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Kissell et al.

[11] **3,709,076**

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[54] **METHOD AND APPARATUS FOR SUBDIVIDING A BODY OF FIBERS INTO SECTIONS**

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[73] Assignee: **Owens-Corning Fiberglas Corporation**

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[52] **U.S. Cl.** **83/42,** 83/49, 83/152, 83/284, 83/326, 83/402, 83/434, 83/438, 226/97

[51] **Int. Cl.** **B26d 1/56**

[58] **Field of Search**.....83/24, 42, 49, 284, 326, 152, 83/402, 434, 509, 510, 512, 438; 226/97

[56] **References Cited**

UNITED STATES PATENTS

3,340,778	9/1967	Boone et al.	83/326 X
1,666,203	4/1928	Harshberger	83/326 X
2,127,820	8/1938	Kindelberger	83/284
3,143,016	8/1964	Obenshain	83/402 X
390,167	9/1888	Hammerstein	83/284
1,786,153	12/1930	Doyle	83/284 X
2,772,736	12/1956	Campbell	83/510
3,154,986	11/1964	Reid	83/326 X
3,244,337	4/1966	Curtze et al.	83/402 X

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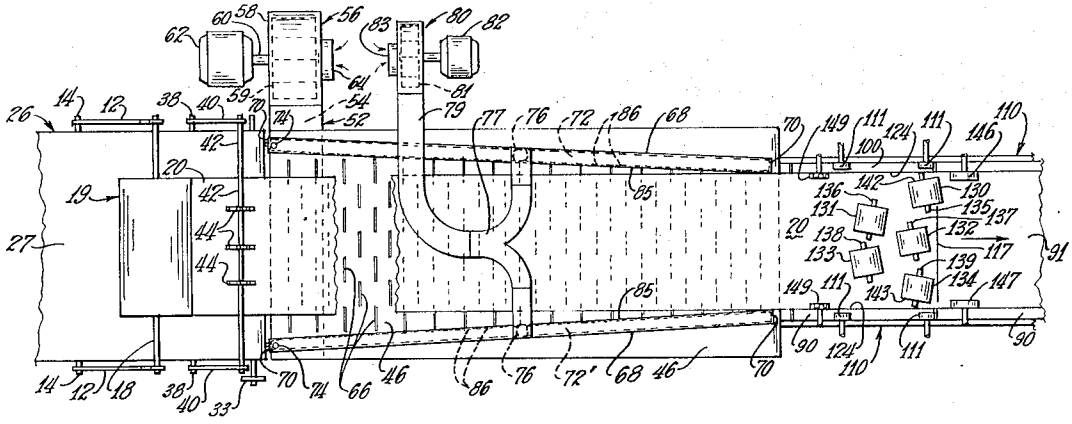
[57] **ABSTRACT**

The disclosure embraces a method of and apparatus for advancing a severable body or web of material, such as a body of mineral fibers or glass fibers, to a severing station, and subdividing the web or body at the severing station into discrete sections by progressively severing the body or web in a manner requiring a minimum of pressure on the severing instrumentalities.

37 Claims, 10 Drawing Figures



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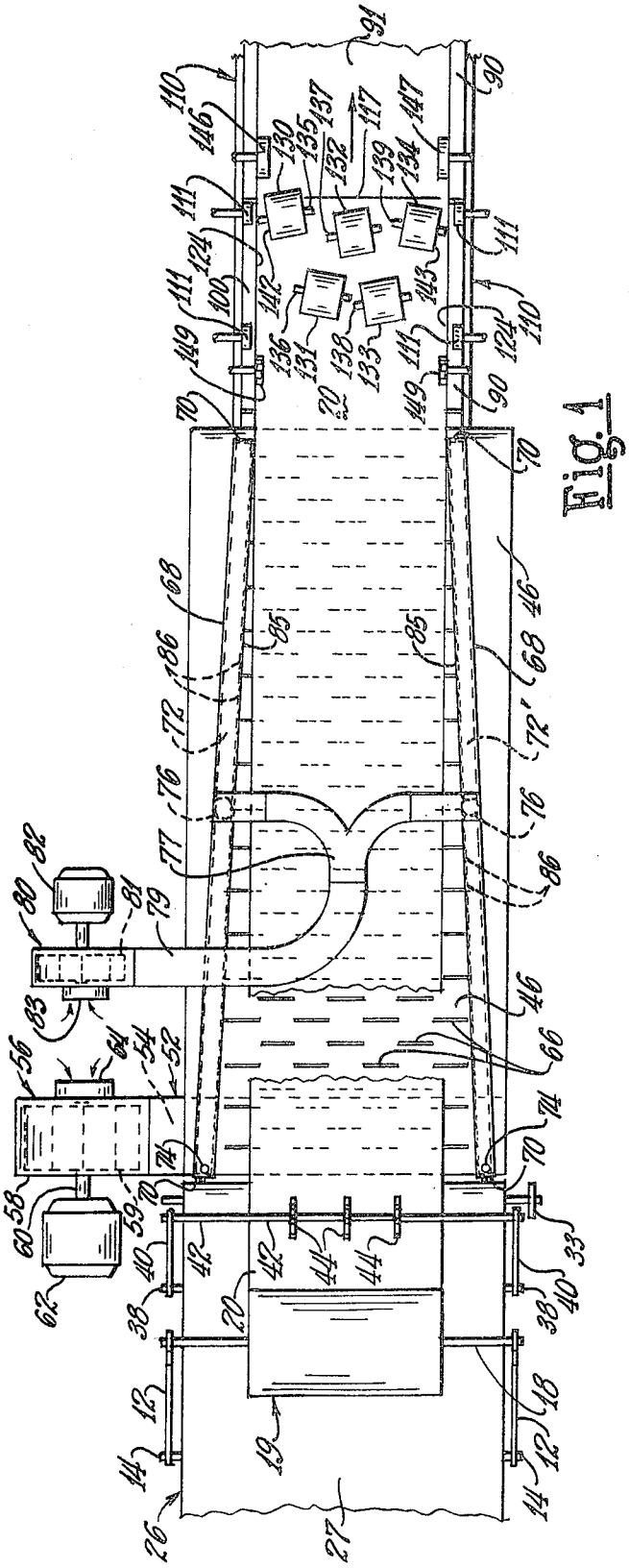

Fig. 1

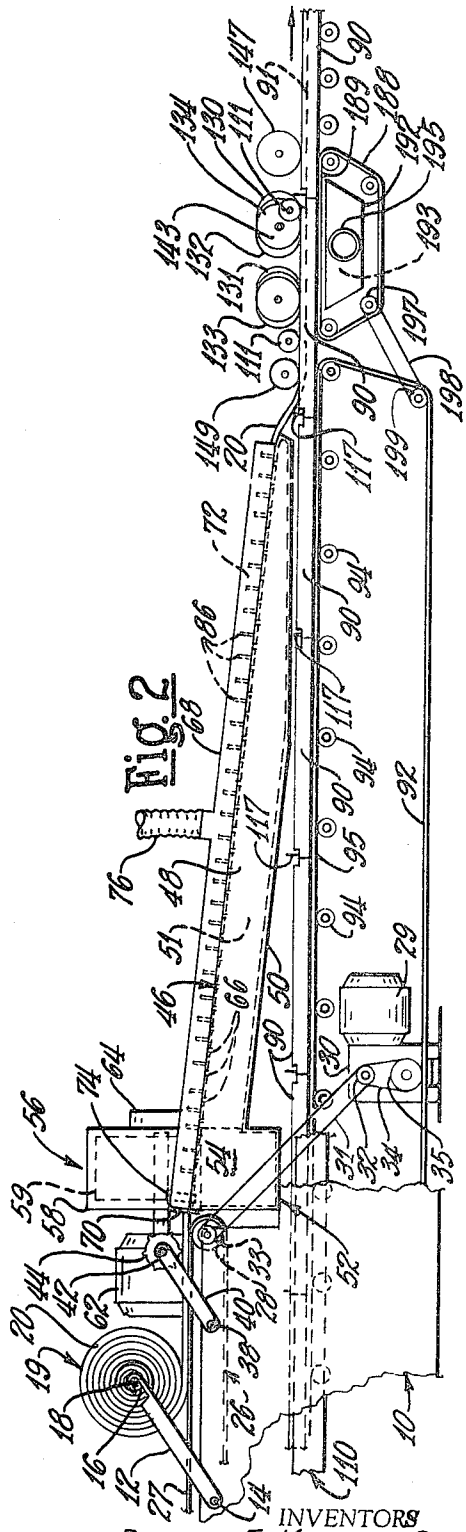

Fig. 2

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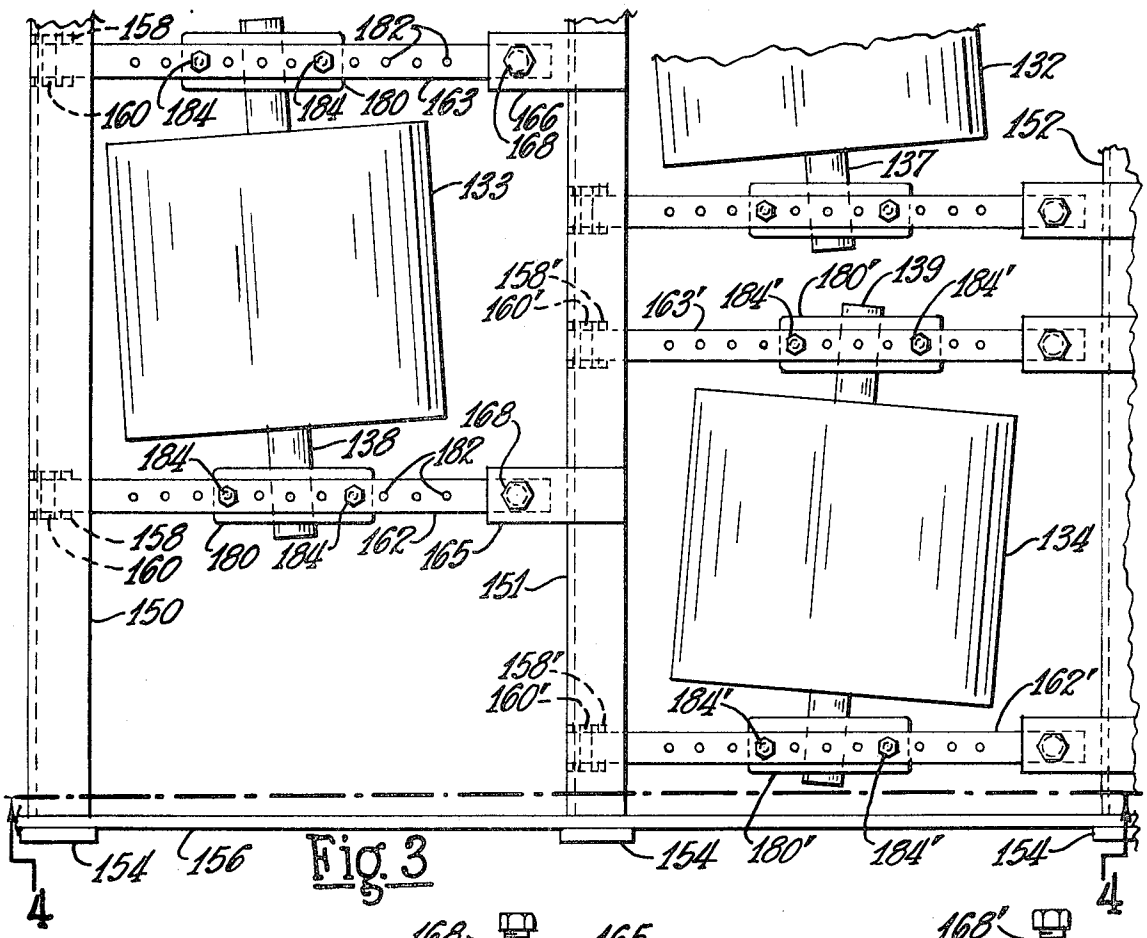

Fig. 3

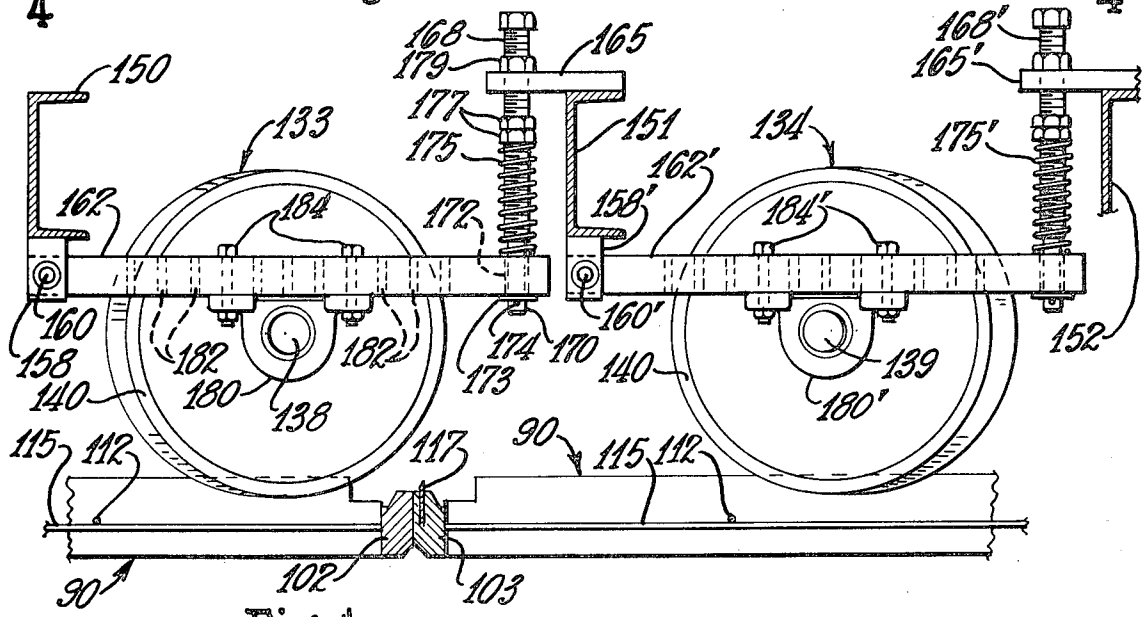

Fig. 4

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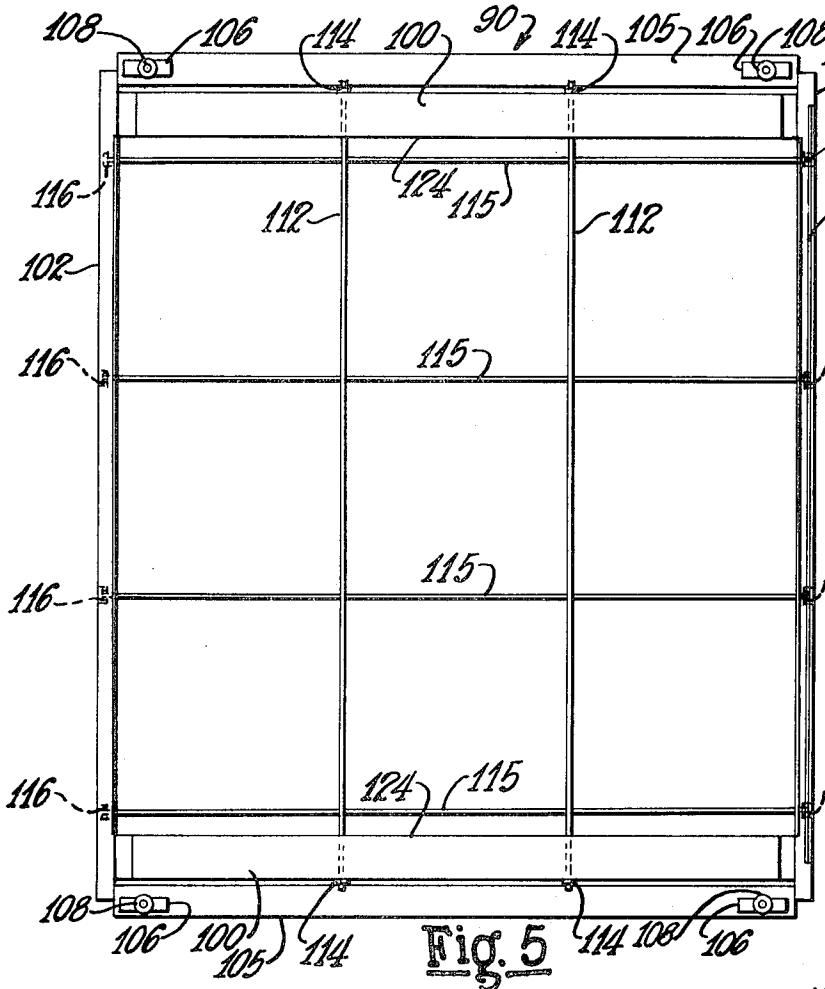

Fig. 5

Fig. 7

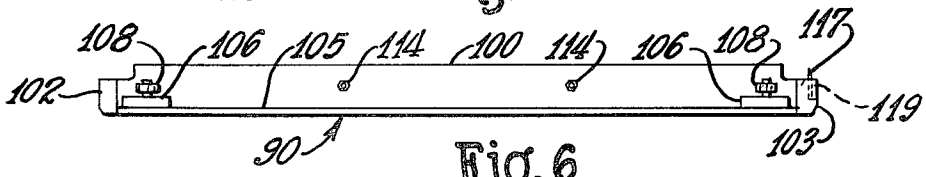

Fig. 6

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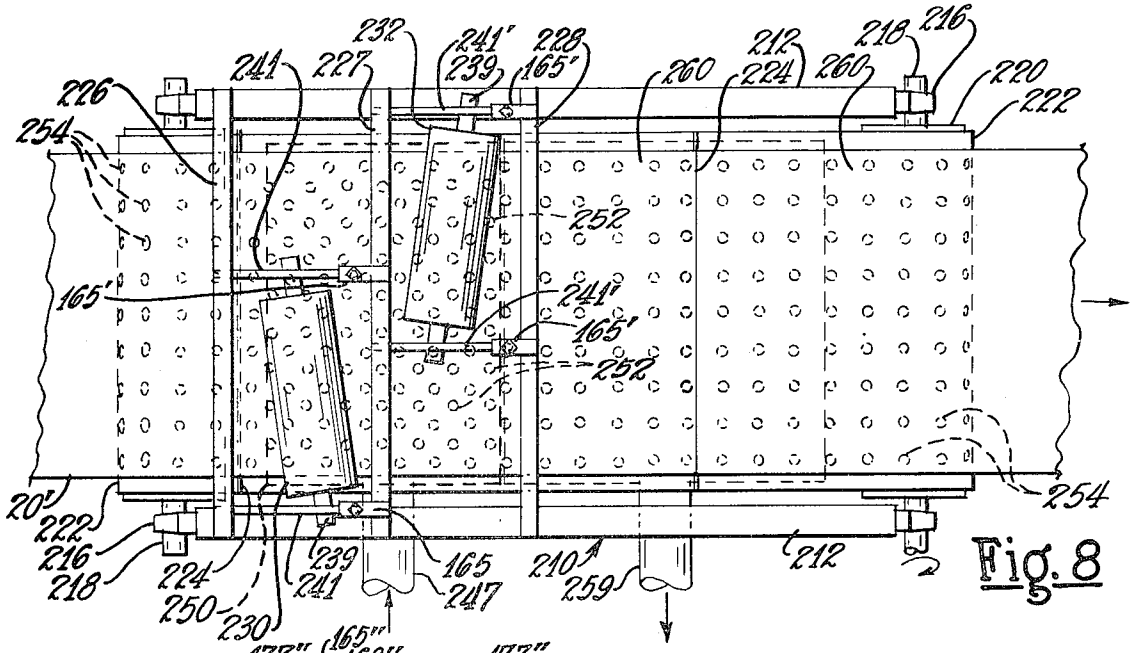

Fig. 8

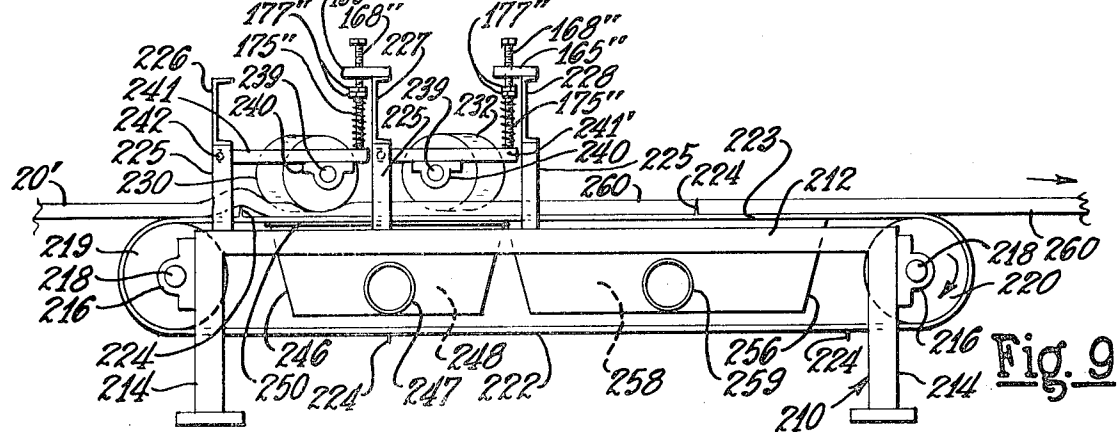

Fig. 9

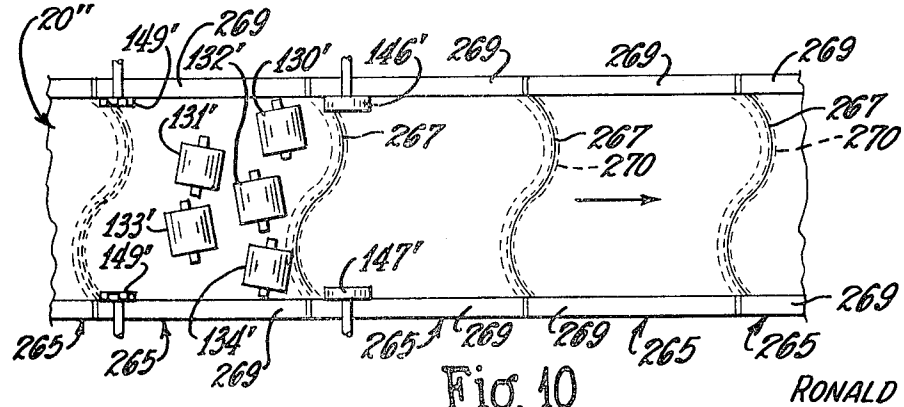

Fig. 10

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METHOD AND APPARATUS FOR SUBDIVIDING A BODY OF FIBERS INTO SECTIONS

The invention relates to a method of and apparatus for advancing a severable body of material, such as a body or mat of fibers and severing the advancing body or mat into discrete bodies or mat sections of predetermined size wherein the severing of the body of material or fibers of the mat is accomplished progressively at spaced regions of the body or mat without impact and with a minimum of pressure on the severing instrumentalities.

Heretofore, it has been conventional practice to sever a mat of fibers by impinging a cutter bar in engagement with the fibers of a mat with the bar moving in a direction normal to the plane of the mat. Such cutting method is usually referred to as a "guillotine" type serving operation. In severing a glass fiber mat by such method where the fibers are impregnated with uncured tacky binder, the binder and broken fibers tend to adhere to the cutting bar necessitating frequent cleaning. In such mat severing method, it requires accurate timing to operate the cutting bar so that the severed mats are of the same size.

The present invention embraces a method of severing an advancing body or web of material such as an advancing mat or body of fibers wherein spaced regions of the body of material or mat are fractured or severed by a progressive severing or crushing action, minimizing the pressures required for severing the body.

An object of the invention resides in a method of subdividing an advancing body or web of material, such as a mass or body of glass fibers, into discrete bodies or sections, the method involving engaging the moving body or mass with a plurality of moving surfaces, each surface being engageable with a portion of the body or mass and cooperating with a moving member to effectively sever the body or fibers by a progressive severing or crushing action without interrupting the advancement of the body or mass or disturbing the orientation of the material or fibers and wherein successive uniform lengths or sizes of bodies may be attained without the use of timing devices.

Another object of the invention resides in a method of advancing a linear body or mass of fibers and aligning the advancing body or mass of fibers for movement to a processing or severing station through the use of air streams wherein the advancing mass is supported by an air cushion and the mass aligned with a processing station by laterally directed air streams whereby the advancing mass or body is undisturbed to promote the maintenance of uniform width and thickness of the body or mass.

A further object of the invention resides in an apparatus for processing a rectilinearly moving body of material or mass of fibers wherein a severing bar disposed transversely of the advancing body or mass of fibers cooperates with a plurality of rotatable body engaging surfaces or rollers mounted in askew relation whereby spaced portions of the body of material or mass are progressively engaged with the cutting bar to effectively sever or fracture the body or mass of fibers.

Another object of the invention involves the advancement of a rectilinear body or mass of fibers, such as glass fibers, upon moving support means embodying fiber-severing bars in spaced relation and a plurality of rotatable rolls arranged in askew relation and cooperating with the spaced bars for fracturing or severing the body or mass of fibers by crushing the fibers between the askew mounted rolls and the bars.

Another object of the invention resides in a method and arrangement for advancing a body or mass of mineral fibers, such as glass fibers, to supports or carriers, each provided with a severing bar cooperating with askew mounted rolls for severing a section from the advancing mass whereby each of the supports or carriers mounts a severed section.

Another object of the invention resides in concomitantly advancing a rectilinear mat of fibers and a plurality of mat carriers or trays in the same direction, engaging the moving mat with successive carriers or trays, and severing successive sections from the mat whereby a severed section is congruent with and supported by each of the carriers or trays.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawing of a form of the invention, which may be preferred, in which:

FIG. 1 is a plan view of one form of arrangement or apparatus for preforming the method of the invention;

FIG. 2 is an elevational view of the apparatus illustrated in FIG. 1;

FIG. 3 is an enlarged top plan view of a portion of the apparatus shown in FIG. 1;

FIG. 4 is a sectional view taken substantially on the line 4—4 of FIG. 3;

FIG. 5 is a top plan view illustrating one form of support means or carrier for a fibrous body or mat section;

FIG. 6 is an end elevational view of the construction shown in FIG. 5;

FIG. 7 is a side view of the construction shown in FIG. 5;

FIG. 8 is a top plan view of a modified arrangement for subdividing a body or mat of fibers into sections;

FIG. 9 is an elevational view of the arrangement shown in FIG. 8, and

FIG. 10 is a schematic plan view illustrating the use of the method of the invention for severing fibers in a curvilinear contour.

While the method and apparatus of the invention are particularly usable for processing and subdividing a moving mass, mat or body of mineral fibers, for example, glass fibers, it is to be understood that the method and apparatus may be employed for processing and subdividing a severable body or web of other material or a body or mass of other kinds of fibers which are of a character that may be subdivided or severed into sections or discrete bodies through the use of the method and apparatus of the invention.

Referring to the drawings in detail, FIGS. 1 and 2 illustrate an apparatus particularly adapted for processing and subdividing an advancing mat or body of fibers, such as glass fibers, into sections wherein the body or mat may be impregnated with uncured binder depending upon the end use for the discrete mat sections. The apparatus is inclusive of a support means or frame 10, a portion of such means being shown in FIG.

2 upon which components of the apparatus are mounted.

A pair of arms **12** are pivoted to the support means by pins **14**, the distal end regions of the arms **12** being shaped with recesses **16** adapted to removably accomodate a mandrel or rod **18**, the latter extending through and positioning a roll **19** of severable material **20** which may be a web of material, or a mat, mass or body of fibers, such as glass fibers.

Where the severable material is a mat or body **20** of fibers, the same may be impregnated with uncured binder, such as phenol formaldelhyde, depending upon further processing of the mat sections subdivided or severed from the body.

Disposed beneath and adjacent the roll **19** of the fibrous body or mat is an endless belt conveyor **26**, the upper flight **27** of the conveyor supporting the roll **19**. The endless belt **26** embraces a drive roll **28** which is driven from a motor **29** through conventional speed reducing transmission mechanism contained in a housing **30**, and a chain **31** engages a sprocket **32**, driven by the speed reducing mechanism, and a sprocket **33** on the shaft supporting the drive roll **28**. The drive means for the conveyor **26** advances the upper flight **27** of the conveyor in a right-hand direction as viewed in FIGS. **1** and **2**.

Mounted by the support means **10** is a shaft **38**. Mounted on the ends of the shaft **38** are arms **40**, one at each side of the conveyor **26**, shown in FIG. **1**. Rotatably mounted in openings in the distal ends of the arms **40** is a shaft **42** disposed above and transversely of the fibrous body or mat **20** at a region spaced from the roll of mat. Mounted upon the shaft **42** are discs or circular members **44** preferably having peripheral projections as illustrated in FIG. **2**, the peripheries of the discs engaging the upper surface of the fibrous mat to assist in retaining the mat in engagement with the upper flight **27** of the conveyor **26** as the mat is conveyed in a right-hand direction as viewed in FIGS. **1** and **2**.

The arrangement is inclusive of means for supporting the advancing mat upon a cushion of gas, such as air, and utilizing air streams for maintaining the advancing mat in a central or aligned position so that the moving mat is properly disposed upon a mat supporting means in advance of the region at which the mat is fractured or severed to provide discrete mat sections.

With reference particularly to FIGS. **1** and **2**, there is mounted on the frame of the machine a mat guiding arrangement which includes a platform or ramp **46** preferably fashioned of sheet metal. Joined with the longitudinal edges of the ramp are transversely spaced depending side walls **48** and a floor or bottom member **50**, the platform or ramp **46**, the depending side walls **48** and the floor **50** providing a chamber **51**. The ramp or platform **46** is preferably inclined downwardly as illustrated in FIG. **2** in the direction of the travel of the mat **20**. The elevated end region of the chamber **51** is in communication with a sheet metal duct construction **52** providing a plenum chamber **54**.

The plenum chamber **54** is in communication with a blower construction **56**, the blower construction including a housing **58** having a tangential air outlet region joined with the duct structure **52**. Mounted for rotation in the blower housing **58** is a blower rotor **59** having connection with a shaft **60** of a drive motor **62**. The blower housing **58** has an axial air inlet region defined by a circular flange **64**. The platform or ramp **46** is fashioned with lengthwise spaced, transversely disposed rows of narrow slots **66** arranged in staggered relation as shown in FIG. **1** throughout the area of the ramp.

The blower **56** provides air flow through the plenum chamber **54** into the chamber **48** whereby air streams are delivered out of the slots **66**. The mat **20**, advancing along the platform or ramp **46**, is supported on a cushion of air provided by the upwardly-directed air streams delivered through the slots **66** beneath the moving mat. Through this method of supporting the fibrous mat on a cushion of air or supporting medium, the mat is advanced along the ramp **46** with a minimum of friction and is not subjected to stresses whereby the orientation of the fibers and the thickness of the mat are not impaired.

The air supported mat is guided or maintained in a desired path by air streams transversely directed onto the edge regions of the mat. Mounted or supported by the platform or ramp **46** are transversely-spaced tubular members **68** preferably of rectangular cross section. The members **68** are preferably fashioned of sheet metal having their ends closed by closure members **70** so that each member provides a hollow or tubular chamber **72**. The end regions of the members **68** adjacent the plenum chamber **54** are provided with openings snugly accommodating pivot pins **74** mounted by the ramp **46**, the pins **74** providing axes about which the tubular members **68** may be pivotally moved or adjusted.

Means is provided for delivering air into the chamber **72** provided by the tubular members **68**. Connected with each of the members **68** preferably at a mid region is a flexible tube **76**, the tubes **76** being joined with a Y-shaped coupling **77**, the coupling being connected by a pipe or manifold **79** with an air blower **80**, shown in FIG. **1**. The blower comprises a rotatable rotor **81** driven by a motor **82**, the blower having an axial air entrance **83**, and a tangential outlet joined with the pipe **79**, the blower delivering air into the chambers **72** through the manifold **79** and flexible tubes **76**.

The inner or opposed walls **85** of the tubular members **68** are provided with lengthwise-spaced slots or openings **86** through which air is delivered into engagement with the edges of the fibrous mat **20**. The air streams delivered through the slots **86** into engagement with the edges of the mat provide a mat guiding medium reducing to a minimum the friction of the mat with the walls **85** of the members. The air streams from the slots **86** serve to guide the mat along the platform **46**. By manually swinging the members **68** about the axes of the pivot pins **74**, the direction of movement of the mat may be varied by controlling or regulating the distance between the air delivery slots **86** and the edges of the mat through pivotal adjustment of the members **68**.

The arrangement is inclusive of novel means for subdividing or severing the advancing mat of fibers without interrupting the advancing movement of the mat of fibers. In the form illustrated in FIGS. **1** and **2**, the mat **20** may be fed onto mat carrier means, carriers or trays **90** which are advanced concomitantly with the advancing mat. The trays are illustrated in FIGS. **1**, **2** and **5**

through 7. The trays 90 are successively advanced to receive the advancing mat 20 and a mat separating or severing means, hereinafter described, severs successive sections of the advancing mat, each section 91 being precisely disposed on a tray for subsequent processing.

As shown in FIG. 2, a moving endless belt 92 is provided for advancing the trays 90 to receive the advancing mat. A plurality of rolls 94 support the upper flight 95 of the belt 92, the upper flight supporting and advancing the trays 90 in a right-hand direction as viewed in FIG. 2. The belt 92 is driven through the speed reducing mechanism in the housing 30 by a chain 34 and a sprocket 35 engaged with the belt 92, the upper flight 95 of the endless belt 92 being advanced at substantially the same linear speed as the mat advancing belt 26 whereby the mat is delivered into the trays without any stretching or distortion of the mat.

In one form of the invention the mat subdividing or severing means is inclusive of a severing bar or member mounted on each of the mat carriers or trays 90. One of the trays is illustrated in FIGS. 5 through 7 and is substantially rectangular in shape. The tray comprises side rails 100 which are preferably of tubular cross section, the rails 100 being welded or otherwise secured to end rails 102 and 103. Strips 105 are secured to the rails 100, the strips having blocks 106 equipped with rollers 108 for engagement with guide means or members 110 disposed at each side of flight 95 of the belt 92 for guiding the moving trays. Portions of the stationary guide members 110 are illustrated in FIGS. 1 and 2.

Each of the trays is equipped with transversely extending spaced wires or rectilinear members 112, the ends of which extend through openings in the rails 100, the ends being threaded to accommodate securing nuts 114. Lengthwise extending wires or linear members 115, spaced as shown in FIG. 5, are secured to the end rails 102 and 103 by nuts 116 on the threaded end regions of the wires 115. The wires 112 and 115 provide a gridlike support for a mat or mat section of fibers disposed on the wires.

The end rail 103 is configurated to accommodate a transversely extending mat severing member or bar 117 which is secured to the end rail 103 by plates 119 and securing screws 120. The spaces 121 between adjacent plates 119 accommodate the ends of the wires 115 and the securing nuts 116. The nuts 114 and 116 may be drawn up to provide the proper tension in the wires 112 and 115. The trays 90 are disposed on the endless belt 95 with the side rails 100 adjacent the edge regions of the belt 92, the mat 20 being of a width to be received and fit between the inner surfaces 124 of the rails 100 so that the mat is accurately disposed in the tray prior to severing the section of the mat disposed on the tray.

One arrangement cooperating with the bar 117 for severing a body of material, such as a mat of fibers, to provide a discrete body or mat section 91 on each tray is illustrated in FIGS. 1 through 4. The method of the invention involves progressively pressing or crushing the body of material or mat of fibers against the bar 117 so that, in effect, the crushing or severing occurs in point regions so that a minimum force or energy is required.

The method and apparatus involve the use of a plurality of rolls or mat engaging members disposed with their axes in angular or oblique relation with respect to the severing bar 117 and with respect to the direction of advancement of the mat 20 of fibers with adjacent rolls being in non-aligned overlapping relation to effect progressive fracturing or severing of the fibers by crushing or pressure engagement of the fibers at successive point contacts of the rolls against the severing bar 117. In the illustrated embodiment of FIGS. 1 and 2, there are five rolls, independent of one another, designated 130, 131, 132, 133 and 134, the rolls being mounted for rotation about axes in angular or askew relation with respect to the fiber fracturing or severing bar 117 and in angular or askew relation with respect to the direction of advancement or travel of the moving mat 20 of fibers.

The rolls 130 through 134 are mounted respectively on rotatable shafts 135, 136, 137, 138 and 139. Referring to Fig. 1, the rolls 130 through 134 in the order of their numbering are spaced transversely and in lengthwise staggered relation about angular or oblique axes relative to the cutter or severing bar 117. The rolls are of such length as to effect slight overlapping in a transverse direction of their successive points of engagement with the bar 117 so that when the severing bar 117 has moved past the rolls 130 and 134, the mat is severed widthwise from a vertical line through the center of the exterior end surface 142 of roll 130 to a vertical line through the center of the outer surface 143 of the roll 134.

Thus the mat is severed except at the side regions extending outwardly beyond vertical lines through the centers of the outer surfaces 142 and 143 of rolls 130 and 134.

A strip of narrow width at each edge of the mat is subsequently severed by engagement with rolls 146 and 147, shown in FIGS. 1 and 2, with a cutter bar 117 to complete a full transverse fracturing or severing of a section of the mat in a tray 90 from the continuous strip of advancing mat 20.

As shown in FIGS. 1 and 2, narrow tucking rolls 149 are disposed adjacent the region of delivery of the mat onto a mat carrier 90, the rolls 149 serving to tuck in the edges of the mat 20 along the lateral edge regions of the mat to facilitate subsequent severing of the edge regions of the mat by the severing rolls 146 and 147.

The mounting arrangement of the fiber crushing or severing rolls is illustrated in FIG. 3, a portion of roll 132 and the rolls 133 and 134 being shown in FIG. 3. A frame structure or support means is inclusive of beams or members 150, 151 and 152 which extend transversely of the direction of advancement of the mat 20, the ends of the beams or members being secured to vertical struts 154 carried by longitudinally extending frame members 156, a portion of one of the members 156 being illustrated in FiG. 3.

Each of the fiber crushing or severing rolls is mounted in a manner whereby the degree of angularity of the axis of each roll with respect to the path of advancement of the mat 20 may be varied. Referring to FIGS. 3 and 4, the roll 133 is mounted in the following manner. Secured to the transverse beam 150 are brackets 158 and 159. Each of the brackets is provided with a pivot pin 160. Pivotally connected with the respective pivot pins are longitudinally extending bars or members 162 and 163. Secured to the beam 151 are

transversely spaced members **165** and **166**. Each of members **165** and **166** has a threaded bore accommodating a threaded member or bolt **168**.

As shown in FIG. **4**, the end regions of each of the bolts **168** is fashioned with an unthreaded tenon **170** which extends through a bore **172** provided in an end region of each of the members **162** and **163**. The bores **172** are of larger diameter than the diameter of the tenons **170** to facilitate pivotal movement of members **162** and **163** about the pivot pins **160**. Each of the portions of the tenons **170** extending below the members **162** and **163** is equipped with a washer **173** and an abutment pin **174** for retaining the bars **162** and **163** on the tenons. An expansive coil spring **175** surrounds each of the bolts **168** and engages the adjacent member, the compressive pressure of the springs being adjustable by adjusting nuts **177**.

The position of the bolts **168** with respect to the members **165** and **166** may be adjusted by rotating each bolt, the bolts being locked in adjusted position by lock nuts **179**. Mounted by each of the bars **162** and **163** are bearing support members or blocks **180** in which are mounted journal means for the shaft **138**, the journal means being of a conventional swivel type to facilitate adjustment of the angularity of the shaft **138** and the roll **133**.

As shown in FIG. **3**, each of the members **162** and **163** is fashioned with a plurality of lengthwise spaced openings **182**. The bearing blocks or bearing supports **180** are secured to the members **162** and **163** by pairs of bolts **184**, the bolts extending through selected openings **182** in the members **162** and **163**. With reference to FIG. **3**, it will be apparent that the degree of angularity of the shaft **138** and roll **133** with respect to the transversely extending cutting bar **117** may be varied by shifting the relative positions of the bearing supports **180** through the selection of pairs of openings receiving the bolts **184**.

The expansive springs **175** exert downward pressure on the fiber crushing or severing roll **133** and this pressure may be regulated by adjusting the position of the nuts **177** controlling the extent of initial compression of the springs **175**. The initial position of the fiber-crushing or severing roll **133** may be regulated by adjusting the positions of the bolts **168** by rotating the bolts relative to members **165**. The relationship of the fibercrushing or severing rolls **133** and **134** with respect to the matsupporting trays **90** is illustrated in FIG. **4**.

The severing bar **117** carried by the rail **103** of a tray **90** is illustrated as at the trailing region of the tray, the latter being advanced in a right-hand direction as viewed in FIGS. **1**, **2** and **4**. The leading rail **102** of the succeeding tray **90** abuts or engages the rail **103** whereby the trays are advanced by engagement of one tray with another as illustrated in FIG. **2**. The rolls designated **130** through **134** are preferably faced or covered with a layer **140** of semi-hard rubber or other yieldable or resilient material suitable for crushing the fibers as the severing bar **117** of a tray moves beneath and is engaged by the rolls.

The rolls **130**, **131**, **132** and **134** are mounted in a manner substantially identical to the mounting of roll **133** hereinabove described except that the angularities of the rolls are varied to avoid undue stress in the mat of fibers and to provide for progressive severing of the mat. As shown in FIG. **1**, the severing rolls **130** and **131** are adjusted for rotation about axes in converging angular relation, and the rolls **133** and **134** are likewise adjusted for rotation about axes in converging relation. The roll **132** is illustrated as adjusted for rotation about an axis substantially parallel with the axis of the roll **130**, but the axis of the roll **132** may be adjusted to a different angle so long as the axis of rotation is at an angle with respect to the severing bar **117**.

The roll **134**, shown in FIG. **3**, is mounted upon a shaft **139** journaled in swivel bearings mounted in bearing blocks or supports **180'**. The bearing blocks **180'** are adjustably mounted on the bars **162'** and **163'**, the bars being pivotally supported by pins **160'** carried by brackets **158'**. The transverse beam **152** supports members **165'** equipped with bolts **168'**. Expansive springs **175'** engage the end regions of the members **162'** and **163'** to bias the fiber-crushing or severing roll **134** downwardly for engagement with severing bars **117** of successive mat supporting trays **90**.

The bearing blocks **180'** may be adjusted by changing the position of the securing bolts **184'** to change the axis of the roll supporting shaft **139**. The rolls **130**, **131** and **132** are supported in the same manner as the rolls **133** and **134** with their respective supporting shafts preferably in angular positions such as shown in FIG. **1**.

By disposing the several fiber crushing or severing rolls for rotation about axes in various angular relations, the region of crushing or severing the fibers, that is, the region of contact of a roll with a severing bar **117**, occurs at a point, the severing of the fibers progressing as different points on the severing bar **117** are progressively engaged with different points on the surface of a crushing or severing roll. By severing or subdividing the mat through a progressive crushing action of the fibers, the downwardly acting pressure on the fiber crushing or severing rolls may be reduced to a minimum because at any one instant the fibers are being crushed and severed at a point contact between the severing bar **117** and a fiber-crushing or severing roll.

Another advantage of the above-described method of severing a section of fibrous mat from a continuous mat or supply is that there are no stresses in the fibrous mat or body set up during severing tending to distort the mat because the severing or crushing of the fibers is occurring progressively and, as the rolls are rotated through engagement of the rolls with a severing bar **117** during the fiber severing or crushing action, the peripheral speed of the rolls is the same as the rectilinear speed of the advancing trays.

By mounting the rolls for rotation about axes of different angularities, the progressive crushing and severing of fibers of the advancing mat do not set up lateral forces acting on the fibers so that there is no distortion or transverse stresses occurring in the mass or mat of fibers or in the severed section. Thus, the severed section of mat supported by the wire grid of a tray is accurately positioned in the tray for further processing of the mat section.

As shown in FIG. **1**, a conveyor belt **188** is disposed beneath the fiber crushing and severing rolls, the conveyor **188** having its upper flight **189** in the plane of the upper flight **95** of the conveyor belt **92**. The linear rate of travel of the belt **188** is the same as the linear rate of

travel of the belt 92. The flight 189 of the belt 188 provides a moving support for the trays or mat carriers 90 during the movement of the mat carriers through the severing station at which the fiber crushing or severing rolls 130 through 134 engage the fibers to sever the mat at the region of a severing bar 117.

The conveyor 188 is of foraminous or perforated character. Disposed adjacent and beneath the upper flight 189 of the conveyor belt 188 is a sheet metal receptacle 192 providing a chamber 193 connected by a pipe 195 with a source of air pressure such as a blower (not shown). The perforations in the belt 188 facilitate escape of some of the air under pressure in the chamber 193. The perforations are small and are spaced and restricted in number so that there is sufficient unperforated area of the belt beneath a tray 90 supported by pressure of the air in chamber 193 on the belt, the upwardly directed air pressure against the belt providing support means resisting the downward pressure of the fiber crushing or severing rolls 130 through 134 on the mat carried by the grid-like structure provided by the wires 112 and 115 on a tray 90.

The conveyor belt 188 is driven at the same linear speed as the belt 92 so that the trays 90 are maintained in abutting relation at least until they have moved away from the mat severing station. As shown in FIG. 2, one of the rolls 197 engaged with the belt 188 is connected by driving chain 198 with one of the rolls 199 engaging the belt 92. This arrangement or other suitable driving means provides for advancing both belts 92 and 188 at the same linear speed.

The arrangement illustrated in FIGS. 1 through 4 operates or functions as follows: a supply roll 19 of a severable body 20, such as a mat of mineral fibers, preferably glass fibers is mounted on the rod 18 carried by the pivoted arms 12. The mat 20 is engaged by the upper flight 27 of the conveyor 26 and is unrolled from the roll 19 by movement of the flight 27 of the conveyor in a right-hand direction as viewed in FIGS. 1 and 2.

The motor 29 is energized to drive the conveyor belt 26 and the conveyor belt 92 or other tray supporting means whereby both conveyors move at substantially the same rectilinear speed with the trays 90 on the belt 92 in abutting relation. The conveyor or mat carrier support means 188 at the severing station is advanced at substantially the same speed as the fibrous mat 20 so that there is no appreciable relative movement between a mat supporting tray and the mat. If it is desired to effect a very slight stretching of the mat of fibers, the tray or carrier supporting means 92 may be advanced at a slightly greater speed than the linear speed of the mat. The motor 62 is energized, driving the blower 56 which provides air under low pressure in the chamber 51, the air escaping through the slots 66 in the platform or ramp 46 along which the mat is advanced by the belt conveyor 26 and under the influence of engagement with the mat with a tray or mat carrier 90 adjacent the severing station.

The air moving through slots 66 beneath the advancing mat 20 provides an air cushion or layer of air supporting the mat during its movement along the ramp or floor 46. The motor 82 is energized, driving the blower 80 to deliver air under pressure through the pipes 76, 77 and 79 into the chambers 72 and 72' provided by the hollow members 68, the members being supported on the ramp 46 and arranged at each side of the mat 20, the member 68 being pivotally adjustable about the pins 74.

Air under pressure in the chambers 72 and 72' is delivered through the slots 86 on the inner walls of the members 68 providing the chambers 72 and 72' into engagement with the edges of the advancing mat 20 in order to assist in guiding and aligning the mat for delivery onto the trays 90. The operator may adjust the members 68 about their pivot supports 74 to center the mat.

The air streams delivered through the slots 66 in the floor or ramp 46 and the air streams delivered through the slots 86 provide an air cushion or layer supporting and guiding the mat 20 so that there is no appreciable friction or drag on the mat throughout its movement along the ramp 46. The mat advancing from the exit end of the ramp 46, is delivered onto the adjacent tray 90 moving at the same speed as the mat so that there is no relative movement between the mat and the tray. The portion of the mat on the tray is supported by the wire grid structure, the mat being above and engaging the severing bar 117 of the tray.

The air pressure in the chamber 193 beneath the severing station exerts an upward pressure on the upper flight 189 of the conveyor 188 to provide added support for the portion of the fibrous mat on the adjacent tray. As shown in FIG. 1, journally supported on the tray guiding members 110 are idler rolls 111 which engage the upper surfaces of the rails 100 of the tray 90 at the fiber fracturing or mat severing station to prevent upward movement of a tray under the influence of air pressure beneath the flight 189 of the conveyor 188.

As the tray and the mat are advanced simultaneously, the rolls 130 through 134 progressively engage the fibers at the cutter bar 117 and progressively crush or fracture the fibers of the mat between the cutter bar 117 and the rolls. By reason of the askew relation of the rolls to the cutter bar, the crushing or fracturing of the fibers occurs in point contacts so that there is a minimum of pressure required on the rolls to crush or fracture the fibers at the cutting bar 117. Thus, the fracturing or crushing of the fibers is a progressive action as the rolls only engage the cutter bar at points of intersection in vertical planes through the axes of the rolls.

Through the provision of several rolls with their axes in askew relation, there are no lateral forces tending to displace, disrupt or move the mat laterally or longitudinally during a fiber crushing or severing operation. After all of the rolls have passed over the cutter bar, the mat is severed except for a narrow strip at each edge region. As the cutter bar of a tray moves beneath the edge rolls 146 and 147, the strips at the edge regions of the mat are severed from the supply mat so that a separate, discrete fibrous mat section or body 91 is supported by each tray 90 after the completion of a cycle of the fiber crushing and severing operations of all of the rolls shown in FIGS. 1 and 2.

FIGS. 8 and 9 illustrate a modified arrangement wherein a continuously moving or advancing mat 20' is severed into discrete bodies or sections where the mat is moved through the mat severing or subdividing station supported upon a conveyor belt. The fibrous mat

or body 20' is advanced along a ramp as in the arrangement shown in FIGS. 1 and 2. The fiber crushing or mat severing station is inclusive of an apparatus comprising a frame 210 which includes transversely spaced members 212 arranged lengthwise of the direction of travel of the mat, members 212 being supported on struts 214. Mounted in journal blocks 216 carried by the frame 210 are shafts 218, one shaft supporting a roll 219 and the other supporting a roll 220, one of the rolls being driven by a motor (not shown).

An endless conveyor belt 222 is mounted by the rolls 219 and 220, the upper flight 223 of the conveyor supporting the advancing mat 20'. The outer surface of the belt 222 is equipped with lengthwise spaced mat severing bars or members 224. Mounted upon the lengthwise frame members 212 are vertically disposed pairs of struts 225, the struts of each pair being connected by transverse beams 226, 227 and 228.

In the embodiment illustrated in FIGS. 8 and 9, there are two fiber fracturing or fiber crushing rolls 230 and 232 which cooperate with the bars 224 on the conveyor belt 222 to sever the advancing mat 20' into sections 260, the rolls being journally supported for rotation about independent axes, each axis being askew or angularly disposed with respect to a transverse vertical plane normal to the direction of movement of the mat, the axes of the rolls being angularly disposed to each other. Each of the rolls 230 and 232 is mounted whereby the degree of angularity of the axis of each roll may be varied with respect to the path of movement of the mat 20', as each of the rolls 230 and 232 is supported in a manner similar to the mounting of the rolls 130 through 134 hereinbefore described.

The shaft 239 supporting the fiber crushing or severing roll 230 is journaled in bearings 240 carried by members 241, each member 241 being pivoted at one end by a pin 242 mounted in a bracket carried by the transverse beam 226. The shaft 239 supporting the roll 232 is similarly journaled in bearings 240 carried by members 241'. One end of each of the members 241' is pivotally supported on a bracket mounted on the transverse beam 227. The distal ends of the members 241 and 241' are engaged by tenon portions of bolts or threaded members 168'', the bolts being threaded through openings in support members 165'' carried by the beans 227 and 228.

An expansive coil spring 175'' is disposed between adjusting nuts 177'' and the members 241 and 241' for adjusting the downward pressure exerted by the springs on the fiber crushing rolls 230 and 232. Means is provided for supporting the mat of fibers on a cushion or layer of air in the region of the fiber crushing rolls. Disposed beneath the upper flight 223 of the conveyor belt 222 and the crushing rolls 230 and 232 is a receptacle 246 connected by pipe 247 with a blower (not shown) establishing air pressure in a chamber 248 provided by the receptacle 246. The receptacle 246 is equipped with a closure or cover member 250 having lengthwise-spaced transversely-disposed rows of openings 252, shown in FIG. 8.

The conveyor belt 222 is fashioned with lengthwise spaced transverse rows of openings 254, the openings 254 of the rows being in staggered relation with respect to the openings 252 in the closure or cover member 250 so that as the upper flight 223 of the conveyor belt 222 advances over the cover member 250, the air under pressure in the receptacle 246 is effective on the lower surface of the upper flight 223 of the conveyor to resist the downward pressure of the severing rolls by the air cushion established beneath the conveyor flight 223 at the region of the cover 250. Thus the air pressure beneath the conveyor flight 223 adjacent the cover 250 tends to prevent sagging of the conveyor flight adjacent the crushing rolls 230 and 232.

Means is provided for holding the severed mat sections 260 on the conveyor belt adjacent the mat-severing station. Disposed beneath the upper flight 223 is a receptacle 256 adjacent the right-hand region of the receptacle 246. The receptacle 256 provides a chamber 258 connected by a pipe 259 with a suction blower for establishing subatmospheric or reduced pressure in the chamber 258. As the severed mat sections are successively advanced over the receptacle 256, the suction or reduced pressure is effective through the rows of openings 254 in the conveyor belt 222 to prevent dislodgment of the severed mat sections being advanced by the flight 223 of the conveyor.

The operation of the arrangement shown in FIGS. 8 and 9 is as follows: The continuous mat 20' of fibers is advanced from a ramp of the character shown at 46 in FIGS. 1 and 2 onto the upper flight 223 of the conveyor 222, the upper flight being moved in a right-hand direction at the same linear speed as the advancing mat. As the mat is advanced beneath the crushing or severing rolls 230 and 232, the fibers of the mat at a severing bar 224 is progressively severed as the angularly disposed crushing rolls 230 and 232 are progressively engaged with a severing bar 224 to sever a section 260 from the mat.

As the crushing or severing rolls 230 and 232 are mounted for rotation about axes in angular relation, the crushing action of the rolls engaging the fibers at a severing bar occurs at point contacts, the severing action being progressive at successive points of contact along each roll as it crushes the fibers in engaging a severing bar. By severing the fibers of the mat through a progressive crushing action, the downwardly acting pressure of the rolls against the fibers is reduced to a minimum because the crushing action at any one instant is a severing action at a point contact.

There are no stresses set up in the fibrous mat or body during severing which would impair the character of the mat or tend to effect dislodgment or distortion of the mat because the rolls are rotated through engagement of the rolls with a severing bar 224 whereby the peripheral surfaces of the crushing rolls are moving at substantially the same linear speed as the rectilinear speed of the advancing mat 20'. The air pressure in the chamber 248 exerts an upward force against the region of the conveyor belt flight 223 in registration with the chamber to resist the downward thrust of engagement of the crushing rolls with the severing bars 224.

FIG. 10 is a schematic illustration of a modification of the arrangement shown in FIG. 1 for severing an advancing mat of fibers into sections having curved or curvilinear edges. In this form of the invention, the mat conveying carriers or trays 265 are of a construction similar to the tray 90 hereinbefore described but each tray is equipped at its end regions with a severing bar 267 of nonrectilinear or curvilinear shape. In the em-

bodiment illustrated, each severing bar **267** is of ogee configuration or shape.

The trays or carriers **265** have opposed rails or strips **269** similar to the rails or strips **105** shown in FIG. **5** which may be connected by mat supporting wires (not shown). Each of the trays is provided with transversely extending opposed members **270**, one of which supports a severing bar **267**, the other constituting a frame member of the tray. The members **270** may be joined with spaced wires for supporting the mat sections which, with the wires joining members **269** form a grid-like mat support similar to that shown in FIG. **5**. The trays are arranged in aligned abutting relation in the direction of travel of the fibrous mat **20''**.

A group of body severing or fiber crushing rolls comprising rolls **130'**, **131'**, **132'**, **133'** and **134'** are arranged in the same or similar angular relation as the corresponding crushing rolls shown in FIG. **1**. Through this angular relationship of the axes of the rolls with respect to the curvilinear severing bars **267**, the engagement of each of the rolls with a severing bar **267** is a point contact so that the operation of severing a section from the mat occurs progressively as the crushing rolls engage different points on a severing bar **267**.

It will be apparent from FIG. **10** that progressive point contact of the body severing or crushing rolls with a severing bar may be attained with use of a severing bar of nonrectilinear or curvilinear shape. Thus a mat section severed from the advancing mat of fibers has one pair of opposing edges of rectilinear shape with the other pair of opposing edges of non-rectilinear or curvilinear shape.

Tucking rolls **149'** are disposed adjacent the delivery region of the advancing mat onto a mat carrier **265** to tuck in the lateral edge regions of the mat. Comparatively narrow crushing or severing rolls **146'** and **147'** are disposed adjacent the edges of the mat to complete the severing of the mat into sections. An air pressure chamber, similar to the chamber **192** shown in FIG. **2**, is disposed beneath the region of the crushing rolls **130'** to **134'** to provide an air cushion for supporting the mat **20''** at the region of the crushing rolls to resist the downward thrust of the crushing rolls under the influence of the biasing spring arrangement of the character shown in FIG. **4**.

The arrangement shown in FIG. **10** functions to sever sections from an advancing mat **20''** by a plurality of crushing rolls and cooperating severing bars on trays or carriers **265** in the same manner as explained in connection with the arrangement shown in FIGS. **1** through **4**. In the forms of the invention described herein, severing of a mat or body of fibers into discrete sections may be accomplished with a minimum of expenditure of energy by reason of the progressive severing action of fiber-crushing or severing rolls in cooperation with severing bars or knives. The severing is accomplished without any imposition of stresses or distortions in the mat or in the severed sections.

It is to be understood that the mat of fibers may vary widely in density and the arrangement is admirably suited for severing mats of fracturable fibers such as haphazardly arranged glass or other mineral fibers, the mat being of a density of one to five pounds or more per cubic foot. The progressive severing action enables the satisfactory severing of mats up to several inches in thickness and it has been found that mats of a thickness of one to four inches may be readily severed by the method and apparatus herein disclosed.

It is apparent that, within the scope of the invention, modifications and different arrangements may be made other than as herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

We claim:

1. The method of severing an advancing body of material including moving a body-severing member with the advancing body with one major surface of the body in engagement with the member at a severing station, engaging the other major surface of the advancing body with successive regions of rotatable surfaces rotating about axes oblique to each other and oblique to the direction of movement of the advancing body, and progressively severing the body at regions between the body-severing member and the rotatable surfaces at the severing station.

2. The method of subdividing a body of fibers including advancing a body of fibers from a supply to a body-subdividing station, moving a member concomitantly with the advancing body at the subdividing station, engaging one major surface of the advancing body of fibers with the member, engaging the other major surface of the advancing body with successive regions of rotatable surfaces rotating about axes oblique to each other and oblique to the direction of movement of the advancing body, and progressively severing the body of fibers at successive points of contact of the rotatable surfaces with the member.

3. The method of severing an advancing body of fibers including engaging one major surface of the advancing body of fibers with a member, advancing the member concomitantly with the advancing body, engaging the other major surface of the body with successive regions of rotatable surfaces rotating about axes oblique to each other and oblique to the direction of movement of the advancing body, exerting pressure to engage the rotatable surfaces with the member, and progressively severing the fibers at the region between the member and the rotatable surfaces.

4. The method of severing fibers of a body of fibers into discrete sections including advancing a body of fibers from a supply, delivering the advancing body onto a movable carrier, moving the carrier at substantially the speed of the advancing body and in the same direction, engaging one major surface of the advancing body of fibers with a member movable with the carrier, successively engaging regions of the other major surface of the advancing body with successive regions of rotatable surfaces rotating about axes oblique to each other and oblique to the direction of movement of the advancing body, and exerting pressure on the fibers of the body by the rotatable surfaces and against the member to progressively sever the fibers at the member.

5. The method of severing an advancing body of fibers including engaging one major surface of the advancing body of fibers with a first member, engaging the other major surface of the body with second members rotatable respectively about independent axes in oblique relation one with respect to another and obliquely disposed with respect to the first member, ef-

fecting relative movement between the first member and the second members to progressively engage the first member with the second members, and exerting pressure by the second members on the fibers at the successive regions of engagement of the first member with the second members to sever the fibers at said regions.

6. The method of severing fibers of a mat of fibers including advancing a mat of fibers from a supply toward a fiber severing station, continuously delivering the advancing mat onto a movable carrier, advancing the carrier at substantially the speed of the advancing mat and in the same direction, engaging one surface of the advancing mat of fibers with a severing member movable with the carrier, engaging another surface of the advancing mat with successive regions of rotatable surfaces rotating about axes oblique with respect to each other and oblique with respect to the direction of advancement of the mat, and progressively severing fibers of the mat at successive points of engagement of the rotatable surfaces with the member.

7. The method of severing fibers of a mat of fibers including advancing a mat of fibers from a supply toward a fiber severing station, continuously delivering the advancing mat onto a movable carrier, advancing the carrier at substantially the speed of the advancing mat and in the same direction, engaging one surface of the advancing mat of fibers with a severing member movable with the carrier, engaging another surface of the advancing mat with successive regions of rotatable surfaces rotating about axes oblique with respect to the direction of advancement of the mat, progressively severing fibers of the mat at successive points of engagement of the rotatable surfaces with the member, and engaging edge regions of the mat with the severing member and second rotatable surfaces severing the fibers of the edge regions.

8. The method of severing a mat of glass fibers into discrete sections including advancing a mat of fibers from a supply toward a fiber-severing station, continuously delivering the advancing mat onto successive movable carriers, advancing the carriers at substantially the speed of the advancing mat and in the same direction, successively engaging one surface of the advancing mat of fibers with severing members movable with the carriers, engaging another surface of the advancing mat with successive peripheral regions of rotatable surfaces rotating about axes oblique with respect to the direction of movement of the mat, progressively severing fibers of the mat at successive points of engagement of the rotatable surfaces with the severing members, and engaging edge regions of the mat successively with the severing members and second rotatable surfaces thereby severing the fibers at edge regions to subdivide the mat into discrete sections.

9. The method according to claim 8 including moving the mat along a surface from the supply toward the fiber-severing station, and delivering streams of air between the mat and the surface thereby supporting the mat on a layer of air.

10. The method according to claim 8 including delivering streams of air toward the edges of the advancing mat, and controlling the direction of advancement of the mat by the streams of air.

11. Apparatus for severing a body of severable material, in combination, means supporting the body, a plurality of body severing rolls, means supporting said rolls, a member mounted by the means supporting the body for engagement with the rolls, said rolls being rotatably mounted on axes obliquely disposed with respect to each other and obliquely disposed with respect to the member, and means effecting relative movement between the body and the rolls for progressively severing the body at the regions of engagement of the rolls with the member.

12. Apparatus of the character disclosed, in combination, support means, means for advancing a body of severable material toward a severing station, means supporting the advancing body, means for advancing the body supporting means at substantially the same linear speed as the advancing body, a plurality of body-severing rolls at the severing station, said rolls being rotatably mounted on axes obliquely disposed with respect to each other and obliquely disposed with respect to the direction of advancement of the body, and means mounted by the body supporting means engaged by the rolls for progressively severing the advancing body.

13. Apparatus for severing fibers of a body of fibers, in combination, carrier means supporting a body of fibers, a plurality of fiber-severing rolls, means supporting said rolls, members mounted by the carrier means for successive engagement with the rolls, said rolls being mounted for rotation on axes obliquely disposed with respect to each other and obliquely disposed with respect to the members mounted by the carrier means, and means effecting relative movement between the body of fibers and the rolls for progressively severing fibers of the body at successive regions of engagement of the rolls with the members mounted by the carrier means.

14. Apparatus for severing fibers of a mat of fibers, in combination, support means, means mounted by the support means for advancing a mat of fibers from a supply, movable carrier means receiving the mat of fibers, members mounted by the carrier means, means moving the carrier means in the same direction as the advancing mat, and a plurality of mat severing rolls for engagement with the mat, said rolls being mounted for rotation on axes obliquely disposed with respect to each other and obliquely disposed with respect to the direction of advancement of the mat and carrier means, said members mounted by the carrier means being successively engaged by peripheral regions of said rolls for progressively severing fibers of the advancing mat.

15. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers in the direction of its length, relatively movable mat carrier means, means for advancing the carrier means at a speed substantially the same as the speed of the advancing body of fibers, fiber-severing means mounted by the carrier means, a plurality of rotatable fiber-engaging rolls arranged for engagement with the fiber-severing means mounted by the carrier means, said rolls having their axes disposed in oblique relation with respect to each other and obliquely disposed with respect to the direction of advancement of the body of fibers and the carrier means whereby peripheral re-

gions of the rolls successively compress the fibers against the fiber-severing means mounted by the carrier means for progressively severing the fibers of the advancing body at the regions of engagement of the rolls with the severing means mounted by the carrier means.

16. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers in the direction of its length, relatively movable mat carrier means, means for advancing the carrier means at a speed substantially the same as the speed of the advancing body of fibers, fiber-severing means mounted by the carrier means, a plurality of fiber-engaging rolls arranged for engagement with the fiber-severing means mounted by the carrier means, said rolls having their axes disposed in oblique relation with respect to the direction of advancement of the body of fibers and the carrier means whereby peripheral regions of the rolls successively compress the fibers against the fiber-severing means mounted by the carrier means for progressively severing the fibers of the advancing body at the regions of engagement of the rolls with the severing means mounted by the carrier means, and roll means for severing fibers at the edge regions of the body of fibers to effect the complete severing of a discrete section of fibers from the body.

17. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers in the direction of its length, a fiber-severing station, relatively movable means supporting the body of fibers, a guide medium for directing the advancing body toward the fiber-severing station, means for advancing the body supporting means to the fiber-severing station at a speed substantially the same as the speed of the advancing body of fibers, fiber-severing members mounted by the body supporting means, a plurality of rotatable fiber-severing rolls at the fiber-severing station, the axes of said rolls being disposed in oblique relation with respect to each other and oblique with respect to the direction of advancement of the body of fibers and the body supporting means whereby peripheral regions of the rolls successively compress the fibers against the fiber-severing members to progressively sever the fibers of the advancing body at the regions of engagement of the rolls with the fiber-severing members.

18. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a mat of mineral fibers, means providing a surface receiving the mat from the mat advancing means, a fiber-severing station, mat carrier means receiving the mat of fibers from the surface, means providing a cushion of air between said surface and the mat of fibers, means advancing the carrier means to the fiber-severing station at substantially the same speed as the speed of the advancing mat of fibers, fiber-severing bars mounted by the carrier means, a plurality of rolls disposed at the severing station, said rolls being mounted upon axes obliquely disposed with respect to the direction of advancement of the mat and the carrier means, said severing bars being successively engaged by peripheral regions of said obliquely disposed rolls for progressively severing fibers between the severing bars and said rolls at successive regions of engagement of the peripheries of said rolls with severing bars, and rotatable means engageable with the end regions of the severing bars for severing fibers at the edge regions of the mat.

19. Apparatus of the character disclosed, in combination, means for severing a severable body of material including movable support means for the body, said means provided with body-severing bars, a plurality of body-severing rolls for engagement with the severing bars, each of said rolls being mounted for rotation about an independent axis and the axes being in nonaligned relation, the axes of certain of said rolls being obliquely disposed with respect to others of said rolls, means for effecting relative movement between said rolls and said body-severing bars to effect progressive engagement of point regions on said rolls with the severing bars for progressively severing the body at regions between the severing bars and successive peripheral regions of said rolls, each of said rolls being of lesser length than a severing bar, said rolls being in overlapping relation whereby the body is progressively severed at the regions of engagement of the rolls with a severing bar.

20. Apparatus of the character disclosed, in combination, means for severing fibers of a moving body of fibers including supporting means for the body, said body-supporting means provided with severing bars, a plurality of body severing rolls, the peripheral regions of said rolls being of yieldable material, each of said rolls being mounted for rotation about an independent axis with the axes in nonaligned relation, the axes of certain of said rolls being obliquely disposed with respect to others of said rolls, means for effecting relative movement between said rolls and said bars to effect progressive engagement between point regions on the peripheries of said rolls with a severing bar for progressively severing fibers of the body of fibers between a severing bar and successive peripheral regions of said rolls, each of said rolls being of lesser length than the severing bar, said rolls being in overlapping relation whereby the fibers of the body of fibers are progressively severed throughout the region of a severing bar engaged by said rolls.

21. Apparatus of the character disclosed, in combination, a tray comprising a frame, means carried by the frame for supporting a body of fibers, a fiber-severing bar mounted by the frame, a plurality of fiber-severing rolls arranged for engagement with the fiber-severing bar, said rolls being mounted for rotation respectively on axes oblique to each other and oblique to the fiber-severing bar, and means for effecting relative movement between the rolls and the tray for severing fibers of the body at the regions of progressive engagement of the rolls with the bar.

22. The combination according to claim 21 wherein the peripheral regions of said rolls are of yieldable material.

23. Apparatus of the character disclosed, in combination, a tray for supporting a body of fibers, said tray comprising a frame having end rails and side rails, a plurality of spaced linear elements connected with the end rails, a plurality of spaced linear elements connected with the side rails, a fiber-severing bar associated with one of said rails, a plurality of fiber-severing rolls arranged for engagement with the fiber-sever-

ing bar, and means for effecting relative movement between the rolls and the tray for severing the fibers at the regions of engagement of the rolls with the bar.

24. Apparatus of the character disclosed, in combination, support means, means for advancing a body of fibers toward a fiber-severing station, a plurality of fiber-severing rolls at the fiber-severing station, each of said rolls being mounted on an independent axis obliquely disposed with respect to each other and obliquely disposed with respect to the direction of advancement of the body of fibers, a plurality of trays arranged in successive relation, means for advancing the trays to the fiber-severing station, said trays arranged to receive the body of fibers adjacent the fiber-severing station, and a fiber-severing bar mounted by each of said trays whereby fibers of the body are severed as the severing bars carried by the trays are successively engaged by the plurality of severing rolls.

25. Apparatus of the character disclosed, in combination, support means, means for advancing a body of fibers toward a fiber-severing station, a plurality of fiber-severing rolls at the fiber-severing station, each of said rolls being mounted on an independent axis obliquely disposed with respect to the direction of advancement of the body of fibers, a plurality of trays arranged in successive relation, means for advancing the trays to the fiber-severing station, said trays arranged to receive the body of fibers adjacent the fiber-severing station, a fiber-severing bar mounted by each of said trays whereby fibers of the body are severed as the severing bars carried by the trays are successively engaged by the plurality of severing rolls, and roll means engageable with edge regions of the body of fibers for severing the fibers of said edge regions to complete the severing of discrete sections from the body.

26. Apparatus of the character disclosed, in combination, support means, means for advancing a body of fibers toward a fiber-severing station, a plurality of fiber-severing rolls at the fiber-severing station, each of said rolls being mounted on an independent axis obliquely disposed with respect to the direction of advancement of the body of fibers, means mounting said rolls adjustable to vary the angles of obliquity of the rolls, a plurality of trays arranged in successive relation, means for advancing the trays to the fiber-severing station, said trays arranged to receive the body of fibers adjacent the fiber-severing station, and a fiber-severing bar mounted by each of said trays whereby fibers of the body are severed as the severing bars carried by the trays are successively engaged by the plurality of severing rolls.

27. Apparatus of the character disclosed, in combination, support means, a fiber-severing station, a tray for supporting a mat of fibers at the fiber-severing station, means for advancing the tray, a fiber-severing bar mounted by the tray, a plurality of fiber-severing rolls disposed at the severing station, each of said rolls being mounted on an independent axis obliquely disposed with respect to each other and obliquely disposed with respect to the direction of advancement of the mat and tray, and means establishing pressure on said severing rolls to engage the severing rolls with the severing bar on the tray whereby fibers of the mat are progressively severed at the regions of engagement of the rolls with the severing bar.

28. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, an elongated chamber having a ramp surface along which the body of fibers is advanced by the body-advancing means, said ramp surface having a plurality of open areas, blower means for delivering air into said chamber and through the open areas whereby the body of fibers is supported adjacent the ramp surface upon a layer of air, a fiber-severing station, tray means moving in the direction of the body arranged to receive the body of fibers from the ramp surface, a plurality of rolls at the severing station, said rolls being respectively journaled for rotation upon axes oblique with respect to each other and oblique with respect to the direction of advancement of the body of fibers, and a severing bar mounted by said tray means, said severing bar being successively engaged with the plurality of rolls for severing the fibers at successive regions of point contact of the rolls with the severing bar at the fiber-severing station.

29. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, an elongated chamber having a ramp surface along which the body of fibers is advanced by the body advancing means, said ramp surface having a plurality of open areas, blower means for delivering air into said chamber and through the open areas whereby the body of fibers is supported adjacent the ramp surface upon a layer of air, a fiber-severing station, carrier means moving in the direction of the body arranged to receive the body from the ramp surface, a plurality of rolls at the severing station, said rolls being respectively journaled for rotation upon axes oblique with respect to each other and oblique with respect to the direction of advancement of the body of fibers and spaced severing bars mounted by said carrier means, said severing bars being successively engaged with the plurality of rolls for severing the fibers at successive regions of point contact of the rolls with the severing bars at the fiber-severing station.

30. Apparatus of the character disclosed, in combination, support means, a fiber-severing station, movable carrier means for a mat of fibers, spaced fiber-severing bars mounted by the carrier means, a plurality of fiber-severing rolls disposed at the severing station, said rolls being mounted on axes obliquely disposed with respect to the direction of advancement of the mat and carrier means, means establishing pressure on said severing rolls to engage the severing rolls with the severing bars whereby fibers are progressively severed at the regions of engagement of the rolls with the severing bars, a plurality of open areas in the carrier means, a chamber disposed beneath the carrier means adjacent the fiber-severing station, and means for establishing air under pressure in said chamber for delivery through the openings in the carrier means for supporting the mat of fibers at the fiber-severing station.

31. The combination according to claim 30 including a second chamber disposed adjacent the chamber in which air pressure is established, and means for establishing reduced pressure in said second chamber, said reduced air pressure in the second chamber being effective through open areas in the carrier means for retaining a severed section of the mat of fibers on the carrier means.

32. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, an elongated chamber having a ramp surface along which the body of fibers is advanced by the body advancing means, said ramp surface having a plurality of open areas, blower means for delivering air into said chamber and through the open areas whereby the body of fibers is supported upon a layer of air, a fiber-severing station, a plurality of trays disposed in abutting relation, means for advancing the trays to receive the body of fibers, a plurality of rolls at the severing station, each of said rolls being journaled for rotation upon an independent axis oblique with respect to the axis of an adjacent roll and oblique with respect to the direction of advancement of the body of fibers, a severing bar mounted by each of said trays, the severing bars on said trays being successively engaged with the plurality of rolls for severing the fibers at successive regions of point contact of the rolls with the severing bars at the fiber-severing station.

33. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, an elongated chamber having a ramp surface along which the body of fibers is advanced by the body advancing means, said ramp surface having a plurality of open areas, blower means for delivering air into said chamber and through the open areas whereby the body of fibers is supported upon a layer of air, a fiber-severing station, a plurality of trays disposed in abutting relation, means for advancing the trays to receive the body of fibers, each of said trays having a plurality of wires in crossing relation supporting the body of fibers, a plurality of rolls at the severing station, each of said rolls being journaled for rotation upon an independent axis oblique to the direction of advancement of the body of fibers, a severing bar mounted by each of said trays, the severing bars on said trays being successively engaged with the plurality of rolls for severing the fibers at successive regions of point contact of the rolls with the severing bars at the fiber-severing station, and means adjacent the mat severing station for delivering air under pressure beneath the region of the body of fibers on a tray for supporting the body of fibers at the fiber-severing station.

34. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, an elongated chamber having a ramp surface along which the body of fibers is advanced by the body advancing means, said ramp surface having a plurality of spaced openings, a fiber-severing station, a pair of transversely spaced tubular members between which the body of fibers is advanced along the ramp surface, the inner opposed walls of the tubular members being provided with a plurality of openings, blower means for establishing air pressure within the chamber and within the tubular members whereby air streams are delivered through the openings in the ramp surface providing a layer of air supporting the body of fibers adjacent the ramp surface and air streams delivered through the openings in the walls of the tubular members toward the edges of the advancing body of fibers for guiding the body toward the fiber-severing station, movable conveyor means, a plurality of trays disposed in abutting relation successively advanced by the conveyor means to receive the body of fibers, a plurality of rolls at the severing station, said rolls being journaled for rotation upon axes oblique to the direction of advancement of the body of fibers, and a severing bar mounted by each of said trays, said severing bars being successively engaged with the plurality of rolls for severing the fibers at successive regions of point contact of the rolls with the severing bars at the fiber-severing station.

35. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, an elongated chamber having a ramp surface along which the body of fibers is advanced by the body advancing means, said ramp surface having a plurality of spaced openings, first blower means for delivering air into said chamber and through the openings whereby the body of fibers is supported adjacent the ramp surface upon a layer of air, a fiber-severing station, a pair of transversely spaced tubular members between which the body of fibers is advanced along the ramp surface, each of said tubular members being pivotally mounted at its end adjacent the region of delivery of the body of fibers from the body advancing means, the inner opposed walls of the tubular members being provided with a plurality of openings, second blower means for establishing air pressure within the tubular members whereby air streams are delivered through the openings of said members toward the edges of the advancing body of fibers for guiding the body of fibers toward the fiber-severing station, said tubular members being adjustable to vary the positions of said tubular members with respect to the advancing body of fibers, movable conveyor means, a plurality of trays disposed in abutting relation successively advanced by the conveyor means to receive the body of fibers, a plurality of rolls at the severing station, said rolls being journaled for rotation upon axes oblique to the direction of advancement of the body of fibers, and a severing bar mounted by each of said trays, said severing bars being successively engaged with the plurality of rolls for severing the fibers at successive regions of point contact of the rolls with the severing bars at the fiber-severing station.

36. Apparatus of the character disclosed, in combination, support means, means mounted by the support means for advancing a body of fibers, a body-severing station, a surface along which the body of fibers is advanced by the body advancing means toward the body severing station, transversely spaced tubular means between which the body is advanced along the surface, the tubular means being provided with open areas adjacent the body, blower means establishing air pressure within the tubular means whereby air streams are delivered through the open areas toward the edges of the body for positioning the body with respect to the surface along which the body is being advanced, and means at said severing station for successively severing the advancing body into discrete body sections.

37. The combination according to claim 36 wherein the tubular means are mounted for adjustment relative to the surface along which the body is being advanced to control the direction of movement of the body.

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