

June 15, 1948.

L. L. SALFISBERG

2,443,327

METHOD OF PACKAGING AND MACHINES THEREFOR

Filed Aug. 1, 1944

5 Sheets-Sheet 1

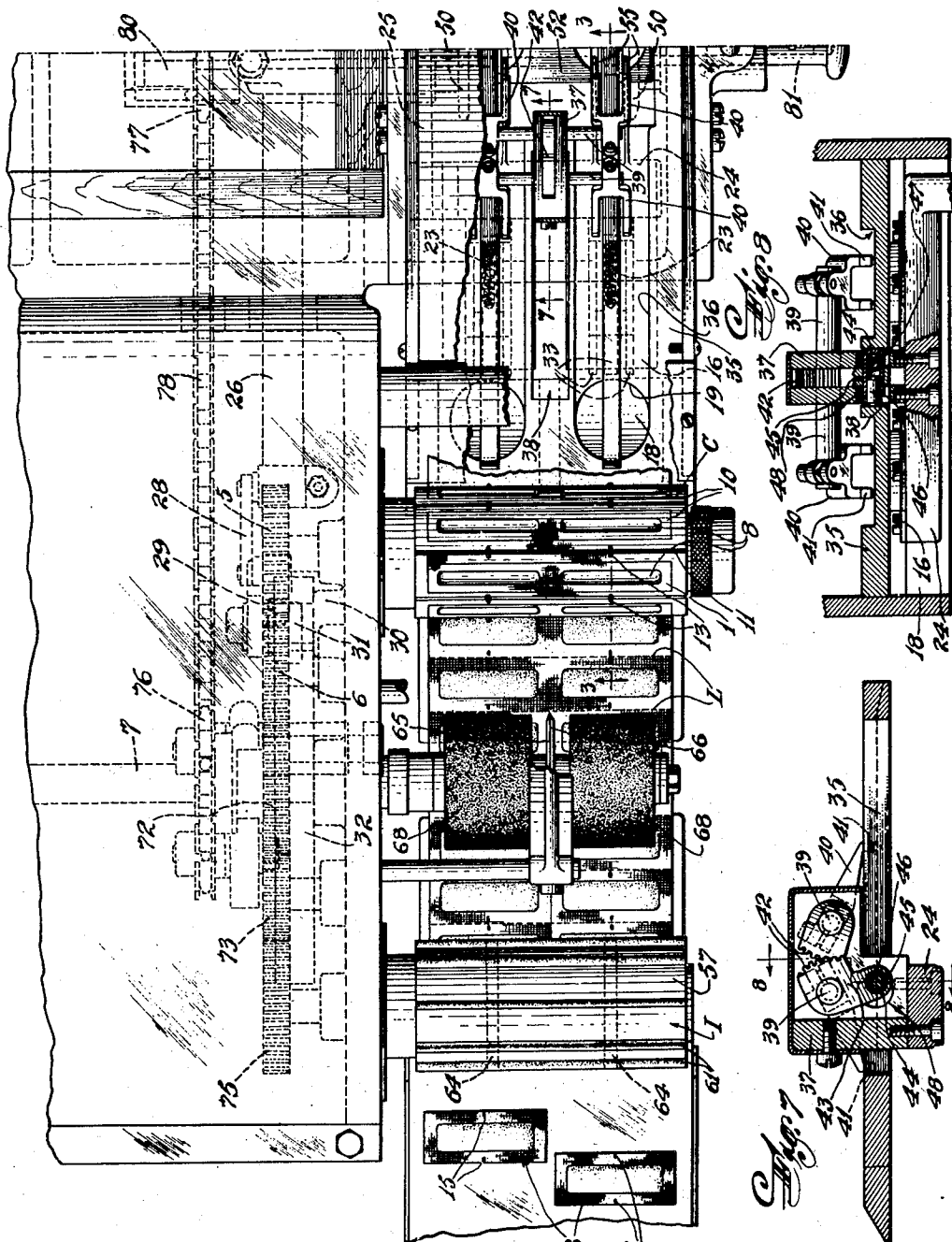


Fig. 1

Leroy L. Salfisberg,
Harry B. Cook.

Inventor

Attorney

June 15, 1948.

L. L. SALFISBERG

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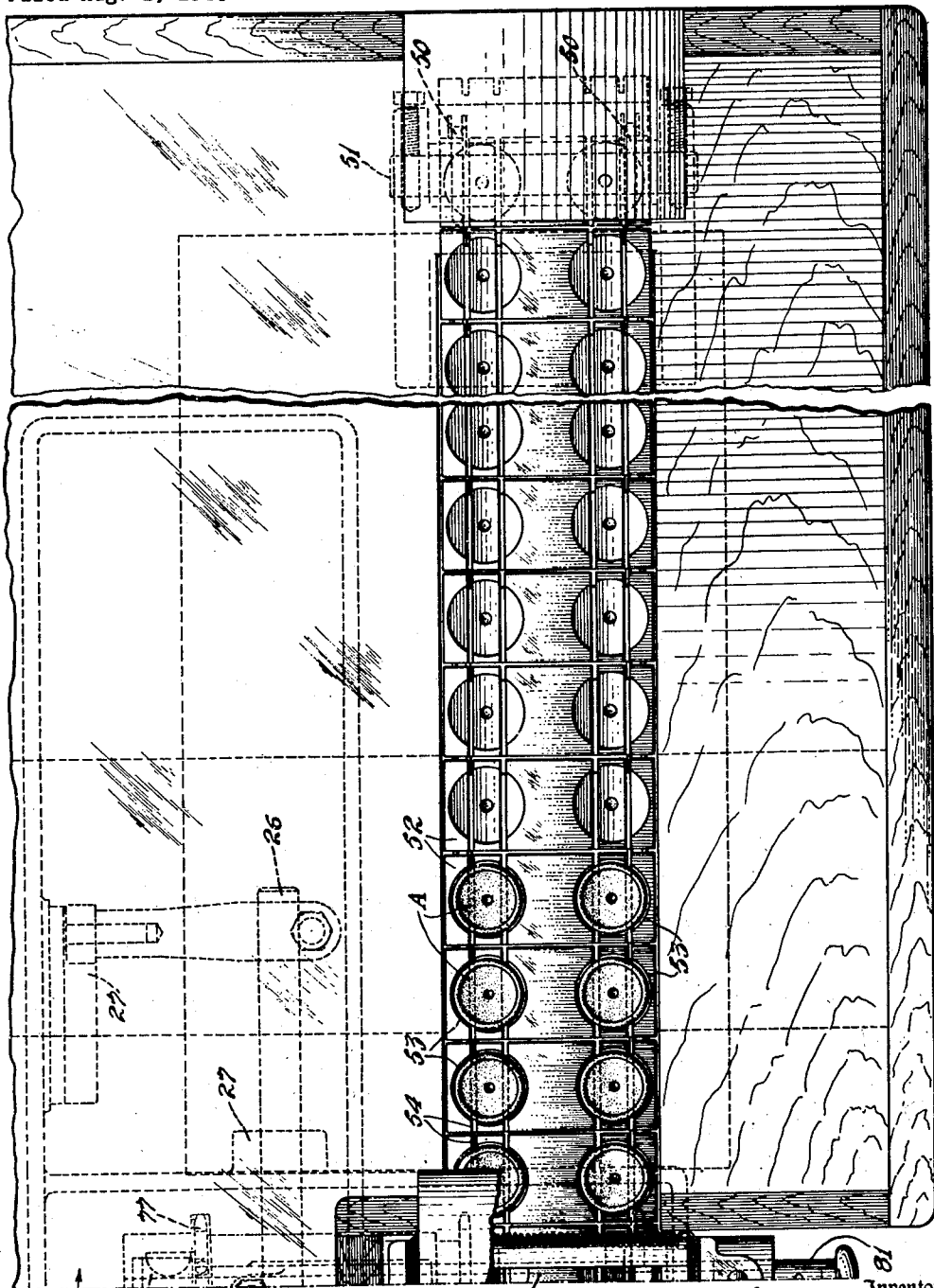


Fig. 1a

Inventor
Leroy L. Salfisberg,
Harry B. Cook,
Attorney

June 15, 1948.

L. L. SALFISBERG

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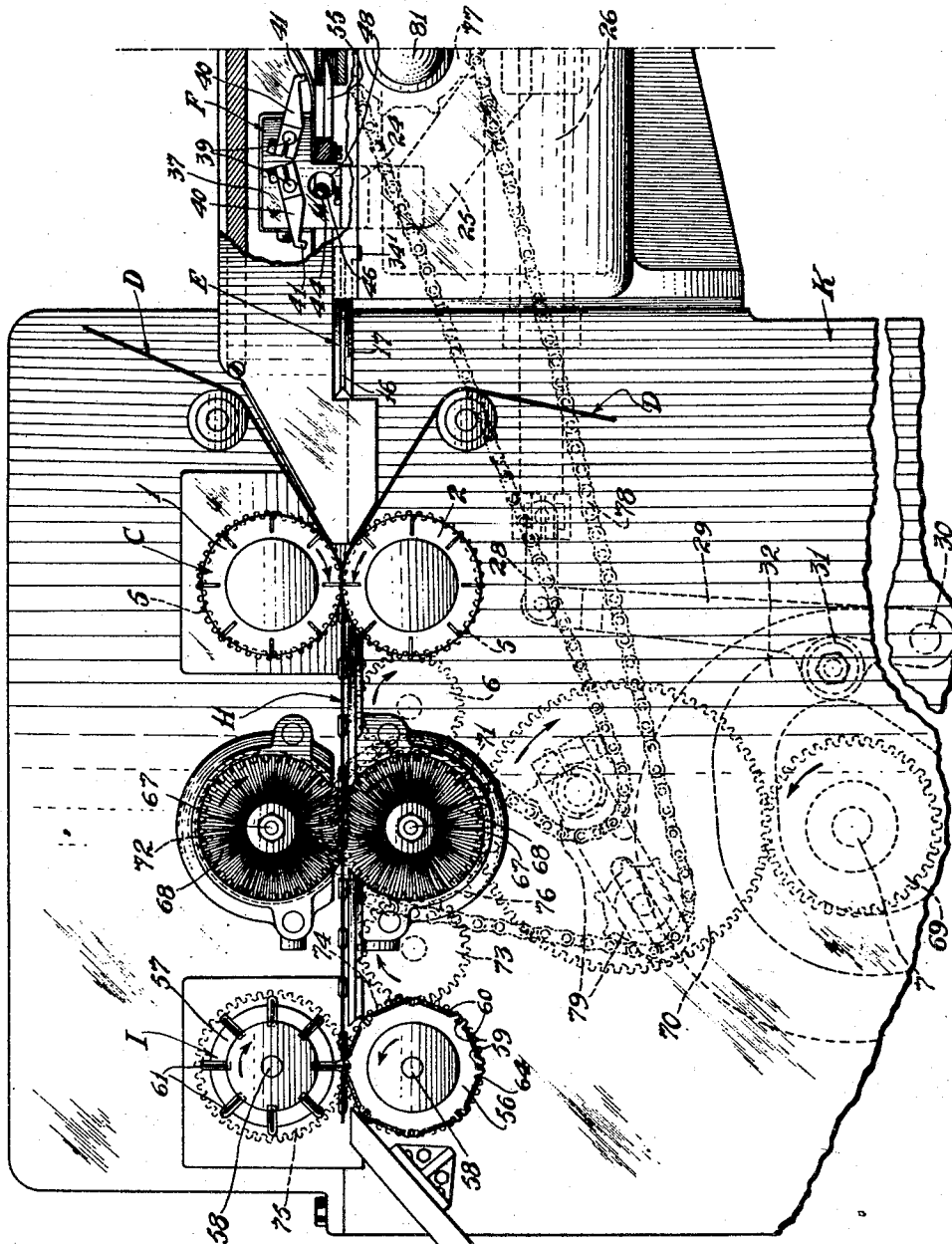


Fig. 2

Inventor
Leroy L. Salfisberg,
Harry B. Cook,
Attorney

June 15, 1948.

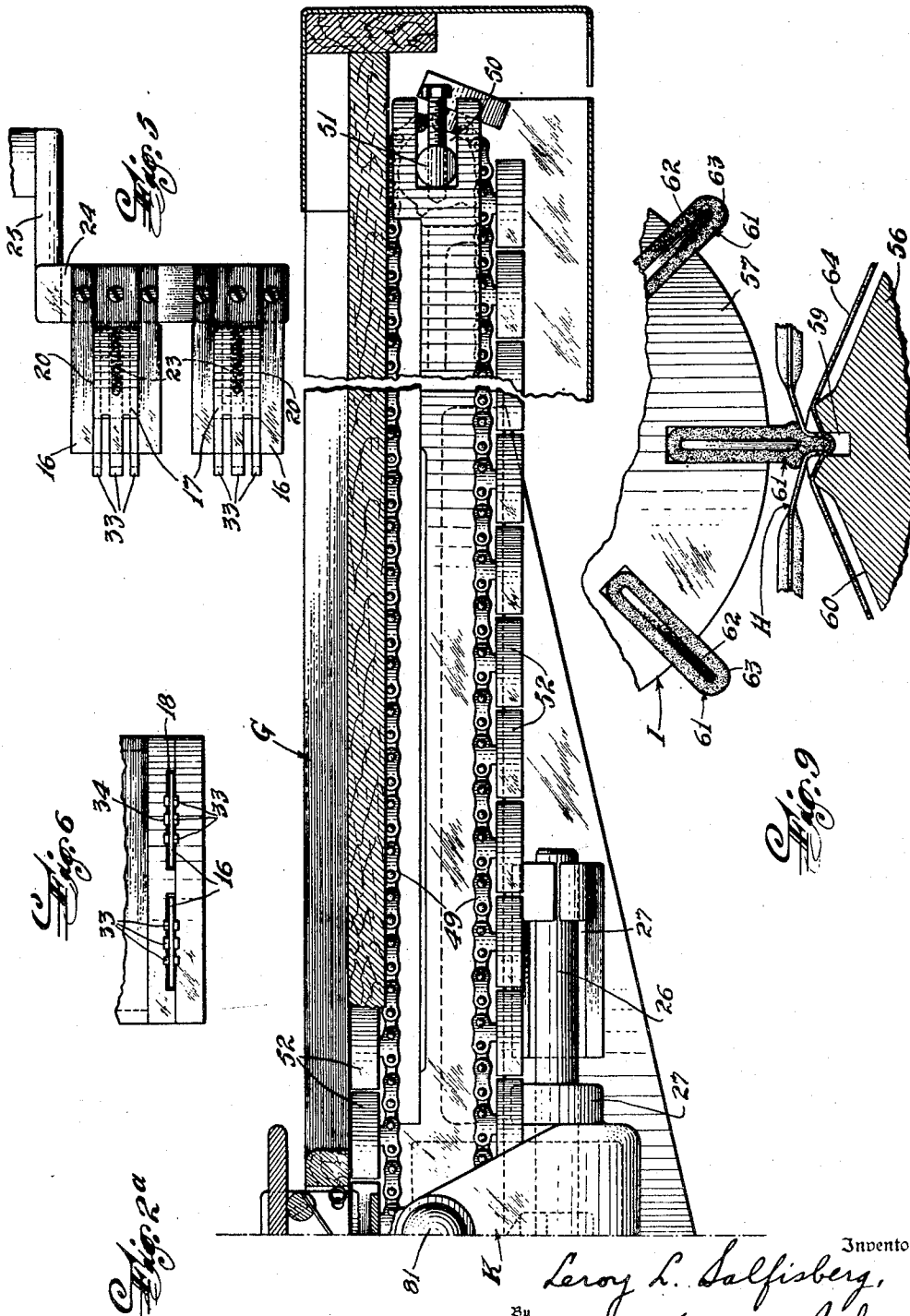
L. L. SALFISBERG

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5 Sheets-Sheet 4



Inventor
Leroy L. Salfisberg,
Harry R. Look,
Attorney

June 15, 1948.

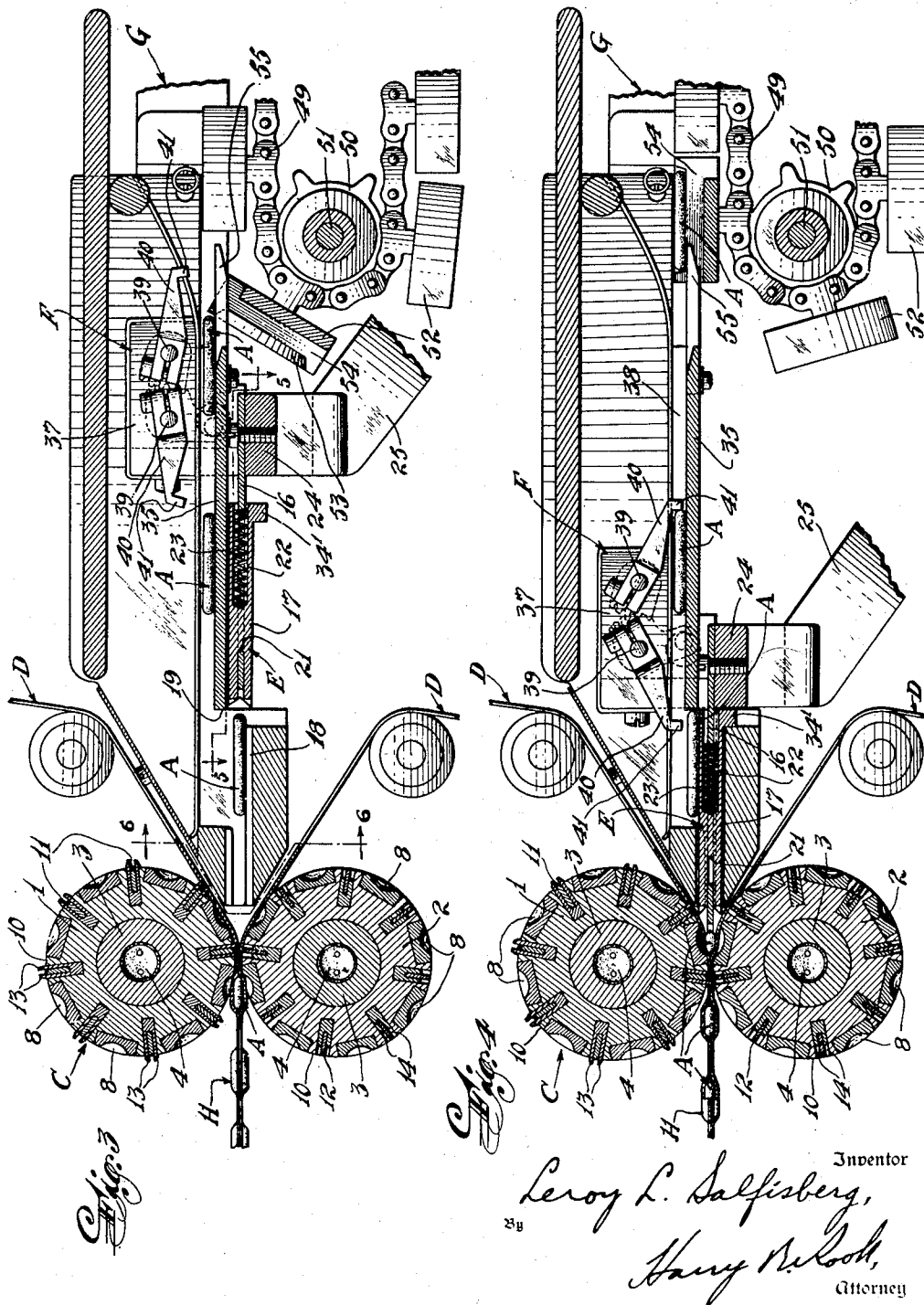
L. L. SALFISBERG

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METHOD OF PACKAGING AND MACHINES THEREFOR

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UNITED STATES PATENT OFFICE

2,443,327

METHOD OF PACKAGING AND MACHINE THEREFOR

Leroy L. Salfisberg, South Orange, N. J., assignor to Ivers-Lee Company, Newark N. J., a corporation of Delaware

Application August 1, 1944, Serial No. 547,603

12 Claims. (Cl. 93—3)

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This invention relates in general to the art of packaging articles and more particularly is directed to the enclosing of articles that can be deformed without injury thereto in individual packages of a shape different from that of the normal shape of the article.

On the one hand, certain articles, such as those made of soft rubber, have such normal shapes or the articles are so easily deformable that they cannot be individually packaged, or packaging thereof is extremely difficult, while on the other hand, it is often desired to place deformable articles into packages of special design or shape that does not correspond to the normal shape of the article.

Therefore, one object of my invention is to provide a novel and improved method and machine such that a normal deformable article can be manipulated, deformed or reshaped temporarily into a special shape different from the normal and then enclosed in a package so that when the article is removed from the package it will return to or resume its normal shape; for example, my invention contemplates a method and apparatus for enclosing a normally circular ring-like soft rubber article in a flat elongated package in such a way that the article will spring back into its normal circular shape when the package is opened.

Another object is to provide such a method and apparatus wherein the articles shall be fed successively, squeezed, deformed or reshaped into the desired shape, inserted between two layers of packaging material while being held in said desired shape and then said layers shall be sealed together in zones closely bounding said article to enclose the article and hold it in said shape in a compartment between said layers.

A further object is to provide a method and apparatus of this character wherein said layers of packaging material shall comprise continuous strips or webs, said articles in succession shall be reshaped and enclosed between said strips and sealed in said compartments while the strips are moved longitudinally continuously, whereby the articles can be reshaped and packaged rapidly in a continuous operation, and thereafter said strips shall be severed in a novel and improved manner between said compartments to form individual packages or groups of packages.

Another object is to provide in such a machine novel and improved simple and reliable construction and combination of means for sealing strips of packaging material together and means for inserting and reshaping the articles and hold-

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ing them in reshaped condition one at a time while they are being sealed in compartments between said strips.

A still further object is to provide novel and improved means for feeding the articles in succession to said inserting and reshaping means whereby the articles can be manipulated in rapid succession.

Another object is to provide in a machine of the character described novel and improved means for dividing and severing the package strips into individual packages or groups of packages, such that the severing shall be effected easily, rapidly and accurately without danger of damaging the packages.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawings in which

Figure 1 is a top plan view of one end portion of a machine embodying my invention.

Figure 1a is a top plan view of the other end portion, Figures 1 and 1a being joinable along the broken lines x—x.

Figure 2 is a side elevational view of the end portion of the machine illustrated in Figure 1.

Figure 2a is a similar view of the portion of the machine illustrated in Figure 1a.

Figure 3 is an enlarged longitudinal vertical sectional view on the line 3—3 of Figure 1, showing the parts in normal position.

Figure 4 is a similar view showing the parts in the position assumed during insertion of an article between the layers of packaging material.

Figure 5 is a fragmentary horizontal sectional view on the line 5—5 of Figure 3.

Figure 6 is a transverse vertical sectional view on the line 6—6 of Figure 3.

Figure 7 is a longitudinal vertical sectional view on the line 7—7 of Figure 1, on an enlarged scale.

Figure 8 is a transverse vertical sectional view on the line 8—8 of Figure 1, and

Figure 9 is an enlarged fragmentary transverse vertical sectional view through portions of the rollers for severing the package strip.

For the purpose of illustrating the principles of the invention, I have shown it embodied in a machine for enclosing a normally circular ring-like article A of soft rubber between two layers of packaging material to form an elongate flat package B in which the article is contained, although it will be understood that the invention may be embodied in machines for packaging

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other types of articles and articles of other shapes.

In general the machine of the invention includes means C for securing together two opposed layers D of packaging material such as metal foil, paper, "Cellophane," "Pliofilm" or the like to form a compartment between them in which one of the articles A is enclosed. The articles are inserted between the layers of packaging material by a pushing and pressing mechanism E to which the articles are fed in succession by a feeding mechanism F to which the articles are supplied by a supply mechanism G.

As the articles are enclosed between the packaging materials, a package strip H is formed having a plurality of longitudinally spaced article containing compartments and this strip is severed into individual packages or groups of packages by a mechanism I.

The strips D of packaging material are fed from any source such as supply rolls that may be mounted in any suitable manner, and are drawn from the supply by the package forming mechanism C. This mechanism includes two rollers 1 and 2 which are mounted to rotate about parallel axes on tubular shafts 3 in each of which preferably is arranged an electric heater 4 of known construction for applying heat to the rollers to facilitate securing the strips B of packaging material together where the latter are thermoplastic or have thermoplastic coating. These rollers are driven in opposite directions through intermeshing pinions 5 each of which is connected to one of the shafts 1 and 2 and one of which is driven by an idler gear 6 through gearing which will be hereinafter described from a drive shaft 7 which is connected to any suitable source of power.

As shown, the rollers 1 and 2 are formed to make simultaneously two packages, each roller having two series of circumferentially spaced recesses 8 each of which is adapted to coincide with or move in juxtaposition to one of the recesses of the other roller during rotation of the rollers. These recesses are shaped to correspond approximately to the shape of the desired package and the coincident recesses of the two rollers form a clearance between them for the article as it is enclosed in a compartment between the packaging strips. The recesses 8 of each series are arranged in alinement with each other longitudinally of the rollers as clearly shown in Figure 1. Each of the recesses is surrounded on the periphery of the corresponding roller with sealing surfaces 10 which preferably are corrugated or crimped for the purpose of sealing the package strips D together in enclosing relation to the articles.

Between the recesses 8 on the roller 1 are knife blades 11 whose beveled edges are adapted to cooperate with straight flat surfaces on corresponding platens 12 on the other roller 2 for scoring the packaging strips in zones or lines L between the article containing compartments to facilitate severing of the strips. Preferably also, the roller 1 has a prong 13 at each side of each knife blade 11 projecting from the roller to enter corresponding notches 14 in the roller 2 to form perforations 15 in the package strips adjacent the scored lines to facilitate tearing open of the individual packages.

In accordance with the invention, one of the articles A is inserted between the packaging strips D as each recess of one roller approaches the corresponding recess of the other roller, and the

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packaging strips are first sealed together by the sealing surfaces 10 along a zone at the leading edges of the recesses and are progressively sealed together in zones bounding the article in which the article is enclosed. As each compartment is completed the knife blade 11 and platen 12 form a scored line or a line of perforations L in a zone in the packaging strip between said compartment and the compartment next to be formed as shown in Figures 3 and 4.

The means E for inserting the articles between the packaging strips includes the presser 16 and a pusher 17 for each series of recesses 8. The presser and pusher cooperate with a chute 18 which has an upwardly facing opening 19 through which the articles are dropped in succession. As shown, the presser 16 comprises a flat plate which has a transverse opening 20 therethrough in which is slidable the pusher 17 the end of which has a deep notch 21 parallel to the plane of the pusher which embraces a portion of the presser. The rear end of the pusher has a socket 22 in which is arranged a compression spring 23 that is interposed between the base of the socket and one end of the slot 20 in the presser, whereby the pusher is normally influenced toward the forward end of the presser but may yield relatively to the presser by virtue of the spring 23. The other end of the presser is rigidly connected to an actuating bar 24 which has a downwardly extending arm 25 which is connected to a push rod 26 slidably mounted in bearings 27 in the frame K of the machine and having one end connected by a link 28 to one end of a lever 29 the other end of which is pivotally connected at 30 to the machine frame. The lever has a follower roller 31 which engages a box cam 32 which in turn is mounted on the drive shaft 7. With this construction, the actuating bar 24 is reciprocated through oscillation of the lever 29 by the cam 32, and thus the pusher and presser 17 and 16 are actuated.

The pusher 17 preferably has opposed fingers 33 which slide in corresponding grooves 34 in the body of the chute 18 and form a grooved seat for the article, and in one position the pusher is located outside the chute at the side of the opening 19 therein opposite the feeding rollers, as shown in Figure 3, so that as the pusher is moved in the other direction it will push the article A through the chute and between the layers of the packaging strip as shown in Figure 4. After the article has been pushed into contact with the layers at the zone where the layers are first sealed together along the leading edges of the recess 8, the pusher and presser together form a nest for the article and start the deformation of the article. Then movement of the pusher is stopped by abutment of a lug 34' thereon with the end of the chute as shown in Figure 4. Whereupon, the presser continues to move in the same direction against the influence of the spring 23 and is projected from the end of the pusher so as to exert pressure on the article A and continue deformation thereof into an elongate or oval shape. Finally the presser presses the deformed article into the recesses between the rolls 1 and 2 as shown in Figure 4 and is held in this position so as to hold the article in said elongate shape until the rolls 1 and 2 have sealed the packaging strips together to partially enclose the article therebetween and hold it in said shape. Thereupon the actuating bar 24 is moved in the other direction to withdraw both the pusher and

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the presser from the compartment between the layers in the position shown in Figure 3.

The articles to be packaged are fed through the opening 19 in the chute 18 for each pusher by the feeding mechanism F which includes a table 35 mounted on the frame K of the machine and having a longitudinal article-guide channel 36 leading to each of the chute openings 19. Reciprocable longitudinally of the table is a feeding element for delivering articles to each chute opening 19 and including a bracket 37 which extends through a slot 38 in the table and is rigidly mounted on the actuating bar 24 and has journaled therein two horizontal shafts 39 at each end of each of which is a feeding arm 40, the two arms at the corresponding ends of the shafts serving the respective chutes 18. Each arm has a pair of fingers 41 for engaging the articles in the guide channels 36 of the table. There is thus a pair of arms for each of the guide chutes and the arms of each pair are oscillatable simultaneously toward and away from the table so that when the feeding element is moved in one direction, in the present instance to the right in Figures 3 and 4, the arms 40 will be swung away from the table so as to move over and clear of the articles lying in the corresponding guide channel 36 as shown in Figure 3 while upon movement of the feeding element in the other direction the arms 40 will be oscillated toward the table so that one thereof will engage and pull one article from the supply mechanism G while the other arm will engage and push the next preceding article into the chute opening 19 as shown in Figure 4.

The means for oscillating the arms is shown as comprising a gear segment 42 on each shaft 39 meshing with the segment on the other shaft, and a depending arm 43 connected to one of the segments which extends into the slot 38 and has a friction element mounted therein to engage the side walls of the slot 38. This friction element is shown as comprising a cylindrical cup-shaped shoe 44 which is mounted in an opening 45 in the arm 43 and has slidably mounted therein a cylindrical shoe 46 between which and the shoe 44 is interposed a compression spring 47 so that said spring tends to hold the shoe 44 and the shoe 46 in frictional engagement with the walls of the slot 38. The bracket 37 has openings 48 through which the shoes 44 and 46 freely project, the walls of said openings serving as stops to limit swinging movement of the arm 43.

With this construction, upon beginning of longitudinal movement of the bracket 37, the shoes 44 and 46 frictionally drag on the walls of the slot 38 so as to oscillate the arm 43 and consequently actuate the feeding arms 40, whereupon continued reciprocating movement of the bracket in the same direction will overcome said friction and cause movement of the bracket longitudinally of the table.

It will be understood that the cam 32 will be so shaped as to produce the proper extent and time of movement of the actuating bar 24, and in operation the articles to be packaged are supplied in succession to the right hand end of the feeding table 35 by the supply mechanism G as shown in Figure 3. When the feeding element F is located at the right hand end of the feeding table the feeding arms 40 are elevated as shown in Figure 3, and upon movement of the feeding element to the left, feeding arms will be moved downwardly so that one will engage the article just supplied to the table while the other will

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engage the next preceding article, and continued movement of the feeding element in that direction will push the latter article through the corresponding chute opening 19. At this time, the pusher 17 of the inserting mechanism E will have moved forwardly as shown in Figure 4 so that the article deposited through the opening 19 will lie upon the top of the pusher. Upon withdrawal of the pusher into the position shown in Figure 3, the article will fall onto the bottom of the chute in line with the pusher so as to be engaged thereby as the pusher next moves to the left of Figure 3.

Then, as the pusher moves to the left in Figure 3, the article will be pushed between the packaging strips D until movement of the pusher is interrupted by the stop 34 whereupon the presser will exert pressure upon and squeeze the article into a new elongated shape as shown in Figure 4 and as herebefore described.

The supply mechanism G is shown as comprising an endless conveyor including a pair of chains 49 which are mounted to ride over sprockets 50 on shafts 51 which are journaled in the machine frame K. Mounted on the chains are a plurality of conveying elements 52 each of which comprises a flat bar rigidly connected to one of the chain links of each chain and having two recesses 53 each to receive an article for one of the article guiding channels 36 of the feeding table. The chains are actuated to move the conveying elements 52 successively into juxtaposition to and under the feeding table 35, and as shown, the feeding table has means cooperating with the conveying elements to automatically direct the articles from the conveying elements to the feeding table. For this purpose, the conveying elements have transverse grooves 54 extending inwardly from their edges across the corresponding recesses 53, and the table has a finger 55 in line with each of said grooves so that as each conveying element is moved toward the feeding table, each of the fingers 55 will enter the corresponding groove 54 beneath the article in said conveying element as shown in Figure 4 so that continued movement of the conveying element will slide the article upon the table into the position shown in Figure 3 ready to be engaged by the corresponding feeding arm 40.

The conveyor may be driven in any suitable manner as will be hereinafter described.

Having thus described the supply of the articles to the package forming mechanism, and the formation of the package by said mechanism, I now refer to the means for severing the package strip into individual packages. This mechanism I includes a pair of rollers 56 and 57 which are mounted to rotate about parallel axes on shafts 58 which are journaled in the machine frame K. These rollers are driven in opposite directions by means which will be hereinafter described. The rollers receive between them the package strip and one roller 56 has a plurality of longitudinally circumferentially spaced slots 59 each to be overlaid or bridged by one of the scored zones produced by the knife blade 11 and platen 12 in the sealing and scoring rollers 1 and 2. Between the slots the roller 56 has cut-away zones 60 to provide a clearance for the article-containing compartments of the package strip.

The other roller 57 has longitudinal elastic ribs 61 spaced circumferentially of the roller and each capable of being squeezed into one of the slots 59 as the rollers are rotated. Referring particularly to Figure 9 each of the elastic ribs 61 is shown as

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comprising a strip of metal 62 which has an elastic covering 63 such as rubber and which preferably constitutes a rubber tube snugly fitted over the strip. The width of the slots 59 and the thickness of the elastic ribs are so related that as the rollers rotate, each elastic rib will be deformed and squeezed into the corresponding slot 59 so as to firmly hold the package strip H at points at opposite edges of the slot and at opposite sides of the scored zone L of the package strip that bridges the slot, and thereafter to exert pressure on said zone between said points such as to pull apart the layers of packaging material and sever the package strip as shown in Figure 9.

If desired, means may be provided for ejecting the severed ends of the package strip from the slots, and for this purpose a plurality of elastic bands 64 may encircle the roller 56 and extend across the slots 59 so that they will be pressed and stretched into the corresponding slots by the elastic ribs 61 during the severing operation as shown in Figure 9, and will contract and pull themselves out of the slots after the ribs 61 have been disengaged therefrom. As the bands retract out of the slots they will push before them the edges of the severed sections of the package strip.

It will be understood, that if desired, the ribs and slots 61 and 59 may be so spaced and suitable clutch mechanism may be utilized to control rotation of the rolls 56 and 57 so as to sever the package strip into sections each including two or more packages B instead of severing individual packages as shown.

In the form of the invention described, it is also desirable that the package strip be divided longitudinally between the two longitudinal rows or series of article containing compartments and for this purpose I may provide two cooperating rotating knife blades 65 and 66 rotatably mounted, one below and one above the package strip, on shafts 67 which are journaled in the machine frame.

It is also desirable to mount on the same shafts 67, brushes 68, one at each side of each knife, so as to hold the package strip against buckling as it is cut by the knives and also to maintain the package strip under tension as it moves from the sealing rollers 1 and 2 to the severing rollers 56 and 57. Brushes and knives are rotated by mechanism about to be described.

The drive shaft 7 has a pinion 69 which meshes with an idler gear 70 that is journaled on the machine frame and in turn meshes with a gear 71 on the lower shaft 67. This gear in turn meshes with another gear 72 on the upper shaft 67 so that the two shafts 67 are rotated in opposite directions as shown by the arrows. The idler gear 6 hereinbefore described meshes with the lower gear 71 and the gear 5 whereby the sealing rollers 1 and 2 are driven in the directions indicated by the arrows.

A similar idler gear 73 meshes with both the lower gear 71 and the gear 74 on the lower shaft 58 of the severing mechanism I, and the gear 74 meshes with another gear 75 on the upper shaft 58 whereby the severing rollers are driven in the directions indicated by the arrows.

For driving the conveyor of the article supply mechanism G, the lower shaft 67 has a sprocket 76 thereon while one shaft 51 of the conveyor has a sprocket 77, and over these sprockets runs a drive chain 78. Desirably, adjustable chain-tensioning idler sprockets 79 are also provided for the chain 78.

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If desired, suitable clutch mechanism of known construction and generally designated 80 and operated by a pull rod 81, may be provided for starting and stopping the conveyor; and of course any suitable mechanism such as a clutch may be utilized for controlling the connection and disconnection of the drive shaft 7 to and from a source of power such as an electric motor.

While I have shown and described the invention as embodied in a certain type of machine and in certain specific details of construction, it will be understood that many modifications and changes may be made in the construction of the machine and the invention may be embodied in machines of different types within the spirit and scope of the invention.

What I claim is:

1. The method of packaging articles that are capable of being deformed without injury thereto, said method comprising securing together two opposed layers of packaging material along at least one zone, inserting an article to be packaged between said layers and in contact therewith at said zone, deforming the article into a different shape and holding it so deformed between said layers and securing said layers together in zones in bounding relation to said article.

2. The method of packaging articles that are capable of being deformed without injury thereto, said method comprising securing together two opposed layers of packaging material along at least one zone, inserting an article to be packaged between said layers and in contact therewith at said zone, exerting pressure on the article at a point in opposed relation to said zone to deform the article into a different shape, securing said layers together while maintaining said pressure to partially enclose and hold the article in said shape, then releasing said pressure and completing the securing of said layers together in zones that encircle the article.

3. The method of packaging articles that are capable of being deformed without injury thereto; said method comprising feeding two strips of packaging material longitudinally continuously into juxtaposition, securing said strips together in a transverse zone, inserting an article between said strips and in contact therewith at said transverse zone, exerting pressure on said article from the side thereof opposite said zone and in the direction of movement of said strips to deform the article into a different shape, progressively pressing and securing said strips together around said article along zones longitudinal and transverse of said strips while maintaining said pressure to partially enclose and hold said article in said shape between said strips, then releasing said pressure and completing the securing of said layers together to entirely enclose the article in a compartment between said strips.

4. A machine for packaging articles that are capable of being deformed by pressure without injury thereto, comprising means for securing together two opposed layers of packaging material at a certain zone and progressively therefrom in zones to form a compartment between said layers, a pusher for inserting an article to be packaged between and in contact with said layers at said certain zone, a presser, and mechanism for actuating said presser after said article has been inserted by said pusher to exert and maintain pressure on said article at a point opposite said certain zone to deform the article

into a different shape and hold it in said shape between said layers until said compartment has been partially formed to partially enclose and hold said article in said shape, said mechanism then actuating said presser to relieve said pressure and withdraw the presser from said compartment.

5. A machine for packaging articles that are capable of being deformed without injury thereto, comprising means for securing together two opposed layers of packaging material at a certain zone and progressively therefrom in zones to form a compartment between said layers, a chute having a portion between said layers to receive an article to be packaged, a pusher reciprocable along said chute to push an article from said chute between and into contact with said layers at said zone, a presser mounted on said pusher and reciprocable therewith and relatively thereto, mechanism for moving said pusher and said presser together to push an article from said chute and for then moving said presser relatively to said pusher to exert pressure on said article at a point opposite said certain zone to deform the article into a different shape and to hold it in said shape between said layers until said compartment has been partially formed to partially enclose and hold said article in said shape, said mechanism then actuating both said presser and said pusher to withdraw them from said compartment and relieve said pressure on said article.

6. In a packaging apparatus, means for continuously feeding layers of packaging longitudinally and in opposed relation including a pair of sealing and crimping rollers rotatably mounted about approximately parallel axes to receive and press said layers of packaging material between them, said rollers having recesses such that said recesses of one roller and said sealing surfaces coincide respectively with the recesses of the other roller to seal said layers together at certain zones adjacent the leading edges of said recesses and progressively therefrom in zones to form compartments between said layers in the coincident recesses of said rollers as the rollers rotate, a chute having a portion extending between said layers to receive an article to be packaged, a pusher reciprocable in said chute to push an article from the chute between said layers, a reciprocable presser to exert pressure on said article at points opposite said zones successively, and mechanism for actuating said pusher and said presser to push an article into contact with said layers at said zones successively and for pressing and maintaining pressure on each article to deform the article into a different shape that corresponds approximately to the shape of said recesses and hold the article in said shape between said layers until a compartment has been partially formed to partially enclose and hold the article in said shape, said mechanism then actuating said pusher and said presser to withdraw them from said compartment.

7. The packaging apparatus set forth in claim 6, wherein said pusher and said presser are movable together and yieldingly relatively to each other and said mechanism is directly connected to said presser, and with the addition of means for limiting movement of said pusher in the direction to push an article between said layers such that said presser will continue to move in said direction relatively to said pusher to deform said article.

8. A packaging machine comprising means for

feeding two layers of packaging material longitudinally into opposed relation to each other, means for securing said layers together to form in succession compartments between said layers, a chute extending between said layers to receive articles to be packaged, a pusher reciprocable in said chute to move an article from said chute between said layers immediately prior to the formation of each said compartment such that said layers will be secured around said article to enclose it in a compartment, means for feeding articles to said chute including a table and a feeding element reciprocable thereon and oscillatable to engage and pass over an article on said table and to engage and move said article along said table to said chute respectively upon reciprocating movement in opposite directions, common means for reciprocating said pusher and said feeding element simultaneously, and means for oscillating said feeding element to pass over and to engage said article upon said reciprocating movement of said feeding element in opposite directions respectively.

9. In a machine of the character described the combination of means for depositing articles at a predetermined point, means for feeding articles one at a time to said depositing means comprising a table to receive articles one by one, a pair of feeding elements reciprocable together along said table and oscillatable, and means for reciprocating and oscillating said elements so that upon reciprocating movement of said elements in one direction both will be oscillated away from the table and pass over articles on said table and upon reciprocating movement of said elements in the opposite direction said elements will be oscillated toward the table, each will engage an article and one will deliver the article to said depositing means.

10. In the machine set forth in claim 9, the addition of an endless conveyor for supplying articles one at a time to said table including article-conveying elements spaced longitudinally thereof and movable into juxtaposition and relatively to said table in succession, said table having means for guiding the articles out of said article-conveying elements onto said table into position to be engaged by one of said feeding elements as said conveying elements move relatively to said table.

11. A machine of the character described comprising means for depositing an article at a predetermined point, means for feeding articles to said depositing means, including a table and reciprocable means for moving articles along said table in succession and for delivering them to said depositing means one at a time, an endless conveyor having a conveying element for each article to move into juxtaposition and relatively to said table whereby said articles may be placed manually in said conveying elements in succession, said table having means cooperating with said conveyor for guiding each article from its conveying element into a position on said table to be engaged by said reciprocable means as the conveying element moves into juxtaposition and relatively to said table, means for continuously moving said conveyor, and means for actuating said reciprocable means in timed relation to the removal of said article from said endless conveyor to said table.

12. A machine for packaging articles comprising a horizontal chute, means for continuously feeding two layers of packaging material longitudinally in opposed relation to each other and

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for securing said layers together along transverse zones adjacent one end and in the common horizontal plane of said chute and progressively therefrom in zones to form compartments between said layers, a continuously moving conveyor having a conveying element for each article whereby said articles can be deposited manually in said conveying elements in succession, means cooperating with said conveyor for guiding and moving each article from its conveying element to a predetermined point in said chute, and means reciprocable in said chute in timed relation to the deposit of said articles at said predetermined point for inserting the articles between said layers in succession and momentarily holding each thereof in contact with said layers at the corresponding said transverse zone until said compartment has been partially formed to partially enclose and hold the article against displacement.

LEROY L. SALFISBERG.

12

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