July 15, 1958 G. M. BONEBRAKE 2,843,061

SEVERING AND STACKING MECHANISM

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FIG. 1

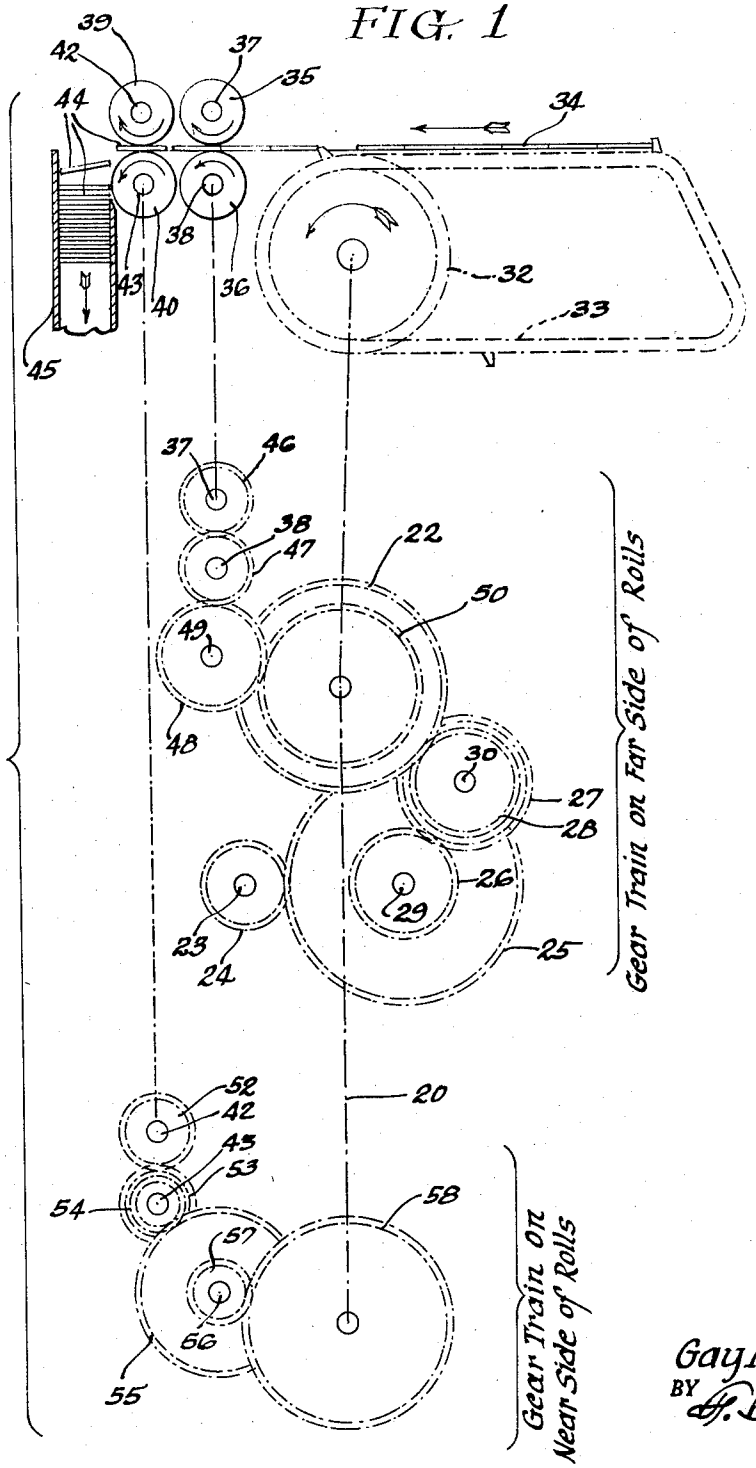
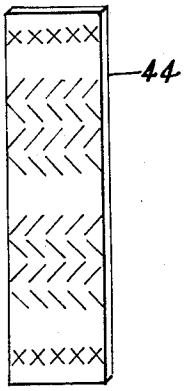


FIG. 2



INVENTOR.
Gay M. Bonebrake
BY
H. Purnell Brewer
Attorney

July 15, 1958 G. M. BONEBRAKE 2,843,061

SEVERING AND STACKING MECHANISM

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FIG. 3

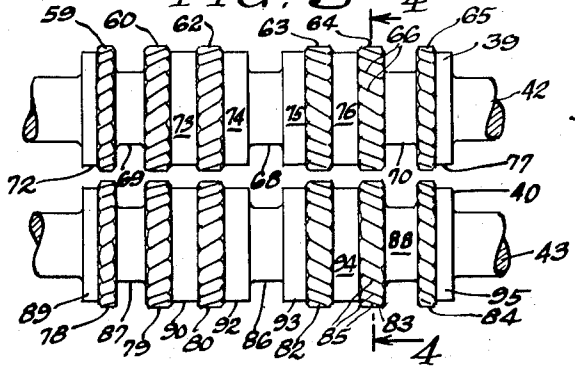


FIG. 4

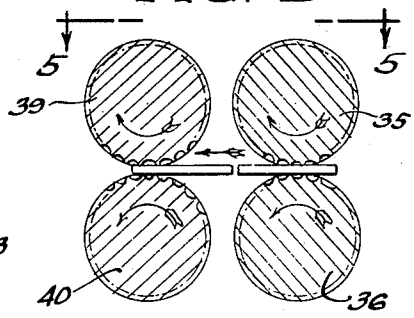


FIG. 6

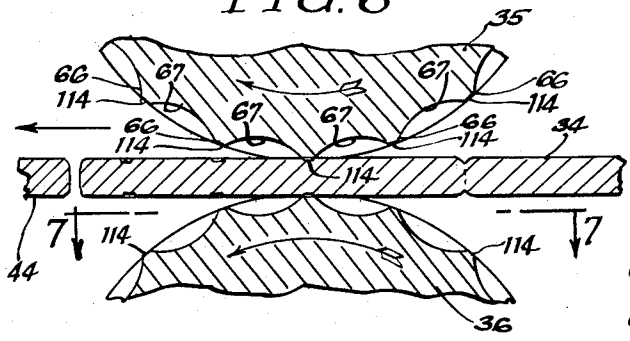


FIG. 5

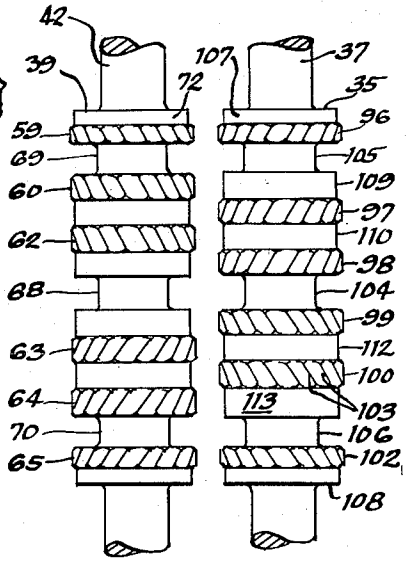
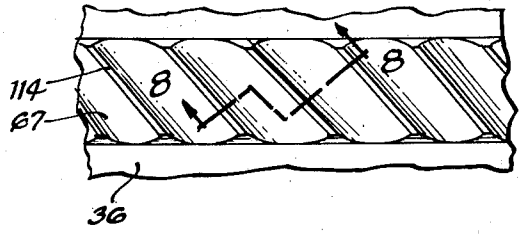


FIG. 7



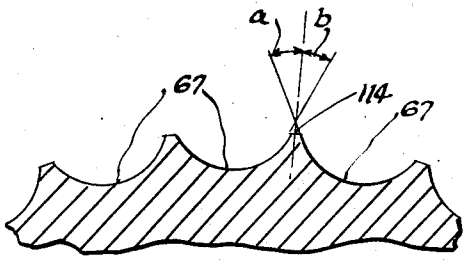


FIG. 8

INVENTOR.
Gay M. Bonebrake
BY
F. Duvall Brewer
Attorney

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SEVERING AND STACKING MECHANISM

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FIG. 9

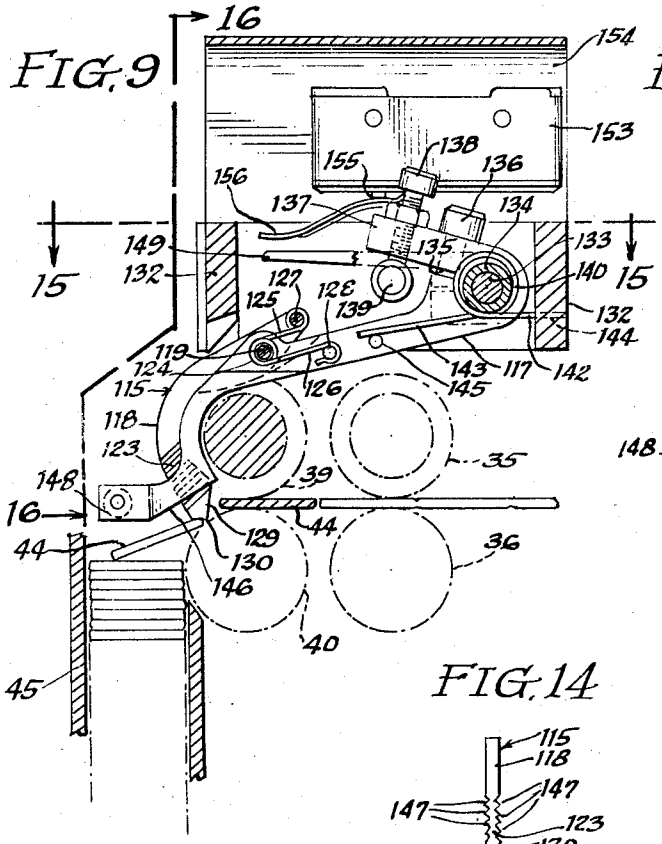


FIG. 10

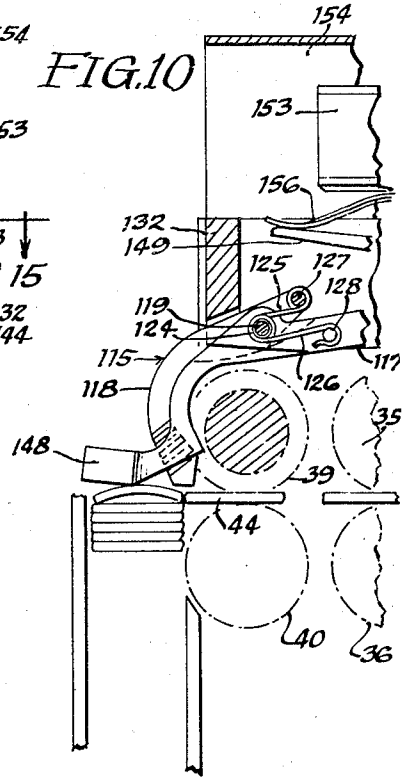


FIG. 14

FIG. 11

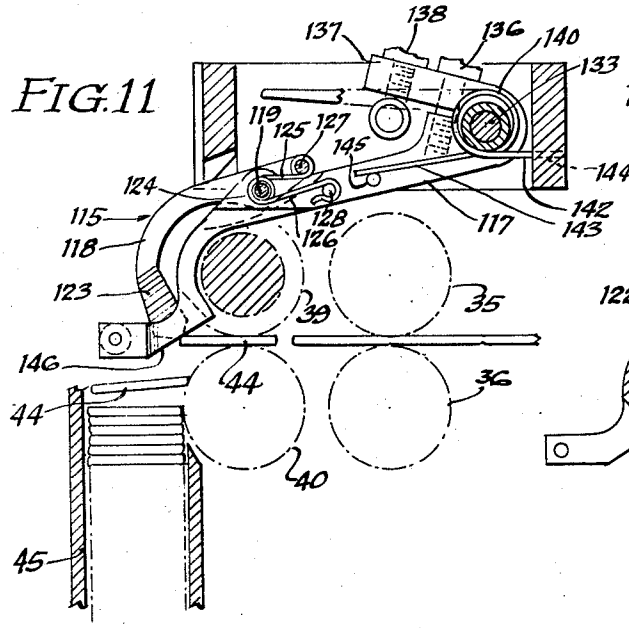


FIG. 13

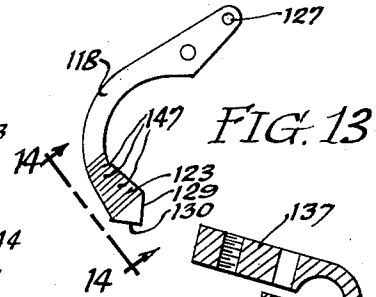
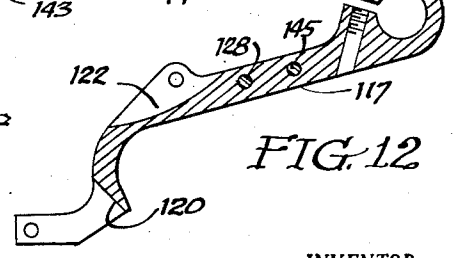


FIG. 12



INVENTOR.
Gay M. Bonebrake
BY
Attorney

July 15, 1958 G. M. BONEBRAKE 2,843,061

SEVERING AND STACKING MECHANISM

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FIG. 15

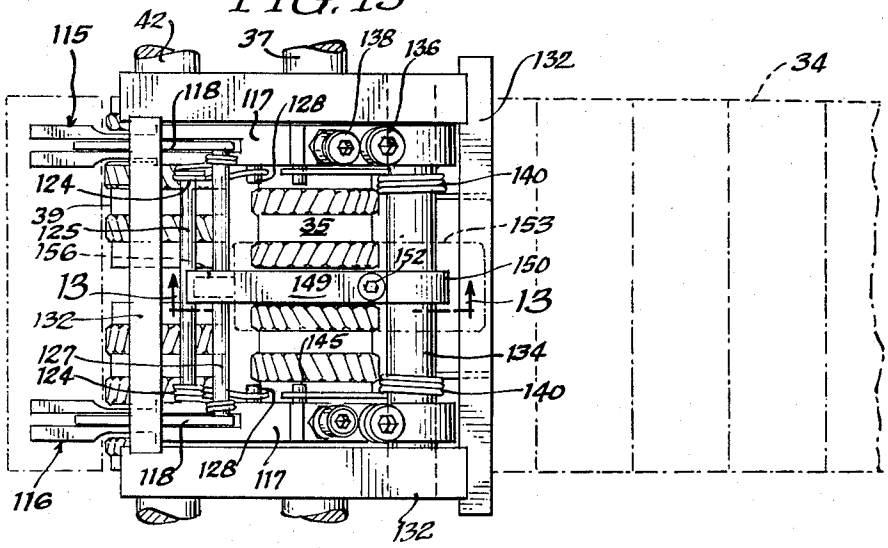


FIG. 16

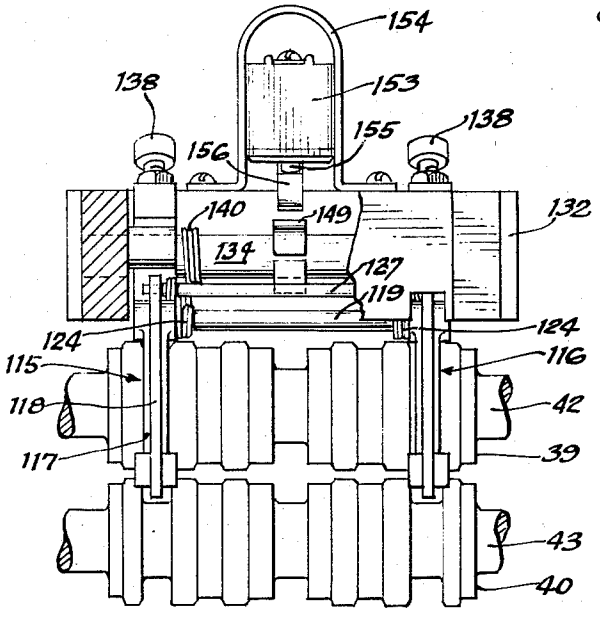
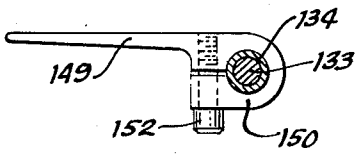


FIG. 17



INVENTOR.
Gay M. Bonebrake
BY G. Thrall Brewer
Attorney

United States Patent Office

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2,843,061

SEVERING AND STACKING MECHANISM

Gay M. Bonebrake, Chicago, Ill., assignor to Wm. Wrigley Jr. Company, Chicago, Ill., a corporation of Delaware

Application July 19, 1955, Serial No. 523,077

9 Claims. (Cl. 107—7)

This invention relates to a severing and stacking mechanism adapted to use for separating pieces from scored slabs and stacking the pieces, which pieces may, for example, be sticks of gum broken from scored slabs by a part of the mechanism.

One of the objects of my invention is to provide a mechanism for breaking pieces from scored slabs of material and wherein pairs of rollers in opposed relationship are utilized for effecting the severing of the pieces, said pairs of rollers having series of serrations on the surfaces thereof which penetrate opposed surface portions of the pieces sufficiently as they pass between the rollers to provide gripping action on the pieces, thereby to avoid slippage of the pieces relative to the rollers.

Another object of the invention is to provide a mechanism of the type described and which embodies serrated rollers for gripping, moving and forcefully severing pieces from scored slabs of relatively fragile and deformable material, and wherein the serrations on the rollers are constructed and relatively arranged to avoid breakage of the pieces, to afford effective gripping action, to promote the wearing qualities of the serrations in continuous and long term use, and to exert centering forces upon the pieces tending to keep them aligned and in centered relationship relative to the rollers.

My invention also has within its purview the provision of a severing mechanism embodying serrated rollers adapted to use for handling pieces of sugar coated confections and the like, and wherein the serrations on the rollers are contoured to render them self-cleaning.

As another object, this invention comprehends the provision of pairs of rollers for gripping opposite surfaces of relatively soft and breakable material, which rollers have circumferentially serrated areas that are segregated axially of the rollers to limit the required roller pressure against the material for good gripping action and as a further precaution for avoiding breakage of the material by the action of the rollers.

It is another object of my invention to provide a breaking and stacking mechanism for scored material in slab form and wherein serrated rollers are used for effecting the breaking of the scored slabs and the movements of pieces broken from the slabs, and wherein spring biased fingers deflect the pieces as they leave the rollers so as to avoid interference between successive pieces and to guide the pieces into an orderly stack.

My invention further comprehends the provision of movable and resiliently biased main and auxiliary fingers for use in deflecting pieces of material as they are discharged from between rollers, and wherein the main fingers have deflecting surfaces and do not move materially under normal operating conditions, while the auxiliary fingers are normally moved by the pieces and follow certain portions of such movements of the pieces, so as to direct their movements.

As another object this invention has within its purview the provision of a mechanism including main and

auxiliary fingers of the type herein described for deflecting severed pieces of material into a stack, and wherein the main fingers are supported and resiliently biased for movement in the event of an abnormal condition, such as a piece getting jammed as it passes the fingers, to effect stoppage of the machine.

My invention further comprehends the provision of main and auxiliary fingers of the type herein referred to which operate adjacent one another for directing the movements of pieces of confectionery from between rollers and which are constructed and arranged to be self-cleaning, so that movements of the fingers remain free and independent of one another.

These and other objects of this invention will become apparent from the following detailed description when taken together with the accompanying drawings, in which—

Fig. 1 is a diagrammatic illustration of apparatus embodying a severing and stacking mechanism of a type adapted to incorporate the invention herein disclosed and illustrates the structure and manner for driving certain moving parts of the apparatus;

Fig. 2 is a perspective view of a piece of material, such as a stick of gum, which has been severed by the mechanism embodying this invention;

Fig. 3 is a fragmentary front elevational view of a pair of rollers incorporating features of the invention herein disclosed;

Fig. 4 is an end sectional view taken substantially at the position of a line 4—4 and in the direction of the arrows indicated in Fig. 3, and illustrates two pairs of rollers which constitute parts of a severed mechanism embodying this invention.

Fig. 5 is a fragmentary top plan view of the rollers illustrated in Fig. 4, and is taken substantially as indicated by a line 5—5 and accompanying arrows in Fig. 4;

Fig. 6 is a fragmentary end sectional view drawn to a larger scale than the previously described figures and which illustrates the passage of material between a pair of the rollers shown in Figs. 3, 4 and 5;

Fig. 7 is a developed fragmentary view taken substantially as indicated by a line 7—7 and accompanying arrows in Fig. 6;

Fig. 8 is a fragmentary sectional view taken substantially on a line 8—8 of Fig. 7 and in the direction indicated by arrows;

Fig. 9 is a side sectional view of my severing and stacking mechanism of this invention which illustrates one phase of the operation of the parts of the mechanism during normal operation;

Fig. 10 is a fragmentary side sectional view similar to Fig. 9, but indicating the parts and their positions, such as might result from an abnormal condition of the operation of the mechanism;

Fig. 11 is a fragmentary side sectional view similar to Fig. 9 and showing the positions of parts at a different phase of the normal operation of the mechanism than that depicted in Fig. 9.

Fig. 12 is a longitudinal side sectional view of a part of the mechanism depicted in Figs. 9, 10 and 11;

Fig. 13 is a side elevational view of another part of the mechanism illustrated in Figs. 9, 10 and 11;

Fig. 14 is an end elevational view of the part shown in Fig. 13, and is taken substantially as indicated by a line 14—14 in Fig. 13;

Fig. 15 is a top plan view of the mechanism shown in Figs. 9, 10 and 11;

Fig. 16 is a front elevational view of the mechanism shown in Figs. 9, 10 and 11, and is taken substantially at a position indicated by a line 16—16 in Fig. 9 and in the direction of the accompanying arrows; and

Fig. 17 is a side sectional view of a part of the mechanism shown in Figs. 9, 10 and 11.

In order to indicate the environment in which the hereindisclosed mechanism is adapted to operate and to provide a suggestion of associated apparatus adapted to use with the severing and stacking mechanism, an exemplary embodiment of which is disclosed for illustrative purposes, I have provided a diagrammatic illustration in Fig. 1 which shows such associated apparatus and means through which moving parts of the severing and stacking mechanism are driven. Reference is so made to my Patent No. 2,643,619, issued June 30, 1953, and relating to Severing Mechanism.

As depicted in Fig. 1, a shaft **20** is driven by a gear **22** which is secured thereto, and which gear is driven from a power shaft **23** through a gear chain including gears **24**, **25**, **26**, **27** and **28**; the gear **24** being secured to the power shaft **23** and meshing with the gear **25**, the gears **25** and **26** being drivingly connected to a shaft **29** and driven together through that shaft, the gear **26** meshing with the gear **27** which is drivingly connected to the gear **28** through a shaft **30**, and the gear **30** meshing with the gear **22** to drive the shaft **20**. A sprocket **32** on the shaft **20** drives a chain conveyor **33** which serves to feed scored slabs of material such as **34** to the severing and stacking mechanism which constitutes the subject matter of this invention.

The severing and stacking mechanism includes a pair of rollers **35** and **36** having parallel axes and being mounted on shafts **37** and **38** in vertically spaced relationship and in alignment with the slab carrying surface of the chain conveyor **33** for receiving the scored slab material directly from that chain conveyor. Rollers **39** and **40** of a second pair are supported in vertically spaced and parallel relationship by shafts **42** and **43**, the second set of rollers being aligned to receive the scored slab material from between the rollers **35** and **36** as the movement of the slab progresses from the chain conveyor **33**. The two pairs of rollers are horizontally spaced from one another and the rollers **39** and **40** are driven at a higher speed than the rollers **35** and **36**, so that as the scored slab material passes through the pairs of rollers and is gripped by each pair, pieces such as **44** are severed from the slabs along each of the scored lines. From the rollers **39** and **40**, the severed pieces are discharged into a hopper **45** through which they pass in stacked relationship to a subsequent machine for wrapping or the like.

In the disclosed embodiment of my invention, and as illustrated in Fig. 1, the shafts **37** and **38** are driven through meshing gears **46** and **47**, which gears are mounted on the shafts **37** and **38** respectively and are of the same size, so that the rollers **35** and **36** are driven in opposite directions at the same speed. The gear **47** on the shaft **38** meshes with a gear **48** on a shaft **49**, which gear **48** also meshes with a gear **50** on the driven shaft **20**. In like manner, the shafts **42** and **43** which carry the rollers **39** and **40** have meshing gears **52** and **53** respectively mounted thereon for driving the rollers **39** and **40** in opposite directions at the same speed. The shaft **43** also has a gear **54** secured thereto, which latter gear is smaller than the gear **53** and meshes with a gear **55** on a shaft **56**. Another gear **57** on the shaft **56** meshes with a gear **58** on the shaft **20**, thereby affording a gear train drive from the shaft **20** to the rollers **39** and **40**. The ratios of the gears which drive the pairs of rollers are calcullated and predetermined so that the rollers **39** and **40** have surface speeds which are substantially faster than those of the rollers **35** and **36**, whereby to sever the pieces of each slab between the two pairs of rollers and afford a substantial separation between the separated sticks as they are discharged from the rollers **39** and **40**.

As may be readily understood from the operation of the apparatus as thus far described, it is important that the slab material being severed shall be firmly gripped by each of the successive pairs of rollers in order to effect severance of the pieces along the scored lines and at a predetermined position between the pairs of rollers. It may also be readily understood that the severed pieces must be directed or deflected into a stack in the chute **45** in a manner to avoid interference between successive pieces which would cause the pieces to be jammed together, bent or broken. The mechanism herein disclosed embodies structure and part relationships which provide the aforementioned results as well as others and which afford a safety feature for stopping the machine in the event of the occurrence of some abnormal circumstance.

Having particular reference to the structures of the rollers **35**, **36**, **39** and **40**, as depicted in Figs. 3 to 8 inclusive, it may be generally observed that the rollers herein disclosed each have thereon axially spaced rows of peripheral serrations in the form of teeth which are adapted to press into opposed surfaces of the scored slabs and pieces as they pass therethrough, thereby to afford a definite and positive gripping action which prevents slippage of those slabs and pieces between the rollers as they pass between the rollers for effecting the severance of the pieces. The disclosed rollers being particularly adapted to use for the severance of compressible, bendable and breakable material, such as scored slabs of chewing gum having sugar on the surface thereof, the rows of serrations are constructed and arranged so that they are self-cleaning, whereby the collection of sugar on or between the serrations is avoided, and also, the serrations of the rows on the pairs of rollers and the serrations on the rows of each pair of rollers are so related to one another that the positive gripping action is accomplished without the occurrence of any appreciable amount of breakage of the material as it passes between the rollers. The serrations are also arranged so that they tend to keep the material centered relative to the rollers and to keep that material moving in a straight line.

As depicted in Fig. 3, the roller **39** has axially spaced rows **59**, **60**, **62**, **63**, **64** and **65** of serrations thereon, the serrations **66**, in each of which rows, in the disclosed structure, consitute linear teeth disposed angularly with respect to the axis of the roller, and which teeth, as shown in Fig. 6, are separated by concave grooves or recesses **67** of substantially arcuate contour. At the center of the roller, a peripheral groove **68** is provided and near the ends of the roller, between the rows **59** and **60** of serrations and between the rows **64** and **65** of serrations, peripheral groves **69** and **70** are provided, which grooves **68**, **69** and **70** reduce the diameter of the roller to an amount substantially less than the root diameter of the rows of serrations. Also, at the opposite ends of the roller, between the rows **60** and **62** of serrations, between the rows **63** and **64** of serrations and between the rows **62** and **63** of serrations and the opposite ends of the recess **68**, substantially cylindrical surfaces **72**, **73**, **74**, **75**, **76** and **77** are provided, which cylindrical surfaces are of smaller diameter than the root diameters of the rows of serrations.

The roller **40** has rows **78**, **79**, **80**, **82**, **83** and **84** of serrations **85** which conform substantially in width and axial separation to the rows **59**, **60**, **62**, **63**, **64** and **65** respectively on the roller **39**. The roller **40** also has grooves **86**, **87** and **88** of a depth and axial spacing corresponding to those of the roller **39**, as well as cylindrical surfaces **89**, **90**, **92**, **93**, **94** and **95** which correspond substantially in diameter and axial spacing to the cylindrical surfaces **72**, **73**, **74**, **75**, **76** and **77** on the roller **39**. It is to be understood, of course, that the peripheral diameters of the rows of serrations on each roller and on each pair of rollers are substantially the same.

It may be observed that when the rollers **39** and **40** of one pair are aligned for use, as shown in Fig. 3, the rows of serrations on the two rollers are equally spaced axially of the rollers and aligned, so that the serrations of the opposed rows on the two rollers of a pair depress opposed

surface portions of the material as it passes therethrough. However, it is particularly pointed out that the serrations of each roller, in addition to being disposed at an angle to the axis of each roller, are angularly disposed on each of the opposed rows on the two rollers, so that the lines or depressions made by the opposed serrations on opposite sides of the material are transversely related to one another. This avoids parallelism of the opposed serrations of the rows on opposite sides of the material and thereby affords one element tending to minimize breakage of the material between the opposed rollers of a pair. Having the serrations in rows of limited width and spaced axially of the rollers also has a tendency to avoid breakage of the material.

The angularity of the serrations with respect to the axes of the rollers is selected to provide traction or gripping action with the material as it passes between the rollers, as well as to minimize breakage of the material resulting from the parallelism of the depressed lines on the opposite sides of the material. Serrations on the rollers extending parallel to the axis of the roller would afford maximum traction against the material, but would provide parallel depressions in the material on its opposite sides. Also, serrations extending around the rollers at 90 degrees to the roller axes would afford a minimum of traction and would also result in parallelism of the depressions on opposite sides of the material. Thus, an intermediate angle between 5 degrees and eighty degrees to the axis of the roller is selected for the disposition of the serrations. It may also be observed that the angular dispositions of the serrations on opposite sides of the longitudinal center of each roller are opposed to one another and equally related angularly to the roller axes. This balances the angular forces acting on opposite ends of each slab or piece as it passes between the rollers and tends to keep the slabs and pieces both centered and aligned.

The rollers, serrations, rows of serrations and intervening spaces on each of the pairs of rollers are substantially in accord with those described in detail with respect to the rollers **39** and **40**. However, as shown in Fig. 5, and except for rows of serrations at opposite ends of the rollers of the two pairs, the intervening rows of serrations on the two pairs of rollers are in offset relationship to one another, so that the intermediate rows of serrations on one pair of rollers fits into the space between serrations on the other pair of rollers. This avoids overlapping impressions from the two sets of rollers, except at the ends of the pieces, and has some tendency to avoid breakage of the material, as well as preventing the surfaces of the material from being excessively marked. It may also be observed by reference to Fig. 5 that on the two pairs of rollers, the angular disposition of the serrations on the aligned halves of the two pairs of rollers are in opposed angular relationship to one another and with respect to the axes of the rollers.

As indicated in Fig. 5, the roller **35** has rows **96**, **97**, **98**, **99**, **100**, and **102** of serrations such as **103**, which rows are of limited width and separated axially of the roller. It may be understood that the rows of serrations and intervening spaces on the roller **36** are the same and aligned with those of the roller **35**, and that, as in the instance of the rollers **39** and **40**, the serrations on the rollers of the pair are in opposed angular relationship with respect to the roller axis on the two rollers of the pair. Grooves **104**, **105** and **106** at the mid-portion and near opposite ends of the roller **35** are in aligned relationship to the grooves **68**, **69** and **70** respectively on the roller **39**. As in the instance of the rollers **39** and **40**, the rollers **35** and **36** have cylindrical surfaces **107** and **108** at their opposite ends. On the rollers of this pair, however, a cylindrical surface **109** is provided between the row **97** of serrations and the groove **105**, a cylindrical surface **110** intervenes between the rows **97** and **98** of serrations, a cylindrical surface **112** is provided between

the rows **99** and **100** of serrations, and a cylindrical surface **113** is provided between the row **100** of serrations and the groove **106**. In the operating positions of the pairs of rollers, as depicted in Fig. 5, the rows **60**, **62**, **63** and **64** of serrations on the roller **39** are aligned with cylindrical surfaces **109**, **110**, **112** and **113** respectively on the roller **35**. As in the instance of the rollers **39** and **40**, the cylindrical surfaces on the rollers **35** and **36** are of a diameter smaller than the root diameters of the rows of serrations on those rollers. The rows **59** and **65** of serrations near the end of the roller **39** are aligned with the rows **96** and **102** respectively near the end of the roller **35**, and the serrations of the rows **59** and **96**, as well as those of the rows **65** and **102** on the rollers of the two pairs, are so disposed with respect to the axes of their respective rollers that the depressions or lines formed thereby on the material which passes therethrough are laterally disposed with respect to one another on each surface of the material.

Referring in greater detail to the structure and shapes of the serrations and intervening spaces, as depicted in Figs. 6, 7 and 8, and as utilized in each of the rows of serrations on each of the rollers, those serrations each have convexly curved outer end surfaces **114** which define or emanate from a common cylindrical surface which is concentric with the axis of each roller. In order to provide better wearing quality, these end surfaces have a lateral width which is substantial. In the disclosed mechanism, this width is between .0025 inch and .005 inch. This width, however, is limited in order to limit the surface pressure required on opposite sides of the material for making suitable impressions therein, for obtaining the desired traction, and also for the limitation of breakage of the material. The surfaces **67** intervening between the outer ends **114** of the serrations, as previously mentioned, are arcuate; the curvatures, in the present instance, being selected to provide an angle of approximately 30 degrees between the center line of each serration and a tangent to the arcuate surface on each side of each end surface **114**, as indicated at *a* and *b* in Fig. 8.

The selection of the curvature of the intervening spaces **67** and the angularity of the surfaces entering the spaces **67** is a controlling factor in providing a self-cleaning action for rollers adapted to use with sugar coated confections, such as chewing gum. It has been found that sugar forced into the grooves **67** from the surfaces of the material does not tend to pack in the grooves of the type herein illustrated and described, but pushes into the lower portions of the grooves and moves along the grooves into the spaces between the rows of serrations, from whence it is discharged from the mechanism. It is believed that the component of force exerted along the surfaces of the grooves and against the sugar which tends to accumulate near the outer ends of the serrations is sufficient with the angularity afforded to successively loosen the adhered material and to force it into the root portion of each groove in a loose condition.

In order to supplement the actions of the rollers **39** and **40** and the gravitational forces acting upon the separated pieces of material as they are discharged from those rollers, as well as to provide a safety feature in the mechanism, I have utilized fingers **115** and **116**, as illustrated in Figs. 9 to 16 inclusive, which fingers extend into closely spaced relationship with the grooves **69** and **70** near opposite ends of the roller **39**, from which severed pieces of material are discharged. The fingers **115** and **116** are substantially alike in structure, so that a description of one will suffice for both. As shown in Figs. 9 to 14, each of the fingers **115** and **116** is a composite unit including a main finger **117** and an auxiliary finger **118** which are movably connected together by a cross shaft **119** at the mid-portion of the main finger for swinging movement relative to one another about the axis of the cross shaft **119**. As shown in Fig. 12, the main finger **117** has a longitudinally bifurcated end portion **120** and

a longitudinal slot **122** in the upper part of the mid-portion, in which slot and bifurcated end portion the auxiliary finger **118** is movably supported by the cross shaft **119** with an end portion **123** of the auxiliary finger extending through the bifurcated end portion of the main finger. A coil spring **124** has extending integral arms **125** and **126** at its opposite ends which are anchored to projecting studs **127** and **128** respectively on the auxiliary finger **118** and main finger **117**, while the coiled portion of the spring surrounds a part of the cross shaft **119**, whereby the auxiliary finger **118** is normally biased toward the end portion of the main finger **117** to a position such as that shown in Fig. 9, wherein angularly disposed surfaces **129** and **130** at the end of the auxiliary finger project beyond the main finger and into close proximity to the peripheral surface of the roller **40**.

Each of the main fingers **117** is supported for swinging movement toward and from the axis of the roller **39** and relative to a frame part **132** of the machine by a cross shaft **133** having a bearing sleeve **134** rotatably mounted thereon; the main fingers having slots **135** therein and being secured to opposite ends of the bearing sleeve by set screws **136** threaded into each main finger and extending laterally of the slot therein. Each main finger also has an angularly projecting portion **137** thereon which has a set screw **138** threaded into the end portion thereof that is adjusted to engage a projecting stud **139** on the machine frame element **132** to afford adjustable stop means for limiting the swinging movement of the main finger toward the axis of the roller **39**. A coil spring **140** has its coiled portion encompassing the bearing sleeve **134** adjacent the main finger and has projecting end portions **142** and **143**, one of which is anchored in an opening **144** in the machine frame element **132** and the other of which engages a projecting stud **145** on the main finger **117**, normally to bias the main finger toward the axis of the roller **39** to a position in which the stop screw **138** engages the stud **139**.

Each of the main fingers **117** has an end surface **146** which is normally disposed in alignment and in acute angular relationship to the path of travel of severed pieces of material which are discharged from the space between the pair of rollers **39** and **40**, as shown in Fig. 9. It is at this angular surface of each of the main fingers that the end portions of the auxiliary fingers **118** extend therethrough, also as shown in Fig. 9.

The spring pressure exerted upon each auxiliary finger by its spring **124**, however, is quite light and is selected so that each auxiliary finger is deflected to a retracted position, as illustrated in Fig. 11, by the engagement of the surface **129** thereof with the forward edge of each severed piece of material as it passes between the rollers **39** and **40**. This deflection, of course, is effected without deformation or damage to the pieces of material. When the auxiliary fingers are deflected upwardly against the forces of their biasing springs to positions such as those depicted in Fig. 11, the forward edge of each piece of material engages the angularly disposed surfaces **146** of the main fingers **117**. The biasing forces of the springs **140** on the main fingers **117** are sufficient to retain the main fingers in their normal positions during normal operations of the mechanism. Thus, engagement of the forward edge of each piece of material with the angularly disposed surfaces **146** of the main fingers **117** effects a downward deflection of the forward edges of the severed pieces of material toward the stack. Then, as each piece of material continues to move forwardly and is deflected downwardly at its forward edge, the auxiliary fingers swing back toward their normal positions with the end surfaces **130** thereof engaging the top surface of the piece, thereby to hold the rear portion of each piece in contact with the surface of the roller **40** as the piece moves outwardly and downwardly. This action of the main and auxiliary fingers not only directs the severed pieces to the stack in the hopper **45**, but also moves each severed piece out of the path of the succeeding piece, so that jamming of the severed pieces is normally avoided.

In order to prevent foreign matter, such as sugar, from collecting on the closely adjacent surfaces of the main and auxiliary fingers so as to deter the freedom of movement of the auxiliary fingers relative to the main fingers, opposite side surfaces of the end portions **123** of the auxiliary fingers have serrations **147** on their opposite sides and extending in a direction lateral to the direction of movement of the fingers. These serrations tend to wear away any sugar or foreign substance which collects between the adjacent surfaces of the fingers and minimize the necessity of stopping the machine during a period of operation for cleaning the working parts, so that they can move freely with respect to one another.

As a safety feature adapted to stop the operation of the machine in the event that a severed piece gets broken or bent or jams in the mechanism because the level of the stack becomes too high, as illustrated in Fig. 10, the main fingers have end portions **148** thereon which are normally disposed above the stack of pieces in the hopper **45**, which end portions present surfaces which are engaged by jammed or bent sticks to force the main fingers **117** upwardly against the biasing forces of the springs **140**. An arm **149** having a clamp portion **150** at one end thereof is secured to the mid-portion of the bearing sleeve **134** by means such as a set screw **152**. This arm swings upwardly as a result of rotation of the bearing sleeve **134** which is effected by upward swinging movements of the main fingers **117**, and it swings downwardly when the main fingers are returned to their normal positions. A switch **153** is supported by an inverted U-type bracket **154** on the top of the machine frame element **132** and has an actuating element **155** normally engaged by a spring arm **156**, which spring arm is aligned for engagement with the arm **149** when that arm is moved upwardly by the main fingers **117**. Upward movement of the fingers **117** which is sufficient to actuate the spring arm **156** to the extent required to effect actuation of the switch **153** stops the operation of the severing mechanism until the condition which has caused the upward swinging movements of the main fingers, such as that illustrated in Fig. 10, has been removed or clarified, so as to allow the main fingers to return to their normal positions.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a severing and stacking mechanism for separating scored slabs of compressible material of predetermined substantially uniform thickness into pieces and stacking the pieces, the combination comprising rollers mounted for rotation in separated pairs and with the rollers of each pair spaced from one another to receive the scored slab material therebetween, said pairs of rollers being aligned to engage and grip successive scored pieces of the scored slab material in succession, means for driving the rollers of the pairs at different speeds with the speed of the second successive pair engaged by the scored slab exceeding that of the first pair to the extent that the pieces are severed from the scored slab between the pairs of rollers, said rollers each having similar and opposed longitudinally spaced sections, each of which sections has thereon a plurality of rows of circumferentially spaced serrations, said rows of serrations being spaced from one another axially of the rollers and aligned on the rollers of each pair, said serrations being in the form of teeth spaced apart on each of the pairs of rollers to press into the surface of the compressible material to provide gripping action thereon, and the serrations of the aligned rows on the rollers of each pair being angularly disposed with

respect to one another, so that they provide transverse depressions on the opposite sides of the material, and the rollers of the different pairs having a part of the rows of serrations offset axially of the rollers from one another.

2. In a severing and stacking mechanism as defined in claim 1, the serrations of each row on each of the rollers being in the form of linear teeth in substantially parallel relationship to one another, and said teeth being separated by concave surfaces of substantially arcuate curvature having an extent of less than a semi-circle.

3. In a severing and stacking mechanism as defined in claim 1, the serrations on each of the rollers having peripheral material engaging surfaces of a thickness of between .0025 and .005 inch.

4. In a severing and stacking mechanism as defined in claim 1, said serrations comprising teeth separated by smoothly curved surfaces, the curvatures of said surfaces being substantially similar and opposed on opposite sides of each tooth, and tangents to the curved surfaces at the peripheral surface of each tooth forming an angle of approximately 30° with the radial center line of the tooth.

5. In a severing and stacking mechanism as defined in claim 1, the serrations on each pair of rollers being disposed in angular relationship to the axes of the rollers, and the corresponding rollers of the two pairs having their serrations disposed in angular relationship to one another.

6. In a severing and stacking mechanism as defined in claim 1, said rollers being circumferentially recessed between said rows of serrations to provide surfaces on the rollers between the rows of serrations which are of a diameter less than the root diameter of the serrations.

7. In a severing and stacking mechanism as defined in claim 1, the combination being further characterized by pairs of differently shaped fingers mounted in adjacent relationship to one another at each end of the rollers of the pair from which the severed pieces are discharged, means supporting the fingers of each pair for separate swinging movements from and toward the rollers, means individually biasing each finger of each pair to a normal position, one of the fingers of each pair having an end portion extending outwardly in the direction of discharge of pieces from the said rollers of the pair from which the severed pieces are discharged and having a surface thereon extending downwardly across the path of discharge of the pieces from said rollers when said one of the fingers is in its said normal position to guide the forward edges of said pieces downwardly, the other of said fingers of each pair having a surface normally extending below said surface of said one of the fingers and into the path of discharge of the pieces from the said rollers, and the biasing force on said other finger being weaker than that on said one of the fingers and such that the finger is initially deflected by engagement with the forward edge of each discharged piece until it gets on top of the said piece to move the piece downwardly out of the way of a succeeding piece.

8. In a severing and stacking mechanism as defined in claim 1, the serrations of each row on each of the rollers being in the form of linear teeth in substantially parallel relationship to one another, and said teeth being separated by concave surfaces of substantially arcuate curvature and each constituting approximately two-thirds of a semi-circle.

9. In a severing and stacking mechanism for separating scored slabs of compressible material of predetermined substantially uniform thickness into pieces and stacking the pieces, the combination comprising rollers mounted for rotation in separated pairs and with the rollers of each pair spaced from one another to receive the scored slab material therebetween, said pairs of rollers being aligned to engage and grip successive scored pieces of the scored slab material in succession, means for driving the rollers of the pairs at different speeds with the speed of the second successive pair engaged by the scored slab exceeding that of the first pair to the extent that the pieces are severed from the scored slab between the pairs of rollers, said rollers each having similar and opposed longitudinally spaced sections, each of which sections has thereon a plurality of rows of circumferentially spaced serrations, said rows of serrations being spaced from one another axially of the rollers and aligned on the rollers of each pair, said serrations being in the form of teeth spaced apart on each of the pairs of rollers to press into the surface of the compressible material to provide gripping action thereon, and the circumferential rows of serrations near the axial mid-portion of each of the rollers of the different pairs being axially offset from one another.

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