

Sept. 19, 1950

H. P. LEWIS
METHOD AND APPARATUS FOR PACKAGING
LOOSE, FLOWING COMMODITIES

2,522,682

Filed Dec. 31, 1946

6 Sheets-Sheet 1

Fig. 1.

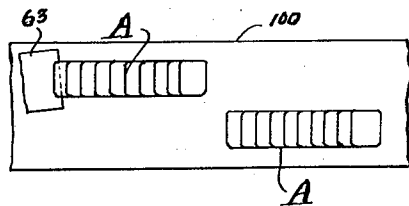
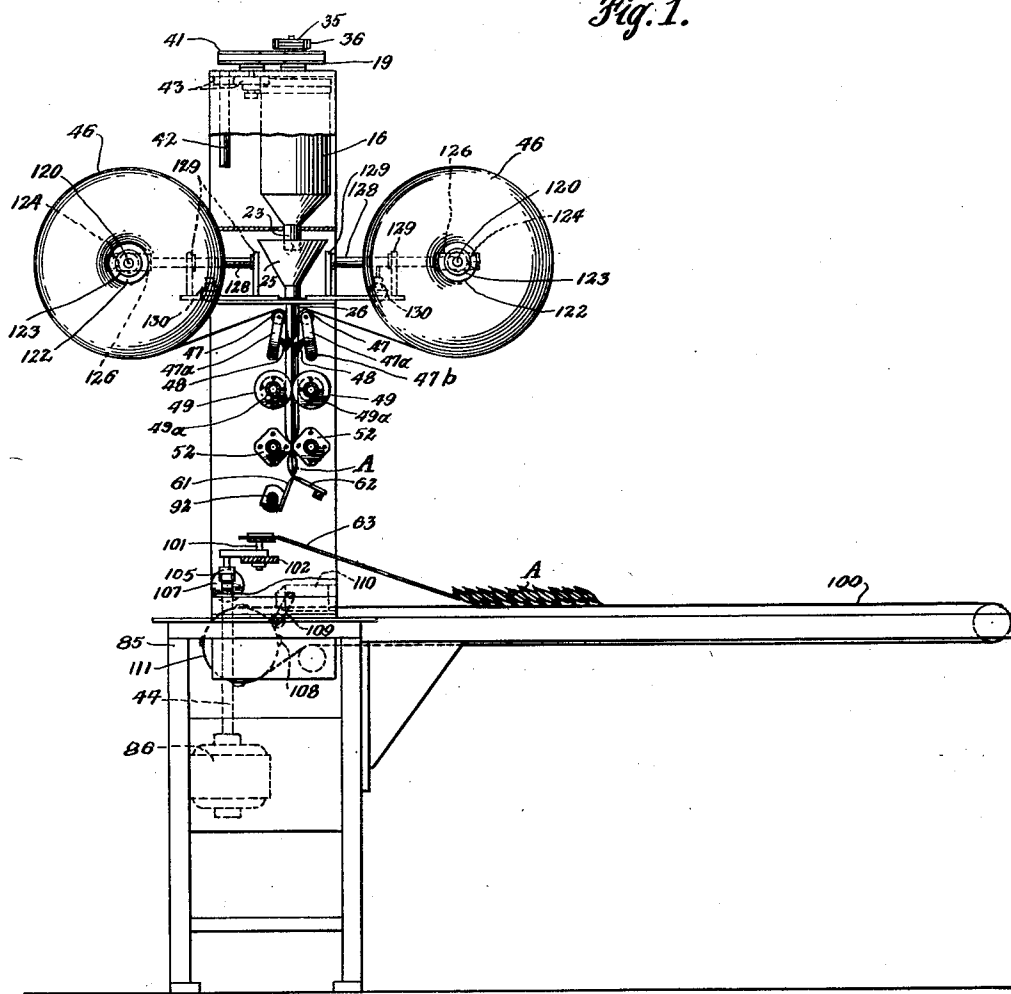


Fig. 1A.

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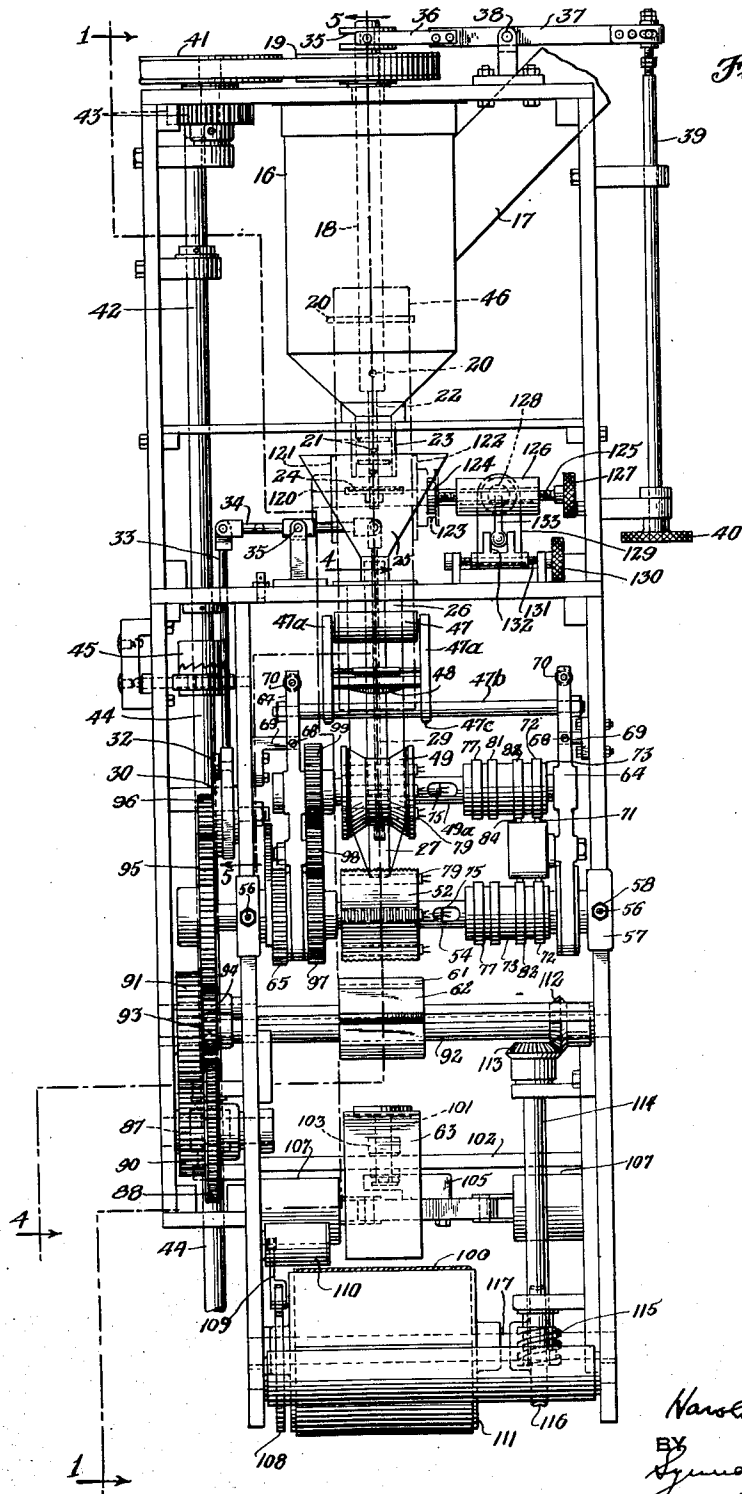


Fig. 2.

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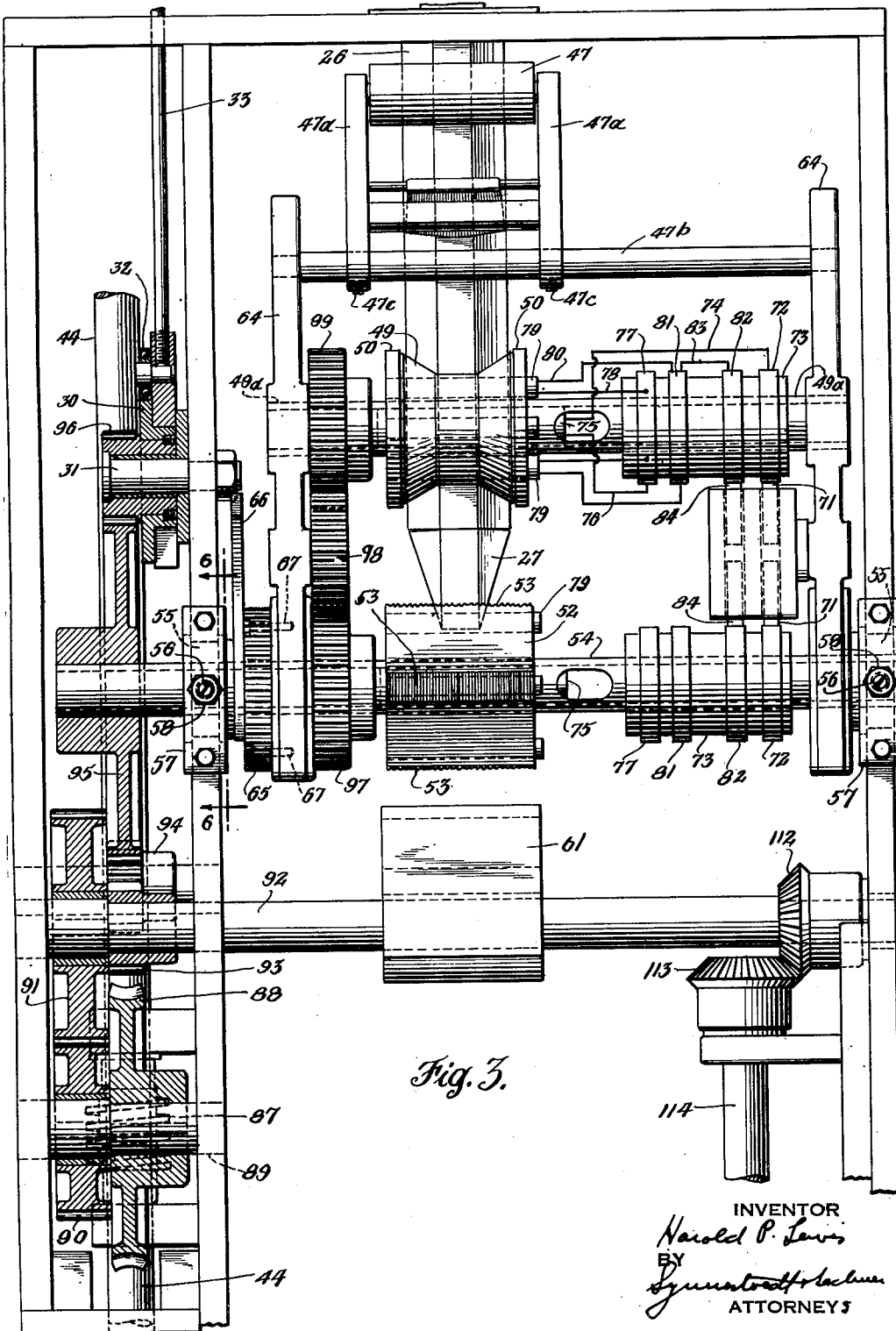
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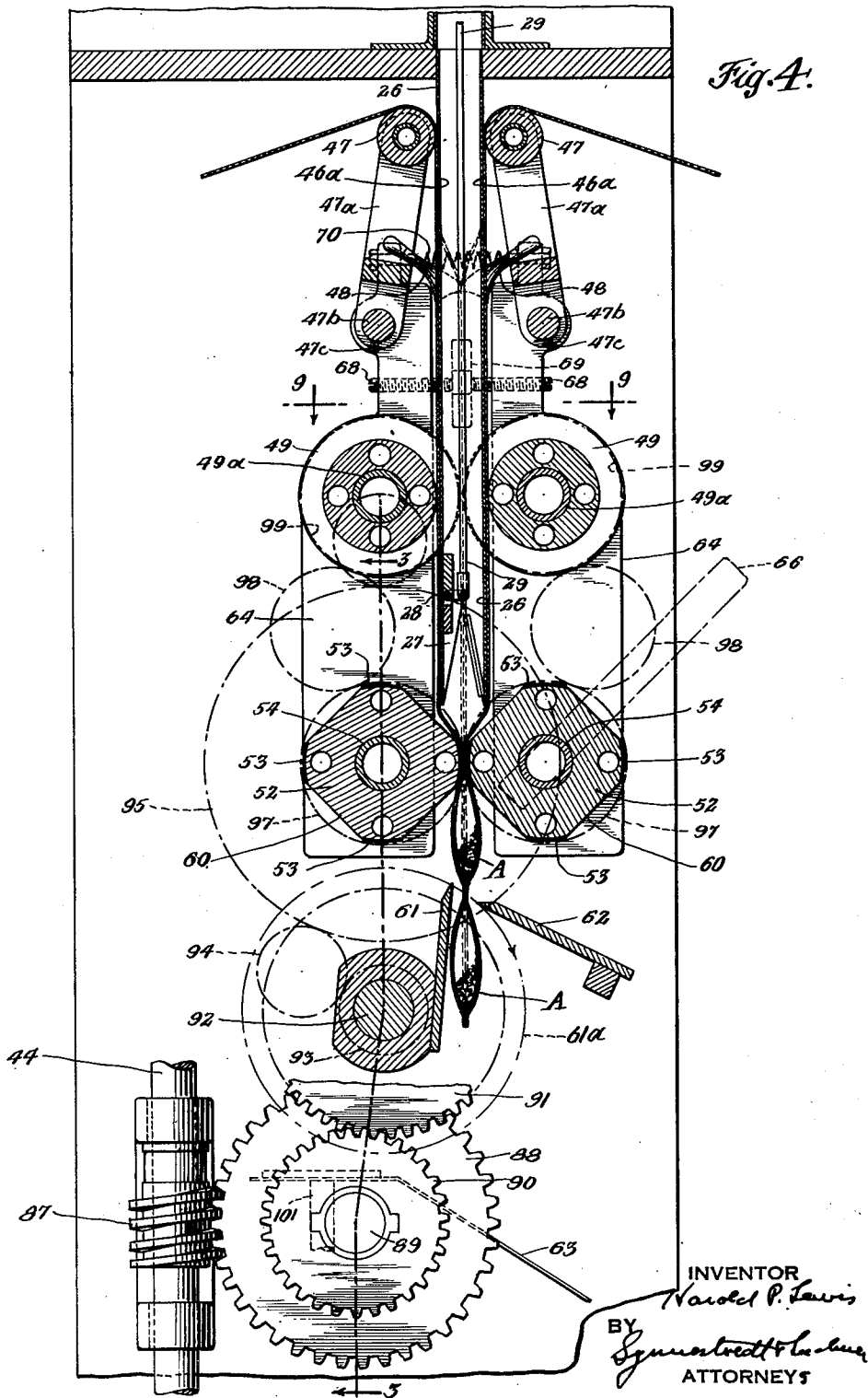
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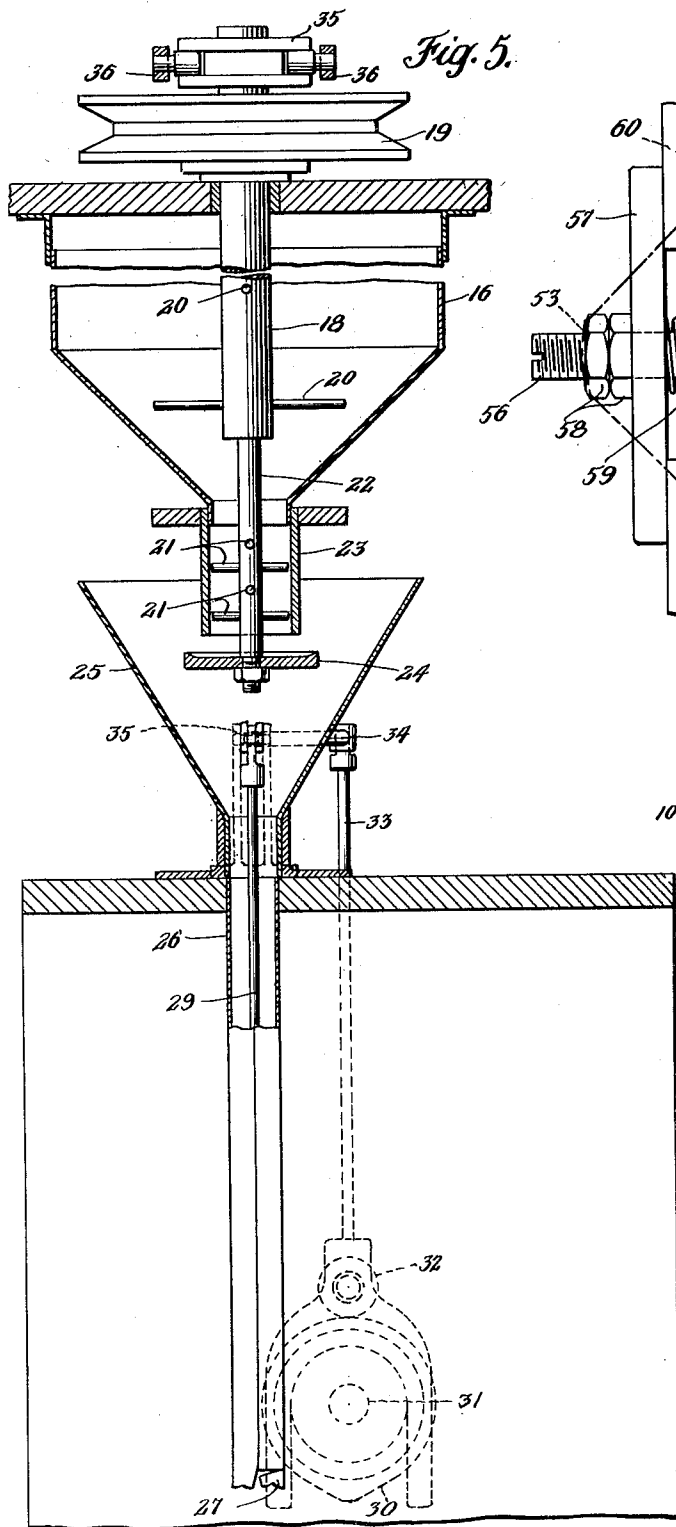


Fig. 5.

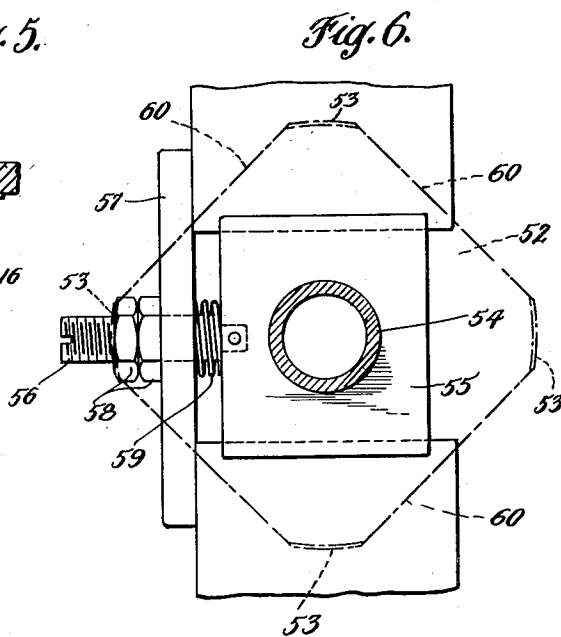


Fig. 6.

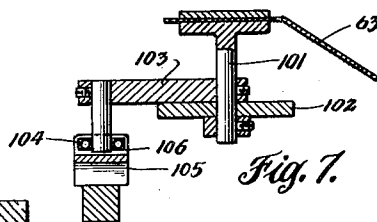


Fig. 7.

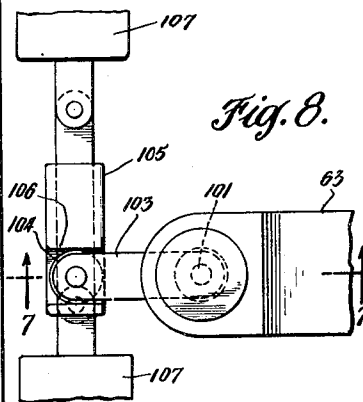


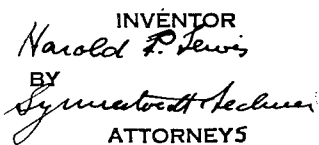
Fig. 8.

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METHOD AND APPARATUS FOR PACKAGING
LOOSE, FLOWING COMMODITIES

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UNITED STATES PATENT OFFICE

2,522,682

METHOD AND APPARATUS FOR PACKAGING
LOOSE, FLOWING COMMODITIESHarold P. Lewis, Newtown, Pa., assignor to Wm.
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Application December 31, 1946, Serial No. 719,561

11 Claims. (Cl. 93—3)

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My invention relates to the packaging of a loose, flowing commodity such as tea, coffee, powder and the like, and is generally directed to the provision of a method and apparatus for rapidly packaging such commodities in paper, cellophane or like flexible material which is adapted to be sealed by the application of heat.

It will be understood that the method and apparatus are also applicable to the packaging of nuts, small pellets and other commodities of such nature but it is particularly useful in processes where the commodity to be packaged is either in the form of a fine powder or contains minute particles which tend to float in the air and will not fall rapidly.

There are several known methods and apparatus for packaging such commodities, but for the most part they are of the intermittent feeding type, i. e., the commodity to be packaged is measured into individual charges which fall into a tube of the packaging material above a transverse seal, the packaging material being moved intermittently to receive a new charge above each transverse seal. This intermittent motion necessarily limits the speed at which packages of the commodity can be formed.

There are also machines for packaging semi-solid commodities such as ice cream, in which there is a continuous feed of the commodity to be packaged and a continuous feed of the packaging material, but I know of no successful application of the continuous process to the packaging of loose, flowing commodities which consist of or contain minute particles which will tend to float in the air or will not fall at a normal rate at which large solid particles will fall.

Tea for packaging in individual tea bags, for example, will vary in size from minute dust-like particles to large grains or bits of tea leaf. When released from a hopper into a feeder tube the tea will fall by gravity in a steady stream and the larger particles will, for the most part, carry the fine particles along, but if the flow is stopped at the upper end of the tube, for example, many of the smaller bits of tea leaf and minute particles will not fall as rapidly as the larger ones. Therefore, when the charge of tea is measured into a tube any substantial distance above the bottom thereof, the particles will fall at various speeds when the charge is released and in packaging the charges at the lower end of the tube it is necessary to hold the package for a brief interval in order to allow the complete charge to fall into the package and to insure, insofar as possible, that there will be no small bits floating in

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the air at the point where the transverse seal is made in the tube of packaging material.

I have discovered, however, that it is possible to operate a packaging machine with a continuous gravity feed of tea, for example, and continuous feed of the packaging material, if the flow of tea is interrupted substantially within the package which will contain it. It is necessary, of course, to interrupt the flow of tea for a brief interval of time to permit the transverse sealing of the tube of packaging material below the end of the tube through which the tea is fed, but I have discovered that if the flow is interrupted at a point immediately above the point at which the transverse seal is formed and substantially within the package which will contain the tea, that the interval of time between the interruption of the flow of tea and the formation of the transverse seal is so small that there will be no time or space for the small particles to "straggle" behind the larger and interfere with the formation of the transverse seal. In other words, it can be said that the tea is measured in the package which will contain it rather than being measured in individual charges above the package and allowed to fall into it.

For the sake of convenience, I refer throughout the specification to the packaging of tea and, at the present time, my invention will probably find its widest application in packaging that commodity because of the popularity of the so-called "tea bag." It will be understood, however, that the apparatus is applicable to the packaging of many other commodities and particularly to those in which there is a gravity feed of a commodity containing particles which tend to float in the air.

It will also be understood that there can be many variations of the gravity feed. In my present application the feed from the hopper through the tube through which the tea is fed to the package is what might be termed an "all gravity" feed. It would be quite possible, however, to feed the tea through the tube by a screw device, for example, in which case the fall of the tea by gravity from the end of the tube into the package would be very small as compared with the fall through the tube from the hopper.

Certain features of the apparatus will also have application to the packaging of commodities where the feed is other than gravity.

It is the primary object of my invention to provide a method and apparatus as above described for packaging commodities such as tea and the like in which there is a continuous flow of the

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commodity and continuous feed of the packaging material, as distinguished from the processes in which the commodity is measured in individual charges and the packaging material fed intermittently.

A further object of my invention is to provide a method and apparatus for packaging tea and the like in which the tea is measured from a continuous flow substantially within the package which will contain it.

Another object of my invention is to provide an improved gate mechanism for interrupting the flow of tea to permit the formation of a transverse seal in the tube of packaging material.

It is a further object of my invention to provide an apparatus for packaging tea which will prevent the finer particles of tea from interfering with the transverse sealing of the tube of packaging material.

Another object of my invention is to provide an apparatus, having a hollow feeder mandrel along which the packaging material is fed, in which ready access can be had to the mandrel for threading and adjusting the packaging material.

It is a further object of my invention to provide improved means for feeding tea from a hopper so that the tea will fall by gravity into a hollow feeder mandrel in a steady, continuous, uniform flow.

Another object of my invention is to provide an improved means for insuring proper tracking of the packaging material through the apparatus.

Another object of my invention is to provide an improved arrangement for segregating into groups on a conveyor a predetermined number of packages after they have been formed.

I accomplish the foregoing together with such other objects as may hereinafter appear or are incident to my invention by means of the apparatus shown in the accompanying drawings wherein:

Figure 1 is a more or less diagrammatic sectional elevational view of a machine constructed in accordance with my invention, the portion in section being taken substantially on the line 1—1 of Figure 2;

Figure 1a is a fragmentary plan view looking down on the conveyor.

Figure 2 is an enlarged fragmentary and elevational view of the machine looking toward the left as viewed in Figure 1;

Figure 3 is a fragmentary view showing certain of the parts of Figure 2 further enlarged and showing certain of the gearing in cross-section and taken substantially on the line 3—3 of Figure 4;

Figure 4 is an enlarged cross-sectional view taken substantially on the line 4—4 of Figure 2 with certain of the gearing which is located in front of the plane of the section being shown in dot and dash lines;

Figure 5 is a fragmentary enlarged cross-sectional view of the hopper mechanism I employ, taken substantially on the line 5—5 of Figure 2;

Figure 6 is a detailed cross-section of a bearing arrangement I employ, taken substantially on the line 6—6 of Figure 3;

Figure 7 is a fragmentary cross-section of a delivery chute I employ taken on the line 7—7 of Figure 8;

Figure 8 is a plan view of Figure 7;

Figure 9 is a detailed plan section taken on the line 9—9 of Figure 4;

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Figure 10 is a vertical cross-section through a control gate I employ, showing the gate in open position;

Figure 11 is a view similar to Figure 10 but showing the gate in closed position;

Figure 12 is a vertical section taken on the line 12—12 of Figure 10;

Figure 13 is a plan section taken on the line 13—13 of Figure 10;

Figure 14 is a plan section taken on the line 14—14 of Figure 11; and

Figure 15 is a diagrammatic cross-section of a knife arrangement I employ.

Referring to Figures 1, 2 and 5, reference numeral 16 indicates the hopper. Tea is led into the hopper 16 through the pipe 17. In the hopper 16 is located a shaft 18 driven from pulley 19. Pins 20 on the shaft 18 serve to agitate the tea to facilitate flow. In addition to pins 20 in the body portion of the hopper, there are pins 21 mounted on the reduced portion 22 of the shaft 18 which extends downwardly through the restricted cylindrical outlet 23 of the hopper. Mounted on the lower end of the reduced portion 22 of the shaft is a plate 24 onto which the tea falls by gravity from the hopper. The tea is thrown from the plate 24 by centrifugal force into the funnel or cone 25 in a steady, continuous stream and from the lower end of the cone 25 the tea enters the tube or hollow mandrel 26 and flows downwardly to the control gate 27 shown in detail in Figures 10 to 14 inclusive.

Gate 27 is pivoted at 28 to swing back and forth across the mandrel intermittently cutting off the flow of tea. The gate is operated by means of the rod 29 extending down through the mandrel 26 and this rod is given reciprocatory movement by means of cam 30 carried by the shaft 31, cam roller 32, cam rod 33, and rock lever 34 pivoted at 35 and connected at one end to the rod 33 and at its other end to the upper end of gate operating rod 29.

In connection with the feed of tea from the hopper 16 to the plate 24, it is to be noted that the shaft 18 carries a collar 35 at its upper portion which is engaged by a yoke 36. This yoke is connected to one end of a lever 37 pivoted at 38 and at the other end the lever is connected to adjusting rod 39 which is adjusted by turning the knurled knob 40 to move lever 37 up or down to impart a like motion to the shaft 18. The purpose of this adjustment is to move plate 24 toward and away from the outlet 23 of the hopper 16. As the plate 24 is moved toward the outlet 23, the opening becomes restricted, thus restricting the flow of tea and as the plate 24 is moved away from the outlet the opening becomes wider thus allowing a greater flow of tea. In this way the amount of tea thrown from the plate 24 by centrifugal motion can be accurately regulated.

It is also to be noted that pulley 19 is driven from pulley 41 which is connected to the shaft 42 by means of gearing 43. In order to provide interruption of the drive when desired, the shaft 42 is connected to drive shaft 44 by a jaw clutch 45. This clutch provides a convenient means of stopping the tea supply in case trouble should develop anywhere further along the line.

The packaging material may be paper, cellophane or like flexible material which can be sealed by the application of heat and pressure. The particular packaging material used will depend on the commodity to be packaged. Tea, for example, is generally packaged in special water permeable paper which is either surface-coated

with a thermo responsive adhesive or may have such adhesive incorporated in the paper itself. There are several known papers of this kind on the market. In the case of nuts, small candy pellets, etc., a transparent waterproof material is generally used.

The packaging material (hereinafter referred to as "paper") is fed to the machine from rolls 46 (see Figure 1) over idler rollers 47 located on either side of the feeder tube or mandrel 26 at its upper portion. The rollers 47 are mounted on arms 47a carried by rods 47b and the arms 47a may be locked as by means of set screws 47c, into such position of adjustment that the rollers will have proper contact with the paper being fed into the machine. The paper is fed parallel to the tube as indicated at 46a in Figure 4 and the edges are brought together by means of brushes 48 in order to form the paper around the mandrel as indicated at 46b in Figure 9 before it is fed into the rolls 49. These rolls 49 constitute the sole means for drawing the paper from the rolls of paper and feeding it to other parts of the mechanism. The rolls 49 have a contour to fit around the mandrel leaving flanges 50 at either side which engage the paper. The rolls are electrically heated and when the paper is pressed between the flanges there is formed a heat seal to seal the opposed longitudinal edges 51 of the strips of paper above the lower end of the mandrel 26.

Below the end of mandrel 26 are provided the heat sealing rolls 52 having engaging portions 53 which come together below the mandrel to engage the paper and form a transverse heat seal immediately below the tea bag being filled from the mandrel and above the tea bag just ahead of it. These rolls are likewise electrically heated and are mounted on tubular shaft 54 carried by bearings 55. The engagement of these two rolls 52 is regulated by means of set screw 56 which is secured in the bearing block of the bearing 55 (see Figures 3 and 6). The set screw extends through the plate 57 mounted on the frame of the machine and on one side is held in fixed position by means of two lock nuts 58. A spring 59 is located between the plate 57 and the bearing block of a bearing 55 and urges the two shafts 54 toward each other. The bearing blocks, however, cannot move beyond the desired point of adjustment as they are held from such movement by set screw 56. However, in case a tea ball should happen to be fed between the engaging surfaces 53 of the rolls, it is desirable that the shafts should move away from each other in order to prevent damage to the machine and this is permitted by reason of the spring 59 which allows the bearing blocks to move outwardly, i. e., to permit the bearing surfaces to move apart.

It is to be noted that the flat surfaces 60 of rolls 52 do not come into contact and thus provide space for the filled tea bags to pass between the portions of the rolls which are not forming the transverse seal, as seen in Figure 15.

After the seal has been made, the formed tea bags A are fed downwardly between knives 61 and 62. Knife 62 is stationary and knife 61 is rotated in a clockwise direction, as indicated by the dot and dash line 61a in Figure 4, and is so synchronized with the other parts of the machine that the transverse seal is cut centrally, thus severing the tea bags from the strip of paper with one-half the transverse seal on the lower bag and one-half the transverse seal on the bag above it. From the knives the tea bags A are dropped to an

inclined chute 63 from which they are fed to a conveyor belt 100 (see Figure 1).

Reverting now to the paper feed mechanism, it will be seen that the rods 47b carrying the arms 47a and the shafts 49a of the rolls 49, are carried by frame members 64 which are pivoted at their lower ends on shafts 54. This is to permit the frame members to be swung outwardly, thus carrying rollers 47 and rolls 49 away from the mandrel 26 to permit threading of the paper through the machine and to give access in general to the parts involved. The frame members 64 are interlocked by means of gears 65 shown in Figures 2 and 3, so that when the handle 66 fixed to one of the gears 65 is moved downward both frame members will pivot on shafts 54 to move apart as above described. It is to be noted that the rolls 52 will not be moved apart.

In this connection it is pointed out that the gears 65 are secured to the frame members 64, as by means of screws 67 (see Figure 3) and that these gears and the frame members are mounted on the shafts 54 for free rotation so that the frame members may be swung toward and away from each other without causing back drive of the main drive gearing of the machine to be hereinafter described.

The position of the frames 64 is regulated by means of set screws 68 carried at the upper portion of the frame (see Figure 4). These screws engage a fixed block 69 and are adjustable to permit the frames to come toward each other in the proper operating position. A spring 70 yieldingly holds the frames in operating position and will permit the frames to move apart in case of jamming of the paper feed.

The heating of the rolls above mentioned is accomplished in the following manner, it being pointed out that since all of the rolls are heated in the same manner the circuit for only one of the rolls will be described. Current is supplied to brush 71 which is in contact with ring 72 carried on an insulating block 73. The insulating block 73 is mounted on shaft 49a and rotates therewith. From ring 72 a connection 74 leads to one side of a thermostat 75 which is mounted in the hollow shaft 49a adjacent the roll 49 so that it will be affected by the heat of the roll. The shaft 49a is tubular in order to permit insertion of the thermostat at the most efficient location adjacent the roll. From the other side of the thermostat a connection 76 leads to ring 77. From the ring 77 a connection 78 leads to one side of a heater 79 and from the other side of the heater 79 a connection 80 leads to a ring 81. The ring 81 is connected to a ring 82 by jumper 83. This ring 82 is in turn connected to brush 84 which is connected to the other side of the line. The circuit is thus from the brush 71 through the thermostat, thence through the heater and back to brush 84. It was found desirable to have a fourth ring because of space limitations and the number of connections involved.

The mounting and the drive of the apparatus is as follows.

The apparatus is carried by frame 85 (see Figure 1) on which the motor 86 is also mounted. The drive from the motor is as follows. The motor drives the shaft 44 which in turn drives the worm 87 from which the worm wheel 88 is driven. This worm wheel is mounted on shaft 89. Gear 90 is also mounted on this shaft and meshes with gear 91 which is mounted on the shaft 92 carrying the knife 61. Shaft 92 also

carries a gear member 93 meshing with an idler gear 94 which drives a gear 95 secured on the shaft 54 on which the roll 52 is mounted. Gear 95 in turn drives gear 96 which revolves on the stud shaft 31 and supplies the power to cam 30 to which the gear 96 is keyed. Also mounted on shaft 54 is a gear 97 which drives an idler gear 98 in turn meshing with a gear 99 fixed to the shaft 49a carrying the longitudinal sealing roll 49. The gears 98 and 99 are mounted on one of the frames 64 and are moved away from the mandrel 26 when the frames are swung outwardly as above described. It will be seen from Figure 4 that similar meshing gears 97, 98 and 99 are provided for both the right and left hand rolls shown, the gear 97 at the right in Figure 4 being driven by gear 97 at the left.

As mentioned above, the tea bags A are delivered from the knives, and fall onto the chute 63 and from thence are delivered to conveyor belt 100 as shown in Figures 1 and 1a. In delivering the tea bags to the belt 100, the chute is swung back and forth so as to deliver a group of tea bags first to one side of the belt and then to the other side. In practice, it is usual to deliver the tea bags in groups of ten although this number can be varied.

It is to be noted that the conveyor belt moves somewhat more slowly than the speed at which the tea bags are delivered from the chute 63. This is to permit the tea bags to slightly overlie one another or "shingle" on the conveyor as they are delivered from the chute (see Figures 1 and 1a). This shingling of the tea bags makes it easier for the operator to lift them from the conveyor in groups.

Referring more particularly to Figures 1, 2, 7 and 8, the chute 63 is swung back and forth in the following manner. The upper end of the chute is secured to the top of a shaft 101 which is carried by a bearing plate 102. A lever 103 is secured to shaft 101 and is swung back and forth with the shaft as a pivot by means of a roller 104 which is actuated by a sliding bar 105. A slot 106 is cut in the sliding bar 105 for receiving the roller 104, and the sliding bar is moved back and forth by solenoids 107, 107. The operation of the solenoids is timed by means of cam member 108 which operates lever 109 connected to a double-acting switch 110 which first operates one solenoid and then the other. The cam member is usually designed to throw the switch to move the chute 63 at every tenth tea bag so that the tea bags will be delivered to the conveyor belt 100 in increments of ten. The cam member can be changed if desired to give any number of tea bags in a group. The cam 108 and the conveyor drum 111 are driven from the shaft 92 by means of bevel gears 112, 113. Bevel gear 113 is mounted on shaft 114 which in turn drives worm 115 meshing with a worm wheel 116 mounted on shaft 117 carrying the cam 108 and drum 111.

Reverting now to the control gate illustrated in Figures 10 to 14 inclusive, it is pointed out that the edge portion of the mandrel 26 opposite the gate is provided with a lip 118 so positioned that the lower end 119 of the gate will pass beneath it when the gate is closed, as shown in Figure 10. This lip 118 will divert the falling tea away from the side of the mandrel opposite the gate as illustrated in Figure 10, and I have found that when the stream of tea is so diverted the lower edge of the gate toward the end of the closing movement will not be passing through the stream of tea. This will prevent any large pieces of tea

from being jammed against the side of the tube when the gate is closed. One of the most difficult problems to meet in the continuous packaging of tea has been to provide a gate which will give a complete cut-off of the flow of tea during the period when the transverse seal is being formed, and I have found that the arrangement above described is very successful in preventing any leakage of tea past the gate when it is closed.

Further, in connection with the gate, it is to be noted that the gate is at the extreme lower end of the mandrel and, in fact, constitutes an extension of one side of the mandrel. It is also to be noted that the point at which the flow of tea is cut off is immediately above the place at which the transverse seal of the tube of packaging material is formed so that the flow of tea is interrupted substantially within the walls of the package which will contain the particular charge of tea. The gate forms an acute angle with the opposite wall of the mandrel. In other words, the gate does not swing through an arc of 90° but in effect only moves across the mandrel opening.

The feed of the tea through the mandrel is so regulated by adjustment of the centrifugal plate 24 that a complete charge will not gather on the gate when it is shut. It is necessary to interrupt the flow of tea only long enough to permit formation of the transverse seal and during this period a small amount of tea will collect on the gate. The flow of tea above the gate, however, is not interrupted. Therefore, when the gate is opened the tea falling through the mandrel will carry along into the tube of packaging material any tea which has collected on the gate. Since the tea is deposited substantially within the package which will contain it and, since the period of interruption of the flow is so brief, there is no space or time for any small particles to float about in the air and interfere with the formation of the transverse seal. In other words, there is no opportunity for the lighter particles to "straggle" or lag behind the larger as is the case when the flow of tea is cut off above the bottom of the feeder mandrel and allowed to drop through the mandrel into the package.

Referring to Figure 4, it will be observed that the transverse sealing rolls 52 are in such position that the engaging portions 53 of the two rolls have not quite completed the formation of the transverse seal. The gate 27 is in open position to permit the flow of tea even though the transverse seal has not been completely formed. However, during the interval of time required for the tea to fall from the gate downwardly, the seal will be completed. To put it in another way, there is a small time increment when the transverse seal has not been completely formed and the gate is opened. However, the falling tea will not reach the transverse seal during this period and by the time the tea has fallen sufficiently to reach the transverse seal it will have been completely formed.

It is to be noted that the bags of tea are not filled completely. Somewhat on the order of one-third the amount of tea the bag will hold is considered a package charge, the purpose being to allow room for the expansion of the tea when it is wet. Therefore, in regulating the speed of the centrifugal plate 24, which governs the amount of tea falling through the tube, the speed is so adjusted that sufficient tea to charge a package is thrown from the plate during the interval of time that the amount of packaging material

needed to form a package passes the end of the mandrel.

Mechanism for mounting the rolls of paper 46 and for providing adjustment thereof to insure proper tracking thereof is illustrated in Figures 1 and 2. This requires two adjustments of the rolls of paper; first, an adjustment to move the rolls longitudinally of the shafts on which they are mounted; and second, to tilt the shaft carrying the rolls.

Since the mechanism for adjusting both rolls of paper is the same, it will be described only in connection with one of the rolls. The longitudinal adjustment of the roll on the shaft is effected as follows. The shaft 120 is provided with flanges 121 and 122 for carrying the roll of paper and the flange 122 is provided with an annular groove 123 into which a roller 124 fits. This roller is carried on the end of the stem 125 which is screw-threaded in block 126 and adjusted by means of a knurled knob 127 to move the roller 124 back and forth axially of shaft 120. This movement will impart a like movement to the roll of paper to secure axial adjustment thereof with respect to the shaft 120.

The tilting of the roll of paper is effected as follows. The block 126 is mounted on a shaft 128 which is rotatable in bearings 129 supported from the frame of the machine.

Since the shaft 120 is mounted in bearing block 126 and, since the bearing block 126 is carried by the shaft 128, it will be seen that, upon rotation of shaft 128, the bearing block will turn with it thus giving an arcuate or tilting motion to the shaft 120 in a plane transverse the plane of the roll of paper. This motion is imparted to shaft 126 by means of the knurled knob 130 of a screw-threaded adjusting rod 131. Turning of the rod 131 will move the grooved block 132, into which the lower end of lever 133 fits, back and forth thus imparting a tilting movement to the block 126 which, as above described, carries the shaft 120 on which the roll of paper is mounted.

I claim:

1. Apparatus for forming packages of a loose, flowing commodity comprising a substantially vertical hollow feeder mandrel, means to supply a continuous, uniform flow of the commodity to the upper end of said mandrel, means to continuously advance a flexible tube of packaging material downwardly about said mandrel, a gate at the lower end of said mandrel to interrupt the flow of said commodity, transverse sealing means immediately below said gate adapted to form a transverse seal in said tube and means to sever said tube transversely in the area of the said transverse seal, the rate of feed of the commodity to the mandrel being such that less than a package charge will collect on the gate during the interval of time the gate is closed.

2. Apparatus for forming packages of a loose, flowing commodity comprising a substantially vertical hollow feeder mandrel, means to supply a continuous, uniform flow of the commodity to the upper end of said mandrel, means to continuously advance a flexible tube of packaging material downwardly about said mandrel, a gate at the lower end of said mandrel to interrupt the flow of said commodity, transverse sealing means immediately below said gate adapted to form a transverse seal in said tube and means to sever said tube transversely in the area of the said transverse seal, the rate of feed of the commodity to the mandrel being such that less than a package charge will collect on the gate during the

interval of time the gate is closed, the balance of the package charge being supplied during the period in which the gate is open.

3. The method of forming packages of a loose, flowing commodity which comprises forming a tube about a substantially vertical hollow mandrel, continuously moving said tube downwardly about the mandrel, supplying a continuous flow of the commodity to the upper end of the mandrel at such rate that a package charge is fed to the mandrel during the time that packaging material for one package is passing the end of the mandrel, forming a transverse seal in said tube immediately below the end of the mandrel while the tube is moving downwardly, interrupting the flow of the commodity at the lower end of said mandrel while the transverse seal is being formed and severing the tube transversely in the area of said transverse seal.

4. The method of forming packages of a loose, flowing commodity which comprises forming a tube about a substantially vertical hollow mandrel, continuously moving said tube downwardly about the mandrel, supplying a continuous flow of the commodity to the upper end of the mandrel at such rate that a package charge is fed to the mandrel during the time that the packaging material for one package is passing the end of the mandrel, forming a transverse seal in said tube immediately below the lower end of said mandrel while said tube is moving downwardly, interrupting the flow of the material to be packaged at the lower end of said mandrel while the said transverse seal is being formed and severing a tube transversely in the area of the transverse seal, the time the flow is interrupted being such that substantially less than a package charge will collect in the lower end of said mandrel.

5. The method of forming packages of a loose, flowing commodity which comprises forming a tube about a substantially vertical hollow mandrel, continuously moving said tube downwardly about the mandrel, supplying a continuous flow of the commodity to the upper end of the mandrel at such rate that a package charge is fed to the mandrel during the time that the packaging material for one package is passing the end of the mandrel, forming a transverse seal in said tube immediately below the lower end of said mandrel while said tube is moving downwardly, interrupting the flow of the commodity at the lower end of said mandrel while the said transverse seal is being formed and severing the tube transversely in the area of the transverse seal, the time the flow is interrupted being such that substantially less than a package charge will collect in the lower end of said mandrel the balance of the package charge being supplied during the period in which the flow of material is not interrupted.

6. Apparatus for forming packages of a loose, flowing commodity, comprising a hollow feeder mandrel, means for supplying a continuous, uniform flow of the commodity to the upper end of said mandrel, means for continuously advancing opposed strips of flexible packaging material along opposite sides of the mandrel and sealing the edges of the one strip to the opposed edges of the other to form a tube, rotary sealing means immediately below the end of said mandrel adapted to seal said strips together transversely at intervals, a gate at the lower end of said mandrel to interrupt the flow of said commodity, means to close the gate while the transverse seal

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is being formed, and means to sever the packaging material transversely thereof in the area of the transverse seal.

7. Apparatus for forming packages of a loose, flowing commodity comprising a hollow feeder mandrel, means for supplying a continuous, uniform flow of the commodity to the upper end of said mandrel, means for continuously advancing opposed strips of flexible packaging material along opposite sides of the mandrel and sealing the edges of the one strip to the opposed edges of the other, rotary sealing means immediately below the end of said mandrel adapted to seal said strips together transversely at intervals, a gate at the lower end of said mandrel to interrupt the flow of said commodity, means to close the gate while the transverse seal is being formed, and means to sever the packaging material transversely thereof in the area of the transverse seal, the said commodity being supplied to the upper end of the mandrel substantially at such rate that a package charge is fed to the mandrel during the time that material to form one package is passing the end of the mandrel.

8. In apparatus for forming packages of a loose, flowing commodity, a substantially vertical hollow feeder mandrel, means to supply a continuous, uniform flow of material to be packaged to the upper end of said mandrel, means to advance a flexible tube of packaging material downwardly about said mandrel, and a gate at the lower end of the mandrel, said gate constituting a portion of the wall of the mandrel and being hinged to swing into engagement with an opposite wall portion of the mandrel to interrupt the flow of material.

9. In apparatus for forming packages of a loose, flowing commodity, a substantially vertical hollow feeder mandrel, means to supply a continuous, uniform flow of the commodity to the upper end of said mandrel, means to advance a flexible tube of packaging material downwardly about said mandrel and a gate at the lower end of the mandrel, said gate constituting a portion of the wall of the mandrel and being hinged to swing into engagement with an opposite wall portion of the mandrel, said opposite wall portion having an inwardly projecting lip adapted to de-

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flect the flowing commodity away from the wall of the mandrel below the lip.

10. In apparatus for forming packages of a loose, flowing commodity, a substantially vertical hollow feeder mandrel, means to supply a continuous, uniform flow of the commodity to the upper end of said mandrel, means to advance a flexible tube of packaging material downwardly about said mandrel, and a gate at the lower end of the mandrel, said gate constituting a portion of the wall of the mandrel and being hinged to swing into engagement with an opposite wall portion of the mandrel, said opposite wall portion having an inwardly projecting lip extending into the path of flow of the commodity above the lower end of the mandrel.

11. In apparatus for forming packages of a loose, flowing commodity, a substantially vertical hollow feeder mandrel, means to supply a continuous, uniform flow of the commodity to the upper end of said mandrel, means to advance a flexible tube of packaging material downwardly about said mandrel, a gate at the lower end of the mandrel, said gate constituting a portion of the wall of the mandrel and being hinged to swing into engagement with an opposite wall portion of the mandrel at an acute angle thereto to interrupt the flow of material, and an inwardly projecting lip on said opposite wall portion of the mandrel, above the lower end thereof.

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