

July 5, 1960

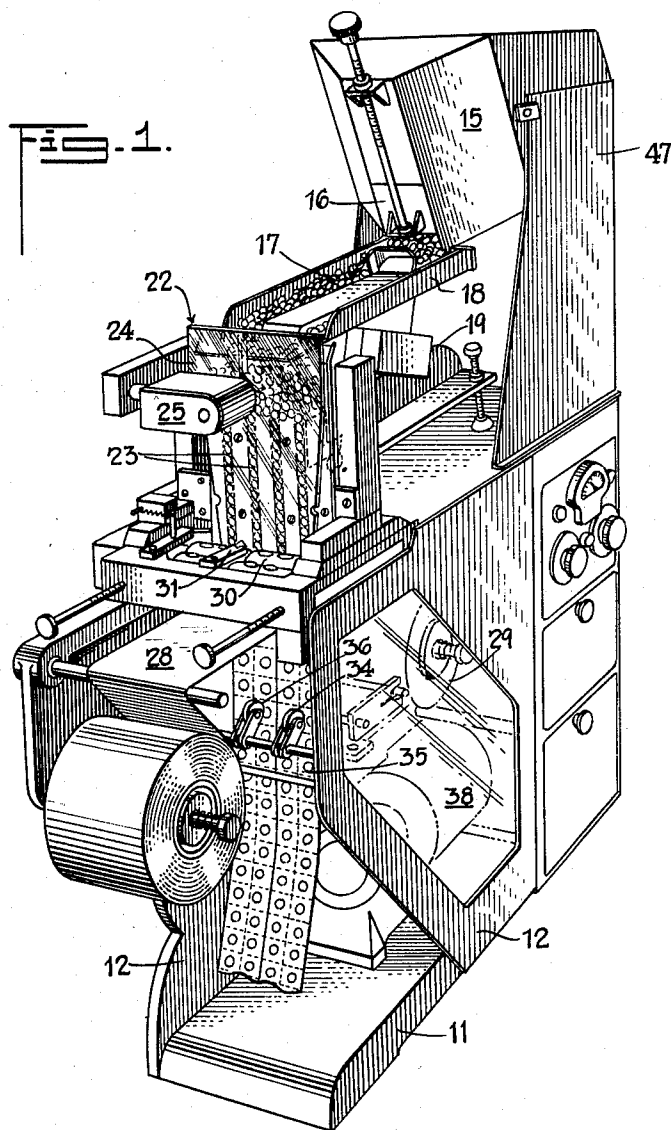
J. H. STROOP

2,943,428

HIGH SPEED PACKAGING MACHINE

Filed Nov. 1, 1956

5 Sheets-Sheet 1



INVENTOR.
JOHN H. STROOP
BY *R. J. Dearborn*
ATTORNEY

July 5, 1960

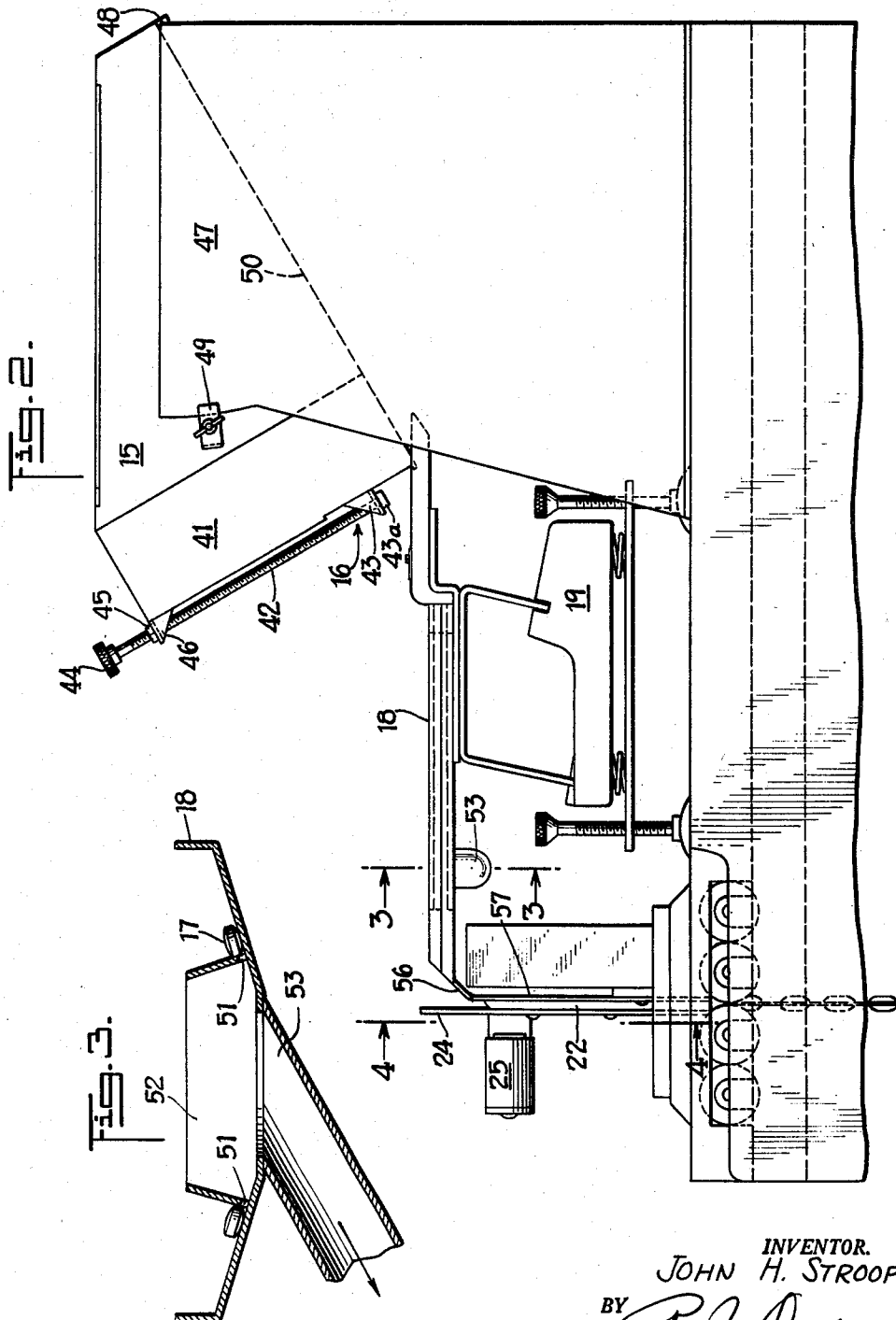
J. H. STROOP

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HIGH SPEED PACKAGING MACHINE

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5 Sheets-Sheet 2



INVENTOR.
JOHN H. STROOP
BY *R. J. Deubner*
ATTORNEY

July 5, 1960

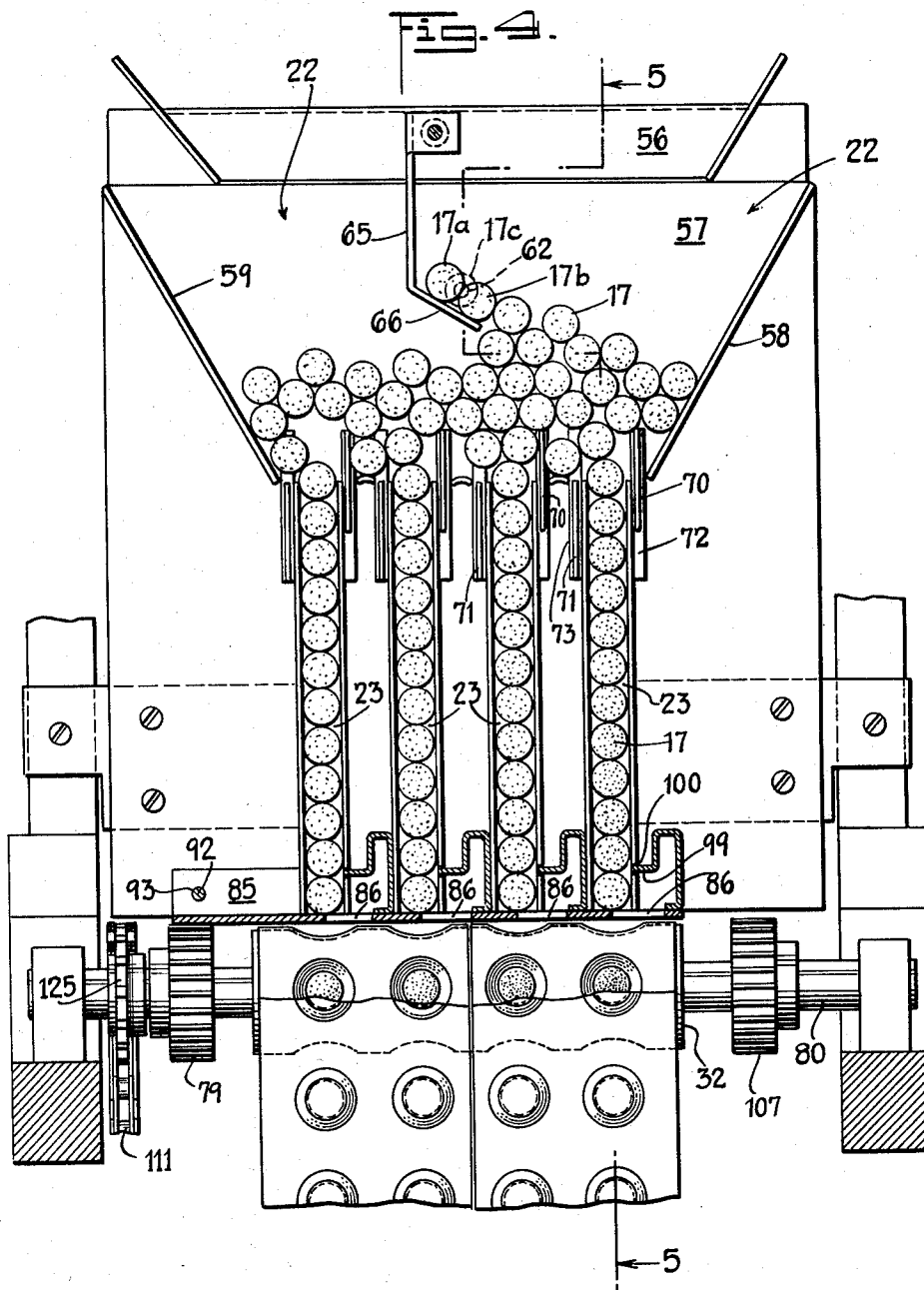
J. H. STROOP

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HIGH SPEED PACKAGING MACHINE

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5 Sheets-Sheet 3



INVENTOR.
JOHN H. STROOP
BY *R. J. Dearborn*
ATTORNEY

July 5, 1960

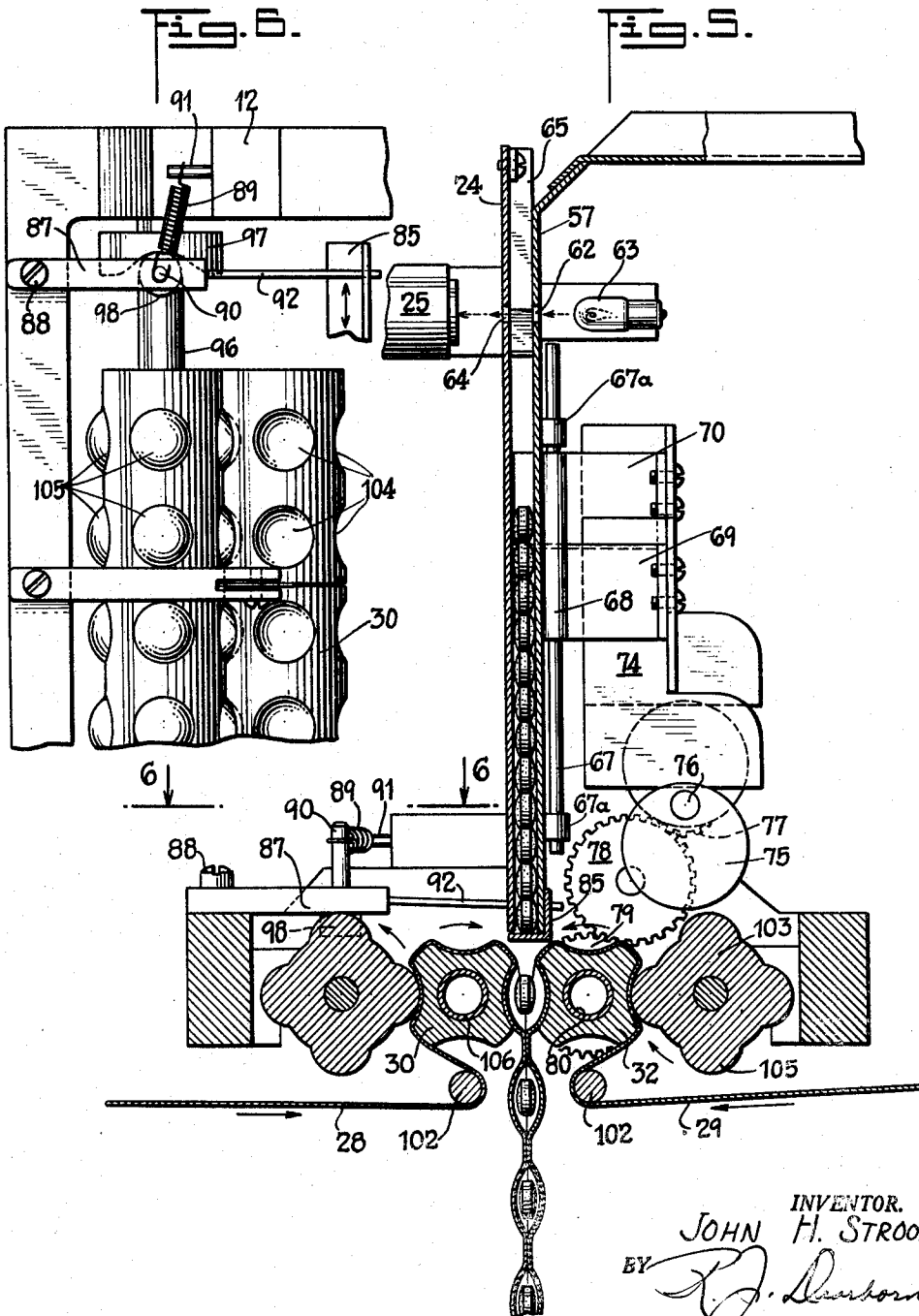
J. H. STROOP

2,943,428

HIGH SPEED PACKAGING MACHINE

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5 Sheets-Sheet 4



INVENTOR.

JOHN H. STROOP

EY

ATTORNEY

July 5, 1960

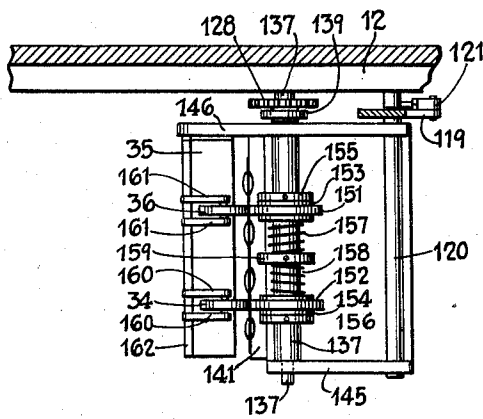
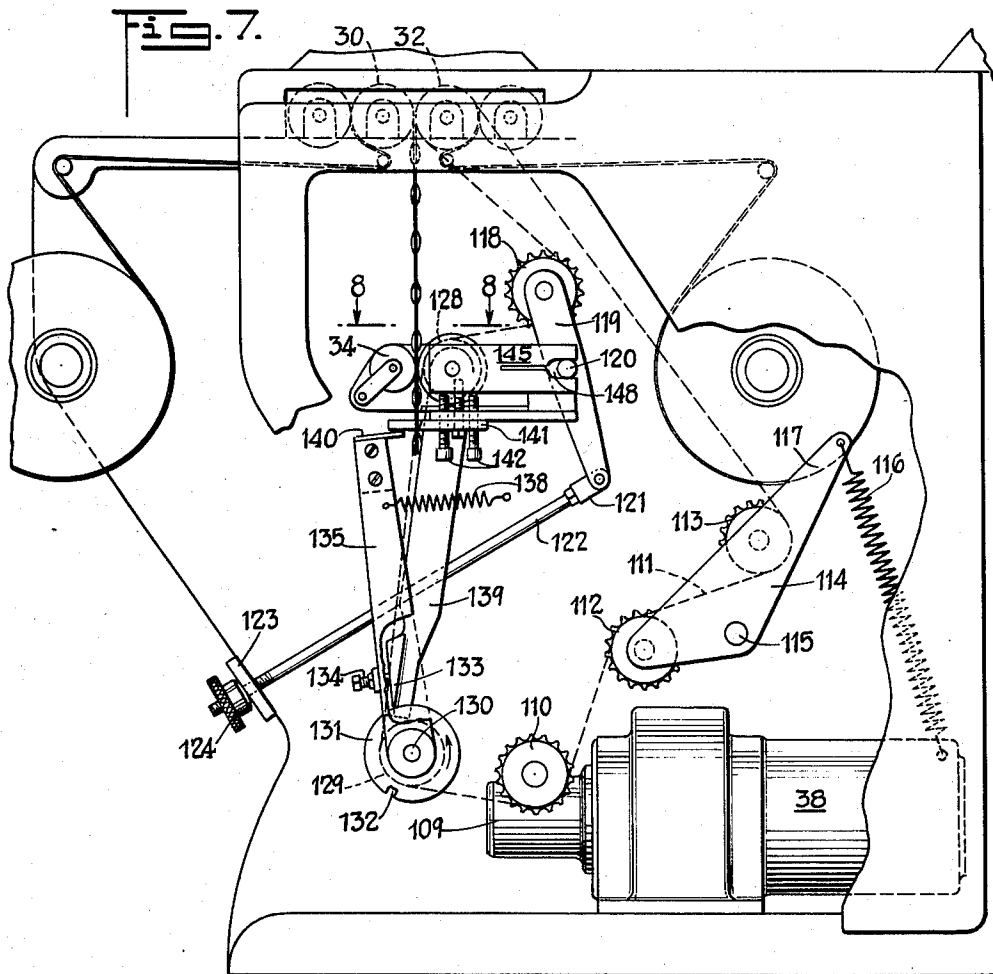
J. H. STROOP

2,943,428

HIGH SPEED PACKAGING MACHINE

Filed Nov. 1, 1956

5 Sheets-Sheet 5



INVENTOR.
JOHN H. STROOP
BY *[Signature]*
ATTORNEY

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2,943,428

HIGH SPEED PACKAGING MACHINE

John H. Stroop, New York, N.Y., assignor to Vol-Pak, Inc., New York, N.Y., a corporation of New York

Filed Nov. 1, 1956, Ser. No. 619,877

6 Claims. (Cl. 53—59)

This invention is concerned with packaging machines in general and more specifically with an improved high speed, article packaging machine. The machine according to this invention, is of a type wherein two webs are brought together around the article to be packaged, and sealed at the edges thereof.

An object of this invention is to provide a machine of the aforementioned type which is relatively simple in construction and reliable in operation.

Another object of the invention is to provide a machine such that it has a superior ability for high speed continuous operation while also being economical with respect to wastage or overflow of the articles being packaged. Thus, it is not necessary to provide the machine with a substantially greater number of articles being fed in for packaging than the quantity which are being continuously packaged.

Another object of the invention is to provide a machine which includes a feeding arrangement for maintaining the necessary supply of articles for packaging, without any overflow of articles.

Still another object of the invention is to provide a machine of the type indicated which employs a knife for cutting the strip of packaged articles into separate package units, wherein the arrangement for such knife includes an adjustable drive in connection with the package strips such that the timing of each cut may be adjusted while the machine is in motion. In this way the cutting adjustment is extremely simple and may be carried out by any non-skilled operator.

Briefly the invention concerns a combination that is employed in a high speed packaging machine. Such machine having a pair of webs brought together and sealed around each package. Furthermore, said webs are subjected to a timed preforming pocket deformation, and said objects are fed into the pockets thus formed in predetermined quantities from an upstanding chute. The particular combination of elements includes those making up an automatic controlled-rate feed means which comprises means for feeding the said objects to the entrance of said chute at a rate exceeding the rate of packaging said objects. The combination also comprising a means for controlling the interruption of said feeding means whenever a predetermined quantity of objects is located at the entrance of said chute awaiting entrance therein, in order to control the total feed so as to maintain an adequate supply without overflow.

Another brief characterization of the invention is one concerning an improved high speed packaging machine. Such packaging machine comprising a pair of cooperating rollers of relatively small diameter having a series of peripherally spaced commodity-defining pockets to receive the articles to be packaged. The machine also comprising means for feeding two independent webs downwardly between the cooperating rollers, and an additional roller having the same diameter as, and cooperating with, each of said first named pair of rollers to preform said web within said pockets. The machine further comprising means for supplying a stream of articles to said pockets in succession for packaging by said webs, said additional rollers being driven in timed relation with said first named pair of rollers and having a series of protrusions thereon situated correspondingly with relation to said pockets for preforming the webs therein.

A preferred embodiment of the invention is set forth

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below by way of example thereof, which is described herein and illustrated in the drawings, in which:

Fig. 1 is a front perspective view of the entire machine;

Fig. 2 is an enlarged side elevation of the upper part of the machine;

Fig. 3 is a cross sectional detailed view, somewhat further enlarged, taken along the lines 3—3 of Fig. 2 looking in the direction of the arrows;

Fig. 4 is an enlarged front elevation view, partly in cross section, taken along the lines 4—4 of Fig. 2, looking in the direction of the arrows;

Fig. 5 is a cross sectional view taken along the lines 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a partial, plan view taken along the lines 6—6 of Fig. 5;

Fig. 7 is an enlarged side elevation of the lower part of the machine with some of the housing broken away to show the interior elements, and;

Fig. 8 is a partial plan view taken along the lines 8—8 of Fig. 7.

Referring to Fig. 1, the overall operation of the machine will be described, followed by a more detailed description of various elements thereof. In the latter case, specific reference will be made to other figures of the drawings. The embodiment of the invention that is illustrated is a relatively simple and compact machine that is mounted on a base 11 by means of various framework structure such as side panels 12. At the top of the machine toward the rear thereof, when viewed as shown in Fig. 1, there is an article holding hopper 15 which has an upstanding slidably adjustable door 16 thereon. The position of this door controls the flow of articles, e.g. a plurality of generally flat circular tablets 17 illustrated. These articles 17 move horizontally along both sides of a vibratory feed trough 18 at a controlled rate as determined by an electrically driven vibrator 19.

The tablets 17 are deposited by gravity from the sloping lip at the end of the trough 18 into a chute 22. Within the chute 22, there are a plurality of individual channels or sub chutes 23 which may be observed through a transparent front panel 24 which makes up one wall of the chute 22.

As the tablets 17 build up on top of one another within the chute 22, they reach a level where they obstruct a light beam from behind the chute 22 that is directed out to a photo-cell unit 25. This photo-cell unit operates to control a switch for the circuit which controls energization of the vibrator 19, so that whenever the given level of articles has been reached, the vibrator is cut off until the articles are fed down below such level again. In this manner the feeding of articles is controlled by the rate at which the articles are fed through the packaging elements of the machine, without any inefficiency or wastage problem created by an overflow of articles. This is done while still insuring an adequate supply of articles, by having the vibrator set at a speed something greater than the rate of packaging the articles, so that an adequate supply is always maintained.

As the tablets progress down the individual sub chutes 23, they are released from the bottom of each such channel into correspondingly located pockets which have been preformed in each of a pair of webs 28 and 29. Webs 28 and 29 are brought around over the surface of package forming and sealing rollers 30 and 32 (see Figs. 4 and 5) where the packaging operation is carried out. It is pointed out that there is a longitudinal slitting knife 31 (see Fig. 1) in connection with each web 28 and 29 in order to divide the strip of packaged articles longitudinally, between any given set of strips of articles as packaged.

As the packaged article strips leave the forming and sealing rollers 30 and 32, they are maintained under tension by means of pull down rollers (not shown in Fig. 1) acting in conjunction with idler, marking rollers 34 and 36 respectively. There is a transverse separating knife 35 which reciprocates rapidly to cut the strip across between packaged tablets. In the illustration, according to Fig. 1, this knife 35 is not operating and a strip of packaged articles is shown continuing below the knife. As will be shown hereafter, there is an adjustment for the operation of the knife 35 relative to the strip so that cutting action may be quickly and easily changed to fall in the desired location between the individual packages of packaged articles.

The main power source for driving the mechanical elements of the machine may take various forms, but is illustrated as being an electric motor 38 which acts in conjunction with a chain drive to turn the pair of sealing rollers 30, 32, as will be pointed out in more detail below.

Referring to Figs. 2 and 3, some of the details of the preliminary feed action of the machine will be described. Articles to be packaged will be deposited within hopper 15 which has an inwardly sloping panelled portion 41 at the front, that carries attached thereon at the lower end of the front panel, the sliding door 16 which was mentioned above and is generally indicated on Fig. 1. Sliding door 16 leaves an adjustable opening at the bottom of the front panelled portion 41 of the hopper 15. The adjustment for door 16 may be carried out in any convenient manner, such as by means of a threaded shaft 42 which is attached to the sliding door 16 by means of a socket 43a attached to a bracket 43 illustrated. There is a collar (not shown) attached to the end of shaft 42. This collar is freely rotatable within the socket 43a but acts therewith to transmit end thrust so as to move the bracket 43 and door 16 longitudinally, with the end of threaded shaft 42. At the other end of the shaft 42 there is a knurled knob 44 for effecting the desired adjustment. Shaft 42 is supported near the upper end by internally threaded lug 45 which is fastened on to the hopper 15 by means of a bracket 46. The entire hopper 15 is detachable from the framework of the machine and is supported on the framework of the machine between side panels 47 by resting on the back edge of the machine with a hook-like edge extension 48 overlapping the same. The hopper is additionally held securely in place by means of clamps 49 with thumb screws as illustrated.

It will be observed that the hopper 15 is constructed so as to have sloping front sides and bottom, as indicated by the dashed line showing 50 at the bottom of the hopper, so that the articles will tend to slide downward and through the adjustably opened door 16.

As the articles are deposited at the end of the trough 18 they are made to travel horizontally along both sides thereof by the vibratory action produced when vibrator 19 is energized. It will be noted that as the articles travel along the trough 18 from right to left (as viewed in Fig. 2) they tend to become lined up in a single row, individually resting against the inner edge of either side of the trough 18, as illustrated in Fig. 3. For this reason a sorting out and elimination of broken pieces of the tablets 17 being fed as well as dust therefrom, is carried out. This sorting and cleaning is effectuated by means of a series of openings or slots 51 on the inwardly sloping side walls of a raised central structure 52, along the center of the trough 18. Thus, the dust and broken pieces of the tablets 17 will fall through the slots 51 and into the central area within the structure 52, from which place they will tend to fall and be drawn downward through a conduit 53. In order to make this action more effective, a vacuum or suction attachment (not shown) may be made to the conduit 53 for carrying away all

dust and broken particles which have been thus sorted out.

At the left end (as viewed in Fig. 2) of the trough 18 there is a downward sloping lip 56 over which the tablets 17 slide and fall into the chute 22. The tablets then continue downward by gravity between an inside panel 57 and the outer panel 24, which stands vertically parallel therewith. These panels are spaced apart just enough to freely accommodate the tablets when lying in a vertical position, i.e. standing on edge. Consequently, the articles will become piled up upon one another and spread out between a sloping side wall 58 (see Fig. 4) on one side, to a similar sloping side wall 59 on the other (Fig. 4).

It is pointed out that while a vertical chute 22 is employed in the illustrated embodiment, it might be more advantageous to use a slope other than vertical for some types of articles being packaged. Furthermore, a sloping chute having a lesser angle of elevation might be employed for tablets like those illustrated, without impairing the operation. If the articles were particularly fragile, it might be necessary to employ a lesser slope.

The tablets are being fed at a rate greater than the rate at which they are deposited in the packages. Consequently, they will continue to pile up vertically in the chute 22 until the level of an opening 62 is reached. Opening 62 is located through the back panel 57, and has a light source 63 (see Fig. 5) located directly behind it. Horizontally aligned with the beam of light which is thus emitted through the opening 62 there lies the photo-cell unit 25. This unit 25 may be a standard piece of equipment, and the details of its construction and operation will not be described since they form no part per se of the present invention. It may be noted that even though the front panel 24 is constructed of transparent material, as indicated above, there may be an opening 64 there-through which is horizontally aligned with the opening 26, so that a full strength beam of light may pass through from the light source 63 to the photo-cell unit 25.

Referring to Fig. 4, it will be observed that the build-up of the articles 17 as they pile up upon one another will finally cause one or more articles to come to rest lying across the path of light between openings 62 and 64. When this happens the circuit controlled by photo-cell unit 25 will cut off the operation of the vibrator 19, as has been indicated above. Then, when the tablet or tablets thus blocking the opening are removed, the vibrator will be reenergized. In order to make sure that the pile up of tablets 17 does not take place in a manner such that three or four of the tablets come to rest with an opening made as they touch one another, so positioned that it will allow passage of the light beam through from light source 63 to the photo-cell unit 25; there is a relatively thin vertical arm 65 which has a bent bottom or foot portion 66 thereon. Foot 66 is so situated relative to the holes or openings 62 and 64 such that the distance from the center line of these openings to the upper surface of the foot 66, measured perpendicularly from the surface of foot 66, is equal to the radius of the circle of any one of the tablets 17.

It will be noted that the arm 65 is attached in a convenient manner to the front panel 24 (see Fig. 5) and it has a width such that it extends for the full distance which separates the front panel 24 from the back panel 57, i.e. slightly greater than the width or thickness of tablets 17 when standing on edge. Now, by referring to Fig. 4, it will be observed that the action of this arm 65 and its lower foot portion 66 is to prevent the possible build-up of tablets 17, such that a substantial amount of light might pass between adjacent tablets across the path from opening 62 to opening 64, as indicated above. This possible build-up is prevented because the tablets are caused to lie with the locus of their center lines lying parallel to the foot 66 in the vicinity of the aligned openings 62 and 64. Consequently, no matter what the random pile-up is, the most unfavorable situation possible is, that

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illustrated in Fig. 4 where two tablets 17a and 17b are resting with their point of tangency lying at the center of the light beam path. Now, it will be observed that practically all of the light beam through opening 62 will be cut off, even in this most unfavorable situation. Therefore, the desired switching action will take place, and the possibility of an undesired continuing operation of the vibrator 19 has been eliminated. With more favorable conditions, a tablet may be held in the dotted line position indicated by 17c so, that the light beam would be entirely cut off.

At the lower edge of the main chute 22, i.e. between the bottom edges of sloping side walls 58 and 59, there are the four individual sub-chutes 23 which are continuously filled with tablets 17 from the main chute 22 above. In order to continuously maintain the sub-chutes 23 filled with tablets, and avoid any bridging across the tops thereof (which would prevent the continuous entry of tablets therein) each sub-chute 23 is provided with a pair of kicker arms 70 and 71. There are a pair of these kicker arms 70, 71 for each sub-chute 23, and each pair is substantially identical in structure and operation so that only one pair need be described.

The kicker arms 70 and 71 are each similar in construction and extend across the width (between panels 24 and 57) of the chute 22. They are vertically moveable alternately from one extreme position well above the top of the corresponding sub-chute 23 (arm 70 in Fig. 4), to a lower extreme position such that the kicker arm is down flush with the top of the sub-chute 23 (arm 71 in Fig. 4). Each of kicker arms 70 and 71 oscillates from its upper to its lower position in a slot 72 and 73 respectively, through the back panel 57.

Referring to Fig. 5, the related structure for causing the operation of the kicker arms is illustrated. It will be noted that each kicker arm is substantially identical so that a description of one will suffice to explain the operation of both. The kicker arm itself is in fact constructed of a rectangular plate 69 which extends through the vertically located slot 73. The plate 69 has integrally attached thereto a sleeve 68, which surrounds a guide rod 67 with a free sliding fit. The guide rod 67 is fastened to the back panel 57 in any feasible manner, e.g. by lugs 67a, as shown. There is an L-shaped plate 74 fastened to the rear edge of kicker arm plate 69 in any convenient manner such as by means of the machine screws illustrated. The bottom edge of L-shaped plate 74 rests in a peripheral groove around the edge of an eccentric cam 75. Cam 75 is securely attached to, and rotated by, a shaft 76 that is in turn rotatably driven by means of a pinion 77 which meshes with a gear 78. Gear 78, in turn, is driven by another gear 79 that is securely fastened to a shaft 80 which carries the roller 32. Thus the action of each kicker arm 70 or 71 is driven from the power source for the machine, and as noted above each of the kicker arms 70 and 71 will have its eccentric cam set on cam shaft 76 so that the kicker arms of each pair oscillate up and down alternately in opposite directions.

Referring again to Fig. 4, it will be observed that there is an escapement mechanism for determining the release of a given quantity of tablets from the bottom of each sub-chute 23. In the illustrated embodiment of the invention this escapement is designed to allow one tablet to be deposited at a time from each of the sub-chutes 23. This could be varied, of course, if it should be desired to deposit two or more tablets at a time, by designing the escapement for the desired number. There is an angle bar 85 which extends horizontally under the lower end of all the sub-chutes 23, and which has a series of openings 86 in the horizontal portion thereof which are equal in size to the cross-sectional dimensions of sub-chutes 23. This angle bar 85 is actuated in horizontal reciprocating movement in timed relation with the rotation of the sealing rollers 30 and 32 by means of a cam actuated arm 87 (see Fig. 5). Arm 87 is spring biased to a counter-

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clockwise rotation about its pivot 88, by means of a spring 89 that is attached to an upright pin 90 which is carried by the arm 87. The other end of spring 89 is anchored at another pin 91 that is attached to the frame 12 of the machine. There is a rod 92 that is carried by, and extends horizontally from, the free end of the pivoted arm 87. Rod 92 engages the angle bar 85 by passing through a hole 93 (Fig. 4) in the vertical side portion of the angle bar 85.

Referring to Fig. 6, it will be observed that there is a cam 97 for oscillating the arm 87 to reciprocate the escapement bar 85. Cam 97 is generally cylindrical in outer configuration, but has a contoured face on the side toward arm 87. This cam is coaxial with a shaft 96 to which it is securely attached for rotation therewith. A cam wheel or roller 98 is carried in a freely rotatable manner by the arm 87, for causing oscillation of arm 87 horizontally about its pivot screw 88. This action causes angle bar 85 to be reciprocated horizontally, as indicated above, to cause the openings 86 to be aligned with the bottom of each of the sub-chutes 23.

It is pointed out that for each sub-chute 23 there is an escapement pin or finger 99 (see Fig. 4) which is directly mounted on the angle bar 85, and which acts to move horizontally therewith through an opening 100 in one side of each sub-chute 23 in order to come in contact with that tablet 17 just above the lower most tablet in the column within each chute 23. Each finger 99, therefore, acts to hold the column of tablets 17 located above the level of the opening 100, while the lower-most tablet falls through the opening 86, when it becomes aligned with the bottom of the chute. It will be noted that this action is mechanically timed relative to the packaging action of rollers 30, so that the articles will be deposited at the proper time after each pocket has been preformed and stands open ready to receive its tablet.

Referring principally to Fig. 5, it will be observed that the packaging action is carried out by the pair of sealing rollers 30 and 32 which are rotated with their axes lying horizontal and parallel to one another. The webs 28 and 29 of packaging material, are fed from supply rolls of heat sealable material, around a pair of guide rods 102 and over the surface of sealing rollers 30 and 32 respectively. Since the package forming mechanism is symmetrical in nature, the action of the two sides is similar, so that reference need be made to only one side thereof. Cooperating with the roller 32 there is a preforming roller 103 which lies with its axis horizontal and parallel to the axis of its cooperating package forming roller 32. The web 29 is fed over the guide rod 102 around the surface of the sealing roller 32. As it passes between roller 32 and preforming roller 103, the web 29 is deformed by being pressed into one of a plurality of pockets or indentations 104 (see Fig. 6) that are peripherally spaced around the surface of the roller 32. This deformation, or preforming of a pocket (insofar as the web is concerned), is carried out by one of a plurality of protrusions 105 around the surface of the roller 103.

It will be noted that although the illustrated protrusions 105 are shaped to just match the corresponding pockets 104, this need not necessarily be the case since a deformation of the web 29 may be created to a somewhat lesser extent by various other configurations extending from the surface of the roller 103.

The web 29 continues to be fed around the surface of the roller 32 during which time it may be softened preparatory to the sealing with the other web 28, by heat transmitted from the roller 32. The rollers 30 and 32 may be heated in any feasible manner, e.g. by means of electrical heating elements (not shown) contained in the hollow shafts 80 and 106. The webs 29 and 28 will then become sealed together around each tablet 17, under a predetermined pressure (depending upon the clearance between the surfaces of rollers 30 and 32), as the tangential surfaces of rollers 30 and 32 come together with

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the two webs therebetween. This action is well-known in the packaging machine art, and need not be described in any greater detail. However, it is pointed out that a very rapid and simple action may be obtained with a machine according to this invention. The sealing rollers 30 and 32 have relatively small diameters so that the pockets have wide open mouths as they are formed. This makes the action in filling them much less exacting and consequently the operation is more trouble free with the allowable speeds much higher. Volumetric structure for receiving the articles to be packaged is created by the preforming of each web in a positive manner by the timed preforming rollers which are geared to the package forming dies, or sealing rollers, so as to insure a proper pocket between the webs for receiving the articles. The gearing for providing this timed preforming action may be accomplished by a simple train of four gears meshing together, all securely attached to one of the shafts 80, 106, the shaft for preforming rollers 103, and the shaft for other preforming roller. One of these gears 107 is shown in Fig. 4 on shaft 80.

It is to be pointed out that the preforming of the webs of packaging material may be carried out to a greater or lesser extent if desired, as pointed out above, so that the articles deposited may or may not find themselves within an envelope that is fully open to a size for receiving the articles, in an unstressed manner. In this manner more fragile articles may have their pockets completely preformed, whereas those with greater strength, or crush resistance, may have the pocket only partially preformed to receive them.

Referring to Fig. 7 in particular, the action of the transverse article separating knife along with the tensioning mechanism, will be described. The source of mechanical power for the machine is an electric motor 38 which in this instance is mounted lengthwise so that its output includes a right angled direction changing gear box 109. Gear box 109 has at its output a chain drive sprocket wheel 110. Sprocket wheel 110 drives a chain 111, schematically indicated by a dashed line 111 in Fig. 7. The chain 111 passes over a pair of tensioning sprocket wheels 112 and 113, that are carried by stub-shafts which are attached to a pivoted, freely rotatable arm 114 that is pivoted about a shaft 115. There is a spring 116 that is attached at one end to an extremity, or extension 117 of the arm 114. The other end of the spring 116 is attached to the framework of the machine in a convenient manner, e.g. to a loop on the housing of motor 38 (as illustrated) in order to provide a spring bias for tending to rotate sprocket wheel carrying arm 114 in a clockwise direction about its pivot 115, as viewed in Fig. 7.

Chain 111 travels around a path which includes a sprocket wheel 125 (Fig. 4) that is securely attached to the shaft 80 for causing rotation thereof. The chain 111 continues around another idler sprocket 118 which is carried on one end of a rocker arm 119. Rocker arm 119 is pivotally adjustable about a central shaft 120 that is held rigidly in the framework 12 of the machine, and extends horizontally therefrom. The other end of the arm 119 has pivotally attached thereto a socket 121 that is internally threaded to receive the end of a rod 122. Rod 122 extends downward to the front of the machine (as viewed in Fig. 1) and passes through an opening in a bracket 123. This opening in bracket 123 is somewhat oblong in shape so as to allow for differences in the angular positions of the rod 122, as adjustment is made of the position for rocker arm 119 about its pivot 120. In order to make such adjustment there is a thumb nut 124, which has a knurled flange as illustrated, and which is internally threaded to be received on external threads at the lower extremity of the rod 122. Thus by turning the thumb nut 124, rod 122 is drawn downward or released and allowed to move upward, depending upon the direction of rotation of the nut 124. By this adjustment, the length of chain 111

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which lies between the sprocket wheel 125 (on sealing roller shaft 80) and a sprocket wheel 128 (see Fig. 8) which drives the pull down mechanism; may be varied in accordance with the adjustment of the position of rocker arm 119. This adjustment therefore makes a change in the relative positions of the two shafts driven by the sprocket wheels just mentioned, so that the relative position along the strip of the transverse cutting action is altered.

Continuing to follow the path of the chain 111 which has been traced above beginning at the motor powered sprocket 110, it will be noted that the chain 111 passes over the sprocket wheel 128 and then goes down to one more sprocket wheel 129, shown in dotted lines in Fig. 7. This sprocket wheel 129 is securely attached to a shaft 130. Also securely attached to shaft 130 to be rotated thereby, there is a disc 131. Disc 131 has a notch 132 in the edge thereof, and the disc acts as a cam surface for a blade 133 which is urged against the surface of the disc 131 by reason of the spring biasing action applied in a leverage manner as will appear. There is an adjustment screw 134 that is carried on a knife arm 135. Screw 134 rests against a surface of the cam rider blade 133. The knife arm 135 is pivoted for free rotation about the shaft 130, and is urged in a clockwise, rotational direction (as viewed in Fig. 7) by means of a spring 138, which is under tension. The swinging, or pivotal oscillation, of the knife blade arm 135 is controlled by the cam rider blade 133 which holds the arm 135 in the position illustrated in Fig. 7, until the notch 132 of the disc 131 reaches blade 133. When this happens an arm 139 which carries the blade 133 integrally attached thereon, and which is freely pivoted about a shaft 137; is released and allowed to swing to the right, or counterclockwise (as viewed in Fig. 7), for a short period of time, so that the knife blade arm 135 rapidly swings over and causes a transverse cut to be made.

The remaining elements of the knife arrangement for making a transverse cut across the strip of packaged materials, includes the horizontally extending knife blade 140 that is fastened at the extremity of the arm 135. A cooperating shear blade 141 extends horizontally across the machine, right beside the path traveled by the strip of packaged tablets shortly after it leaves the strip tensioning puller wheels. Shear blade 141 cooperates with blade 140 to provide the transverse cutting action desired. In order to obtain the best clean cutting action for this knife arrangement, the blade 141 is adjustable relative to its support structure by means of three adjustment screws 142 at either end of the blade 141. Such adjustment is conventional and takes place relative to a pair of end support plates 145 and 146. These plates are held in a fixed position by being supported at the left end of each (as viewed in Figs. 7 and 8) by having the shaft 137 pass therethrough. At the other end of each of these plates 145 and 146 there is a slotted notch 148 which creates a forked structure at that end of each of the plates. This forked structure formed by the notch 148 has its two ends lying on either side of the shaft 120 so as to allow easy assembly of the parts, while fixing the positions of the end plates 145 and 146 when the parts are assembled.

The web tensioning or pull down mechanism includes a pair of frictionally driven, soft tired wheels 151 and 152. These wheels are freely rotatable about the shaft 137 upon which they are mounted, but they are frictionally restrained for maintaining a given tension drive thereto. This friction drive may take various forms, e.g. a conventional arrangement which includes a friction material face disc 153 on one side of pull down wheel 151. Disc 153 is cemented to the adjacent face of a collar 155 which is pinned or otherwise securely fastened to the shaft 137 for rotation therewith. Similarly the other pull down wheel 152 has a friction disc 154

in contact with one face thereof, and there is a collar 156 to which disc 154 is cemented. The collar 156 is pinned to shaft 137 for positive rotation therewith.

The amount of frictional force applied between friction face discs 153, 154 and their corresponding pull down drive wheels 151 and 152 respectively, is determined by a pair of springs 157 and 158 which surround the shaft 137 and are attached to a centrally located collar 159. It is preferable, of course, to include washers as illustrated, between each spring 157, 158 and the corresponding pull down drive wheels 151 and 152. By this arrangement the pull down drive maintains a constant tension on the strip of packaged tablets 17 by reason of having the shaft 137 driven at a speed which would provide a higher linear speed at the surface of wheels 151 and 152 than the speed of travel of the strip, as it is formed. The difference in these two speeds is then taken up by the slippage involved in the frictional drive for wheels 151 and 152, so that they actually rotate at a speed less than the speed of rotation of the drive shaft 137.

In connection with each pull down wheel 151 and 152 there is the idler marking wheel 36 and 34 respectively. Each marking wheel is located tangentially with respect to the corresponding pull down wheel, but on the other side of the package strip. These idler marking wheels 34 and 36 are removably supported on short shafts carried between a pair of arms 160 and 161 respectively in the manner illustrated. These arms 160 and 161 are securely fastened to a cross shaft 162. The idler wheels 34 and 36 are spring biased into contact with their corresponding pull down wheels 152 and 151 respectively, that are located on the other side of the package strip. This spring bias may be accomplished in any convenient manner (not shown).

It is pointed out that the idler wheels 34 and 36 have an additional function, in that they may be changed for different batches of materials being packaged. Thus, a distinct code number or marking may be applied directly on the strip for each separate batch as the articles are packaged.

While a particular embodiment of the invention has been shown and described above in some detail in accordance with the applicable statutes, this is not to be taken as in any way limiting the invention, but merely being descriptive thereof.

It is claimed:

1. In a high speed packaging machine having a pair of webs brought together and sealed around each object packaged, wherein said webs are subjected to a timed preforming pocket deformation means, and wherein said objects are fed into the pocket thus formed in predetermined quantities from an upstanding chute, automatic controlled-rate feed means comprising means for feeding said objects to the entrance of said chute at a rate exceeding the rate of packaging said objects, said chute having transverse dimensions adapted for holding a column of said objects with the lowest object just above the pockets as formed, the entrance to said chute having one transverse dimension substantially equal to the corresponding transverse dimension of the chute so that the objects are oriented with one transverse dimension of each parallel to one another, agitator means alternately moveable at the entrance to said chute for preventing the formation and maintenance thereacross of a bridge formed by two or more of said objects, means for controlling the interruption of said feeding means whenever a predetermined quantity of objects is located at the entrance of said chute awaiting entrance therein, in order to control the total feed so as to maintain an adequate supply without overflow, and escapement means responsive to the preforming pocket deformation means for feeding at least one object into each pocket as the webs progress.

2. In a high speed packaging machine having a pair

of webs brought together and sealed around each object packaged, wherein said webs are subjected to a timed preforming pocket deformation means, and wherein said objects are fed into the pocket thus formed in predetermined quantities from an upstanding chute, automatic controlled-rate feed means comprising means for feeding said objects to the entrance of said chute at a rate exceeding the rate of packaging said objects, said chute having transverse dimensions adapted for holding a column of said objects with the lowest object just above the pockets as formed, the entrance to said chute having one transverse dimension substantially equal to the corresponding transverse dimension of the chute so that the objects are oriented with one transverse dimension of each parallel to one another, two vertically slidable extensions on opposite sides of the entrance to said chute, means for alternately reciprocating said extensions from a non-extending to an extending position in order to agitate the objects situated close to the entrance so as to maintain said chute in a filled state at all times, means for controlling the interruption of said feeding means whenever a predetermined quantity of objects is located at the entrance of said chute awaiting entrance therein, in order to control the total feed so as to maintain an adequate supply without overflow, and escapement means responsive to the preforming pocket means for feeding at least one object into each pocket as the webs progress.

3. In a high speed packaging machine having a pair of webs brought together and sealed around each article packaged, wherein said webs are subjected to a timed preforming pocket deformation at one side of each of a pair of sealing rollers while the other side of said pair of sealing rollers are juxtaposed tangentially for sealing said webs around the articles as deposited in said preformed pockets, said rollers each having peripherally spaced commodity-defining pockets therein and at least one circumferential groove around each roller separating said pockets, the combination of a multiple feed mechanism comprising a preliminary hopper adapted to contain a large quantity of disc-shaped pellets at random, a sliding door adapted to open and control the flow of pellets at random from the preliminary hopper, an inclined feed trough with spaced feed channels, having longitudinal slots therein, arranged to receive the disc-shaped pellets as they flow at random through the control door of the preliminary hopper, a vibrator for settling the random pellets on their flat sides and for moving them downwardly toward the discharge end of the feed channels, a narrow receptacle constituting a main hopper below the discharge ends of the feed trough channels, the sidewalls of said main hopper being spaced to hold the disc-shaped pellets in flat position in a single plane, a plurality of columns with narrow sidewalls corresponding to the width of the narrow main hopper and spaced laterally from each other, each of said columns opening at the top into the narrow receptacle to receive disc-shaped pellets therefrom, a pair of reciprocators, one at each side and extending upwardly, at the top of each column, means for actuating the reciprocators in alternation to liberate the pellets near the mouth of each column so that they will fall into said column, a pair of holes on opposite sides of the main hopper, an electric eye projecting rays through said holes, means responsive to the electric eye for stopping the vibrator when pellets are piled up at the top of the main hopper sufficiently to obscure the rays of the electric eye, a gate extending directly above the space between the dies of the machine and extending longitudinally parallel to the axis of the dies across all of the feed columns, means actuated by the dies and operating in synchronism with the dies for moving the gate backward and forward to simultaneously release at least one pellet from each column whereby each group of pellets falls into one set

of axially aligned pockets between the webs, and package severing and strip-marking means comprising means for maintaining said continuous strip under tension as it leaves said sealing rollers, said tension means including friction coupling overdrive means and cooperating idler wheel means for marking the strip prior to severing the packages, transverse shear means located adjacent to said tension means, means for actuating said shear means in timed relation with said strip for cutting the strip periodically to separate a predetermined number of packages from the strip, means for adjusting the timing of said shear actuating means relative to said strip while the strip is in motion in order to render such adjustment simple for an unexperienced operator, and web slitting means cooperating with said circumferential grooves for longitudinally slitting said webs just prior to the sealing operation to form a plurality of strips of packaged articles.

4. A high speed packaging machine comprising a pair of cooperating rotary, substantially cylindrical sealing dies having a plurality of pockets in axial alignment, said pockets being grouped circumferentially and uniformly around the dies, a second pair of cylindrical dies axially parallel to and mounted on opposite sides of the sealing dies and having projections corresponding to the pockets in the first pair, means for rotating the dies in synchronism to feed a pair of webs between the pocket dies and the sealing dies in succession, whereby pockets are preformed in the webs and enter the pockets in the sealing dies and a multiple feed mechanism comprising a preliminary hopper adapted to contain a large quantity of disc-shaped pellets at random, a sliding door adapted to open and control the flow of pellets at random from the preliminary hopper, an inclined feed trough with spaced feed channels, having longitudinal slots therein, arranged to receive the disc-shaped pellets as they flow at random through the control door of the preliminary hopper, a vibrator for settling the random pellets on their flat sides and for moving them downwardly toward the discharge end of the feed channels, a narrow receptacle constituting a main hopper below the discharge ends of the feed trough channels, the sidewalls of said main hopper being spaced to hold the disc-shaped pellets in flat position in a single plane, a plurality of columns with narrow sidewalls corresponding to the width of the narrow main hopper and spaced laterally from each other, each of said columns opening at the top into the narrow receptacle to receive disc-shaped pellets therefrom, a pair of reciprocators, one at each side and extending upwardly, at the top of each column, means for actuating the reciprocators in alternation to liberate the pellets near the mouth of each column so that they will fall into said column, a pair of holes on opposite sides of the main hopper, an electric eye projecting rays through said holes, means responsive to the electric eye for stopping the vibrator when pellets are piled up at the top of the main hopper sufficiently to obscure the rays of the electric eye, a gate extending directly above the space between the dies of the machine and extending longitudinally parallel to the axis of the dies across all of the feed columns, means actuated by the dies and operating in synchronism with the dies for moving the gate backward and forward to simultaneously release at least one pellet from each column whereby each group of pellets falls into one set of axially aligned pockets between the webs.

5. A high speed packaging machine comprising a pair of cooperating rotary, substantially cylindrical dies having a plurality of pockets in axial alignment, said pockets being grouped circumferentially and uniformly around the dies, means for rotating the dies to feed a pair of webs over said dies and a multiple feed mechanism comprising a preliminary hopper adapted to contain a large quantity of disc-shaped pellets at random, an inclined

feed trough with spaced feed channels, having longitudinal slots therein, arranged to receive the disc-shaped pellets as they flow at random from the preliminary hopper, a vibrator for settling the random pellets on their flat sides and for moving them downwardly toward the discharge end of the feed channels, a narrow receptacle constituting a main hopper below the discharge ends of the feed trough channels, the sidewalls of said main hopper being spaced to hold the disc-shaped pellets in flat position in a single plane, a plurality of columns with narrow sidewalls corresponding to the width of the narrow main hopper and spaced laterally from each other, each of said columns opening at the top into the narrow receptacle to receive disc-shaped pellets therefrom, a pair of reciprocators, one at each side and extending upwardly, at the top of each column, means for actuating the reciprocators in alternation to liberate the pellets near the mouth of each column so that they will fall into said column, a gate extending directly above the space between the dies of the machine and extending longitudinally parallel to the axis of the dies across all of the feed columns, means actuated by the dies and operating in synchronism therewith for moving the gate backward and forward to simultaneously release at least one pellet from each column.

6. In a high speed packaging machine having a pair of webs brought together and sealed around each article packaged, wherein said webs are subjected to a time preforming pocket deformation at one side of each of a pair of sealing rollers while the other sides of said pair of sealing rollers are juxtaposed tangentially for sealing said webs around the articles as deposited in said preformed pockets, said rollers each having peripherally spaced commodity-defining pockets therein and at least one circumferential groove around each roller separating said pockets, the combination of a feed mechanism comprising a chute for feeding said articles to said machine, an entrance to said chute for receiving said articles, means for feeding said articles to said entrance at a rate exceeding the rate of packaging of said articles by said machine, and means for interrupting said feeding means whenever a predetermined quantity of said articles is at said entrance to avoid overflow of said articles, and package severing and strip-marking means comprising means for maintaining said continuous strip under tension as it leaves said sealing rollers, said tension means including friction coupling overdrive means and cooperating idler wheel means for marking the strip prior to severing the packages, transverse shear means located adjacent to said tension means, means for actuating said shear means in timed relation with said strip for cutting the strip periodically to separate a predetermined number of packages from the strip, means for adjusting the timing of said shear actuating means relative to said strip while the strip is in motion in order to render such adjustment simple for an unexperienced operator, and web slitting means cooperating with said circumferential grooves for longitudinally slitting said webs just prior to the sealing operation to form a plurality of strips of packaged articles.

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