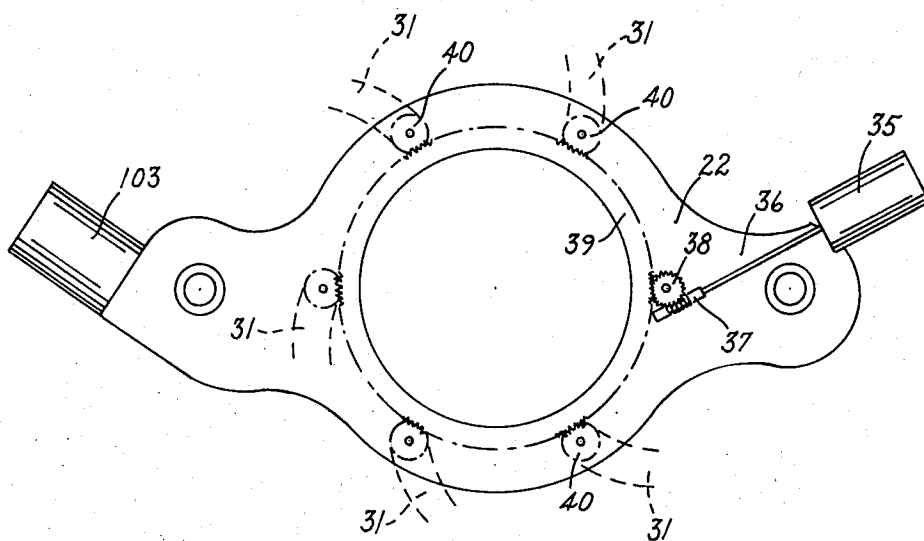


Fig. 6

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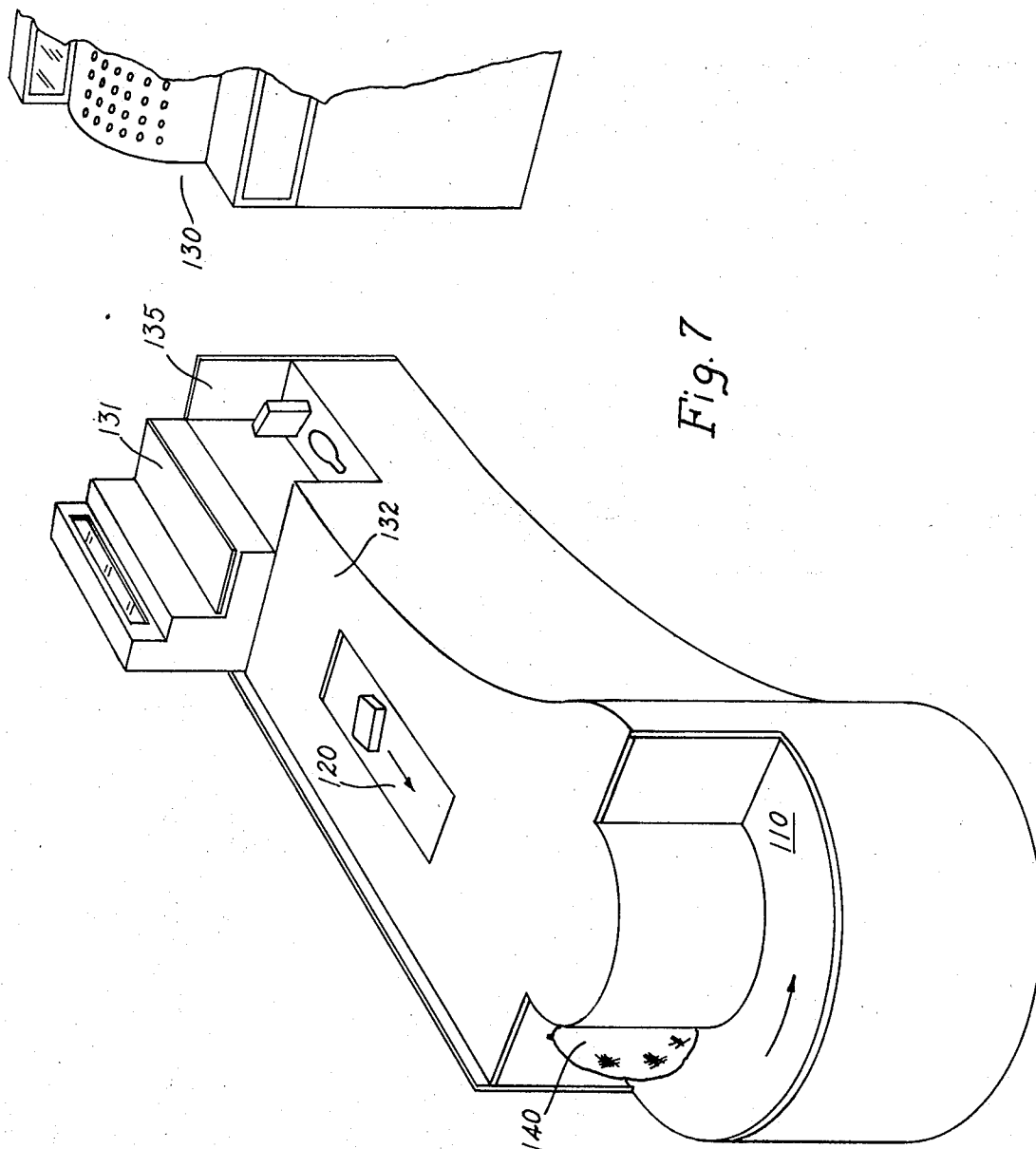


Fig. 7

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10 Claims

ABSTRACT OF THE DISCLOSURE

A packaging apparatus for randomly packing grocery items consisting of a plurality of various sizes of cans, boxes and the like into a nylon net or mesh bag, includes a supply roll of tubular net material fed through an annular feed orifice, and a traveling head with a large central aperture has a plurality of net holding fingers which move to the center at the orifice for picking up the netting and outwardly to the edge of the orifice in a position remote from the feed for opening the mouth of the netting. The traveling head moves upwardly away from the feed orifice pulling out a predetermined amount of the netting. A load conveyor belt moves the groceries to be packaged into the mouth of the bag filling the same while the netting is oscillated. The filled bag is then sealed at the bottom by heat sealing and cutting it from the supply, and the bag is twisted to close the mouth and the twisted neck is heat sealed providing a sealed bag for the customer. The sealed bag is then released from the filling unit, passed to a conveyor belt for delivery to the customer.

Included among the objects and advantages of the present invention is a grocery packaging machine for the random packing of various sizes of cans and packages into a plastic net or mesh tubing which is sealed at both ends forming a bag for carrying by the customer.

Another object of the invention is to provide a feed means for a plastic net tubing which is arranged to form a bag for packaging grocery items for a customer.

Another object of the invention is to provide an automatically loading grocery packaging machine for packaging groceries from a grocer's check stand into a plastic net tubing which is closed at both ends forming a bag for such groceries.

These and other objects and advantages of the invention may be readily ascertained by referring to the following description and appended illustrations in which:

FIG. 1 is a partially broken away perspective view of a net holding and feeding mechanism for apparatus according to the invention;

FIG. 2 is a generally schematic side elevational view of one form of bagging machine according to the invention;

FIG. 3 is a side elevational sectional view of the feeding mechanism for the netting of a bagging machine;

FIG. 4 is a detailed view of the drive mechanism for sealing apparatus for the bottom of the net bag;

FIG. 5 is a perspective view of the upper sealing apparatus and bag transfer mechanism;

FIG. 6 is a plan view, generally schematic, of a traveling head for picking up netting and holding said netting open for the packaging operation;

FIG. 7 is a generally schematic perspective view of a grocery store checkout counter illustrating the loading belt for the mechanism of the bagging machine and a delivery belt for the bagged groceries; and

FIG. 8 is a detailed view of a heat sealer for the bottom of the bag.

FIG. 9 is an end elevational view showing the delivery conveyor.

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In the general view of the device illustrated in FIG. 2, the apparatus includes a grocery supply belt, illustrated in general by numeral 10, a bagging machine traveling head illustrated in general by numeral 12, a bagging machine lower feed arrangement illustrated in general by numeral 14 and a roll of tubular nylon or other plastic netting or mesh for the machine illustrated in general by numeral 16. A bag accepting conveyor, illustrated generally by numeral 18, provides means for twisting the bag for closing, as described below, and a delivery conveyor system, illustrated in general by numeral 20, for delivery of the packaged groceries.

The feed and holding mechanism for the net tubing is illustrated in FIG. 1, wherein the head assembly is mounted on a pair of opposed jack screws 13 and 15. The head is moved toward and away from the feed assembly 14 by means of nuts 20 and 21 secured to a plate 22 of the head assembly and threaded on the jack screws 13 and 15 which are rotated. A reversible motor 25 rotating a sprocket 26 drives a chain 27 which is mounted around sprockets 28 on jack screw 13 and sprocket 29 on jack screw 15. The sprockets 28 and 29 are secured to the jack screws, and on rotation of the sprockets by the chain, the jack screws are rotated threading into and out of the nuts thereby moving the head toward and away from the feed 14. A series of fingers 30 are mounted on a slotted arm 31 which is pivotally attached by means of pivot pin 32 to the plate 22 are arranged to move radially centerwise of a large aperture 33 in the plate 22 for picking up netting through the feed arrangement, described below. The slot permits radial movement of the fingers. Actuation of the arms is illustrated in FIG. 6, wherein a reversible electric motor 35 rotates a shaft 36 on which is mounted a worm 37 driving wormwheel 38. The wormwheel in turn rotates a ring gear 39, and a gear 40 secured to each arm turns the arms in and out depending upon the rotation direction of the motor 35. As the arms are rotated inwardly the pickup fingers move towards the center of the aperture, and when the arms are rotated outwardly the fingers are retrieved towards the periphery of the opening.

The pickup fingers 30 include a movable head 42 having a pin 41 mounted thereon. The head 42 has a limited movement prevented from further movement by a pin 43 mounted in a slot 44, the head being held in outermost position by a spring 45 biased against it.

A feed mechanism includes a base plate 50 mounted on the lower end of the jack screws 13 and 15, and the plate 50 is arranged to remain stationary in relation to the jack screws and provides a base therefor. Tubular material for packaging passes through a feed cone which includes an outer cone 51 and an inner cone 52 juxtaposed therebetween providing an annular space for passage of tubular material 55 passing therebetween. The outer cone 51 is mounted on the plate 50, and the inner cone 52 is held in position by means of rollers 53 on opposite sides. The rollers are biased against the end of the inner cone by springs 57 pushing against lever 56a and link arms 56 on which the rollers are mounted. The tubular netting material passes between the rollers and the bottom of the inner cone 52, which provides tension on the tubular material but permits it to be pulled through the feed cones. On the top of inner cone is a series of notches 58 and mating notches 59 in the outer cone. The notches are positioned in the cones to register with the points 42 of the pickup fingers. This permits the points to pass into the netting held between the two cones, and securely hold the net. The held net is then pulled up with movement of the top plate, and the net is opened as the fingers move outwardly forming the bag to be filled. The cones are mounted in a slotted frame 60 which is pivoted

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by pin 61 on a ring gear 61. A pitman 64 reciprocally mounted in a pair of pins 65 and attached to the cones prevents rotation of the cones but permits the cones to oscillate on movement of the ring gear 62. The ring gear 62 is rotated by a reversible motor 66, FIG. 3, driving a spur gear 67 meshed with the ring gear 62. The motor and the spur gear being shown in dashed lines in FIG. 3 to merely indicate positioning thereof.

A plate 70 is reciprocally mounted on the jack screws 13 and 15 by means of collars 71 and 72 which slide over the screws but is not threadedly engaged therewith. Pins 73 are arranged to impinge on the movable head as the head approaches the feed cone, depressing the plate 70 against springs 75 and 76 mounted around the lower end of the jack screws to permit the fingers to move into position for engagement with the notches in the feed cones. The plate 70 when not depressed is normally above the feed cones in position to permit a pair of opposed arms 77 and 78 to swing in, FIG. 4, gather the netting into a tight bunch and a heat element on each arm 78 seals lower end of the bag shut. Each arm 77 and 78 is mounted on a pivot pin 79 and a sprocket 80, secured to each arm, is arranged to move the arm inwardly and outwardly under the influence of a moving chain 81 which is driven by a reversible motor 82 on which is mounted a sprocket 83. A pair of idler sprockets 84 and 85 hold the chain away from the orifice 86 in the plate 70.

The arm and heater arrangement is illustrated in detail in FIG. 8 where the arm 78 has a reciprocal head 90 thereon held in biased outward position by a spring 91. The movement of the head 90 is limited by slots 92 in the head mounted over pins 93 secured to the plate 70. In a V-shaped notch 94 is mounted a heat unit 95 supplied by a line 96 passing through under the plate and connected to the heat element. The other arm 77 is similarly arranged. When the arms move together the heat elements seal the plastic together and further movement move the sharp front edges of the two arms together cutting the netting.

After filling, the upper part of the bag is closed by means of a pair of opposed arms 90 and 91, FIG. 5, each of which has a heat element 92 in the V-shaped end for sealing the bag material gathered therebetween. The arms are mounted on a plate 93, and they are moved inwardly and outwardly by means of chains 94 and 95. The chains are rotated by meshed gears 96 and 97, each having a chain sprocket, and one of which is mounted on the shaft of a reversible motor 98, shown in FIG. 2. Each chain is mounted over a sprocket attached on the arms, and chain 94 is mounted on sprocket 100 secured to the arm 91 and chain 95 is mounted sprocket 101 which is secured to the arm 90. A motor 103 having a worm 104 mounted on its shaft 105 rotates a wormwheel 106 which is fastened to the plate 94 for moving the plate pivotally around jack screw 15.

A filled bag is sealed and released at its bottom, and the bottom of the bag drops on a belt conveyor 110 which on rotation twists the bag at its top 111, shown in FIG. 2, and the twisted top is then grasped by the arms 90 and 91 moving inwardly, which, also, heat seals the twisted top when the arms are together. The motor 103 then moves the bag laterally, and on reaching a lateral position the bag is dropped and the conveyor 110 passes it to a delivery conveyor 115. The delivery conveyor may be a belt which passes over a head pulley 116 at a point spaced from the unit, or a rotary table or the like depending on the design of the grocery check stand.

The delivery belt system for the completed bag is illustrated in FIG. 9, wherein the belt 110 is mounted on pulleys 112 and 113 which in turn are mounted on the structure, not shown, and the belt is rotated by an electric motor which likewise is not shown since it is conventional arrangement.

In using the unit, groceries from the checker, a typical check out stand is shown in FIG. 7, are delivered onto

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a feed belt 120, FIG. 2, mounted over pulley 121 and opposite pulley 122 driven by a belt drive motor arrangement 123. The groceries are passed from the belt onto a delivery chute 127 which passes the groceries through the opening in the guard plate 29. Sensors 128 and 129 mounted on the belt connected with a sensor 130 mounted on the plate 50 provides means for determining the load in the tubular material. The sensors may be microswitches with feelers, strain gauges, or the like to indicate the weight and/or volume of loading in the bag.

A typical layout is illustrated in FIG. 7 wherein a checker stand includes a cash register 130, a scale 131 and a counter top 132. In using the apparatus of the invention, the customer pushes a grocery cart into the space between the cash register and the scale. The clerk then rings up the amount of each item on the cash register, pushing the smaller items onto the belt conveyor 120, with the breakable and the large items being placed in a space 135 below the scale. The grocery items placed on the belt conveyor 120 pass over the chute 127 into the bag. The feed cone oscillates for filling thus insuring full filling of the bag. The sensors determine when a sufficient amount of groceries have been placed in the bag, and these activate the bottom seal and cut off which permits the bag to be dropped onto the conveyor 110, which is activated twisting the top of the bag, after which the grippers are activated sealing the top and dropping the bag onto the conveyor 110. This conveyor then deposits the groceries, contained in the tubular material sealed at the bottom and the top, onto delivery conveyor 115 for the customer.

The unit is loaded by reeling off a small amount of tubular material from the roll 16, passing it under a tension roller 145, through a passage 146 into the feed head, shown in FIG. 3. The inner cone is removed by pressing up on the lever arms 56a and 56b which are connected to the links 56 against the spring pressure of the spring 57 which releases the rollers from the bottom of the cone. The inner cone is removed and the netting is pulled up into the outside cone 51. When the netting is pulled up into the cone 51 the inner cone is then replaced into the interior of the tubular net and pushed down so that it is held by the rollers 53, and the net passes up between the juxtaposed cones. The drive motor for the jack screws is then activated lowering the head to where it contacts the pins 73 on the cutoff plate on the bottom. The head is further lowered pushing the cutoff plate downwardly to the position where the fingers mate with the notches in the feed tube and gather up the netting. A strand or two of netting is caught in the notch 47 and as the drive motor of the jack screws is reversed the head moves back up pulling out a length of the netting and as the head approaches the top of the jack screws the fingers are retrieved from the center by activating the drive for the fingers which opens the netting for filling. The motor for the ring for the cones is activated to oscillate the cone while the bag is being filled. As soon as the sensors indicate the bag is filled the lower cutoff arms move in cutting the netting and sealing the opening of the netting. The lower end of the bag drops onto the belt 110 which on being activated twists the neck of the bag by rotating the same. The fingers are then retrieved further so the notches extend into the notches 34 in the cover plate 92 which cuts off any strands in the notches 47 in the fingers and the arms 90 and 91 move in holding the twisted bag and heat sealing the same together. The arms are then opened which drops the bag onto the belt 110, and this belt deposits the bag onto the conveyor 115.

The device is illustrated using electric motors, however, these may be substituted by hydraulic motors, air motors, or in many cases by hydraulic cylinders for the actuation of the various parts of the unit.

I claim:

1. Packaging apparatus for random and various shaped and sized items at a check stand, comprising

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- (a) feed means for holding tubular netting in tubular shape;
- (b) a head movable from a position adjacent said feed means to a position spaced therefrom including means for grasping the end of tubular netting in said feed means;
- (c) means for moving said head away from said feed means pulling out a length of said tubular netting;
- (d) means for moving said grasping means outwardly to expand the mouth of said tubular netting;
- (e) means for oscillating said feed means during filling of held tubular netting;
- (f) means for sealing held tubular netting adjacent said feed means and cutting off the sealed netting from a supply of tubing;
- (g) means for rotating filled netting for twisting the top thereof in a twisted neck;
- (h) means for sealing said twisted neck forming a sealed filled bag;
- (i) means for releasing said sealed netting;
- (j) means for transporting a filled bag to a point of pick up; and
- (k) means for feeding a length of netting to said feed means.

2. Packaging apparatus according to claim 1 wherein said feed means includes an outer member and a smaller inner member, having an annular space through which the tubular netting is passed.

3. Packaging apparatus according to claim 2 wherein said outer member is conical and said inner member is conical, and said inner member is held in position by spring loaded rollers, and the tubular netting passes between the rollers and said inner conical member.

4. Packaging apparatus according to claim 1 wherein said movable head is mounted on jack-screws and rotation of said screws moves said head toward and away from said feed means.

5. Packaging apparatus according to claim 1 wherein

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said means for grasping includes a plurality of spaced fingers mounted on said head, arranged for extending through said netting for holding the same.

6. Packaging apparatus according to claim 1 wherein said tubular netting is heat sealable plastic and both sealing means includes heat elements.

7. Packaging apparatus according to claim 1 wherein said means for sealing said twisted neck includes a pair of grasping jaws arranged to contact and hold said twisted neck during sealing thereof, means for rotating said jaws out of alignment with said head, and motor means for opening said jaws provides means for releasing said sealed netting.

8. Packaging apparatus according to claim 2 wherein the exit side of said conical members are spacedly notched, a plurality of space fingers mating with said notches, whereby said fingers move into said notches to enmesh with the netting held in said annular space.

9. Packaging apparatus according to claim 1 wherein said unit is tipped at an angle, whereby held netting is maintained at an angle so that articles dropped into said netting falls onto the side thereof.

10. Packaging apparatus according to claim 1 wherein said means for rotating said filled netting includes a belt conveyor mounted in position to receive the freed lower end of the filled netting, and means for operating said belt.

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