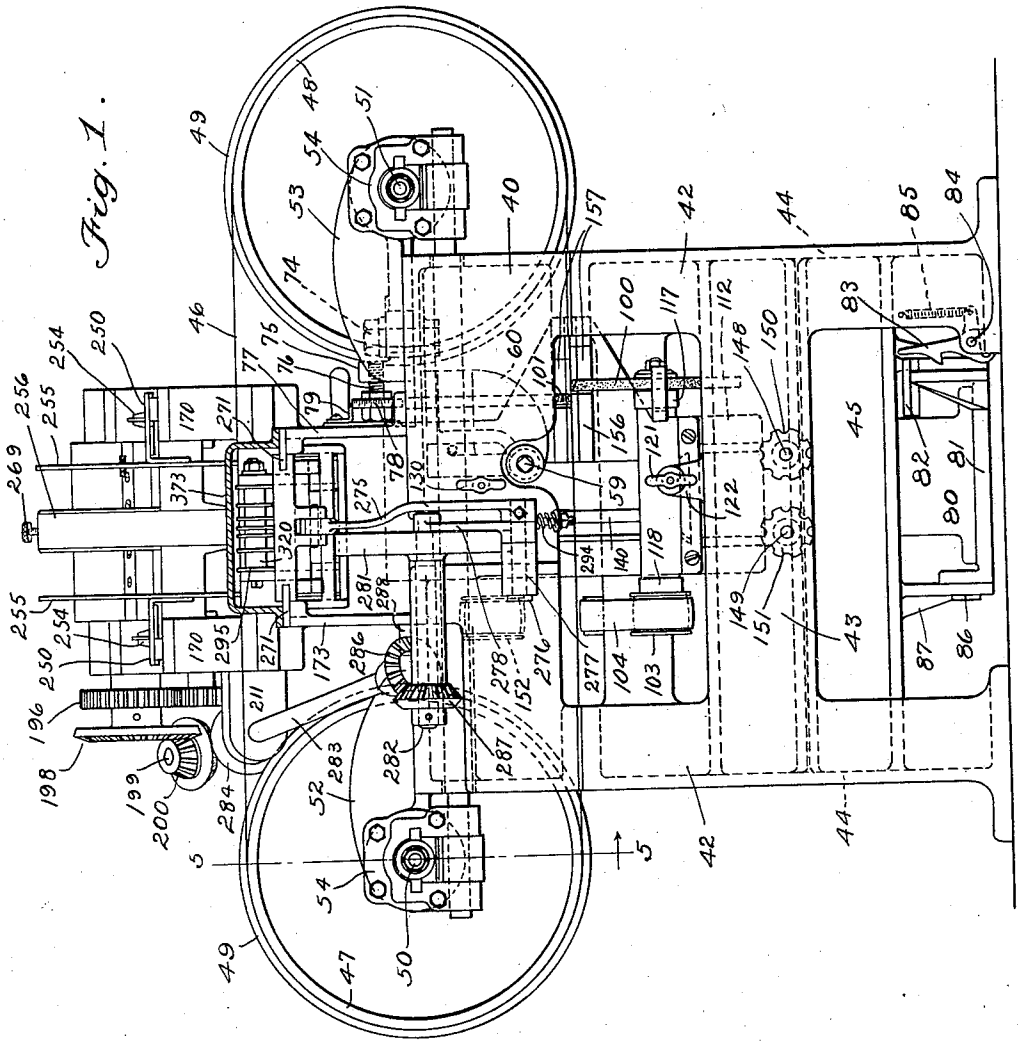
May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921 18 Sheets-Sheet 1

Fig. 1.



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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

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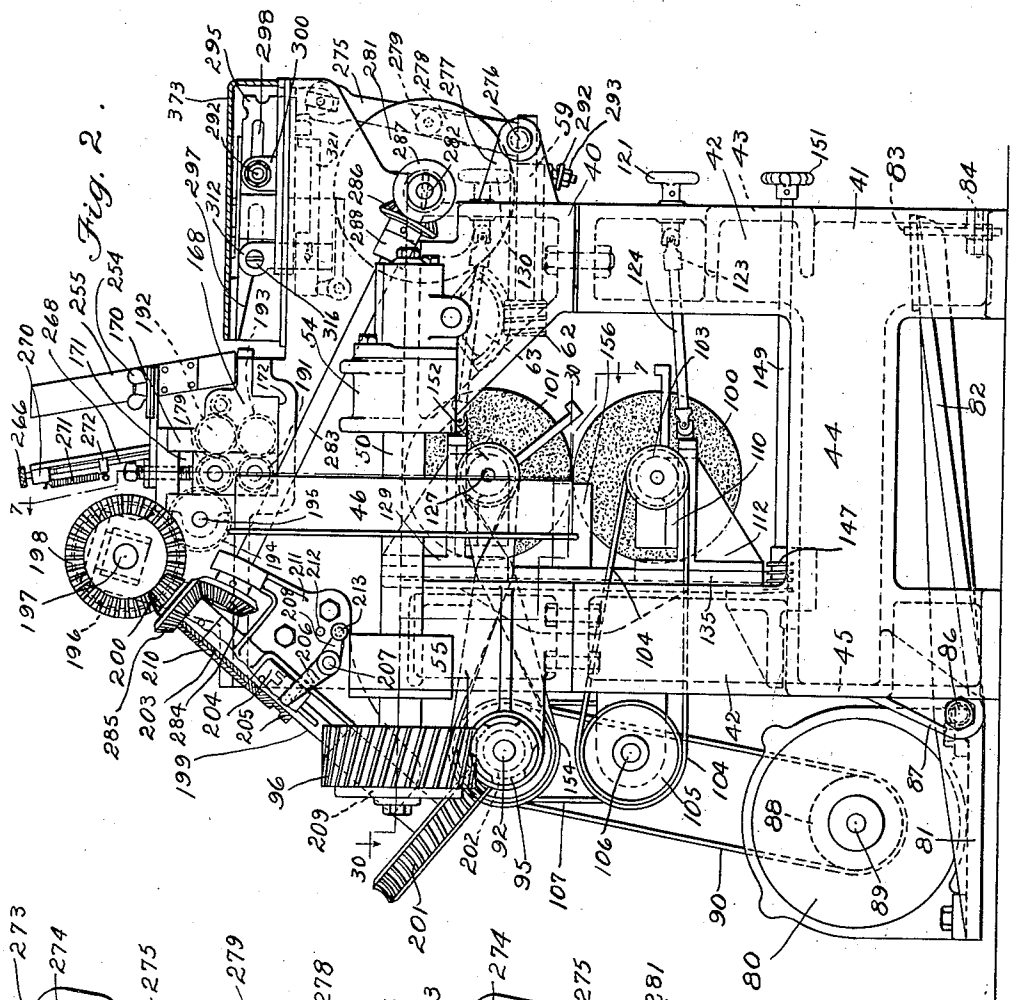


Fig. 2.

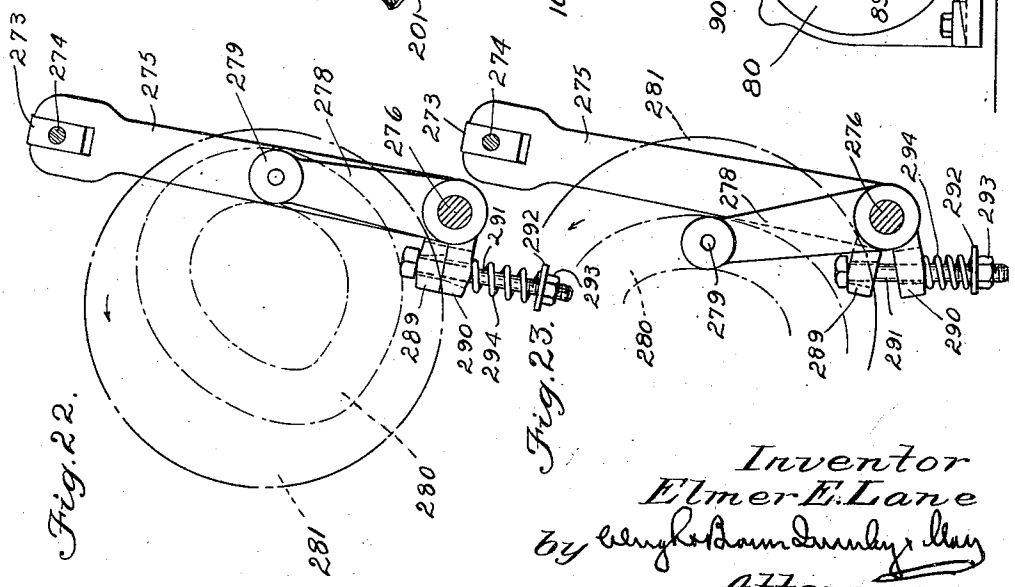


Fig. 22.

Fig. 23.

Inventor
Elmer E. Lane
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May 22, 1928.

1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921

18 Sheets-Sheet 3

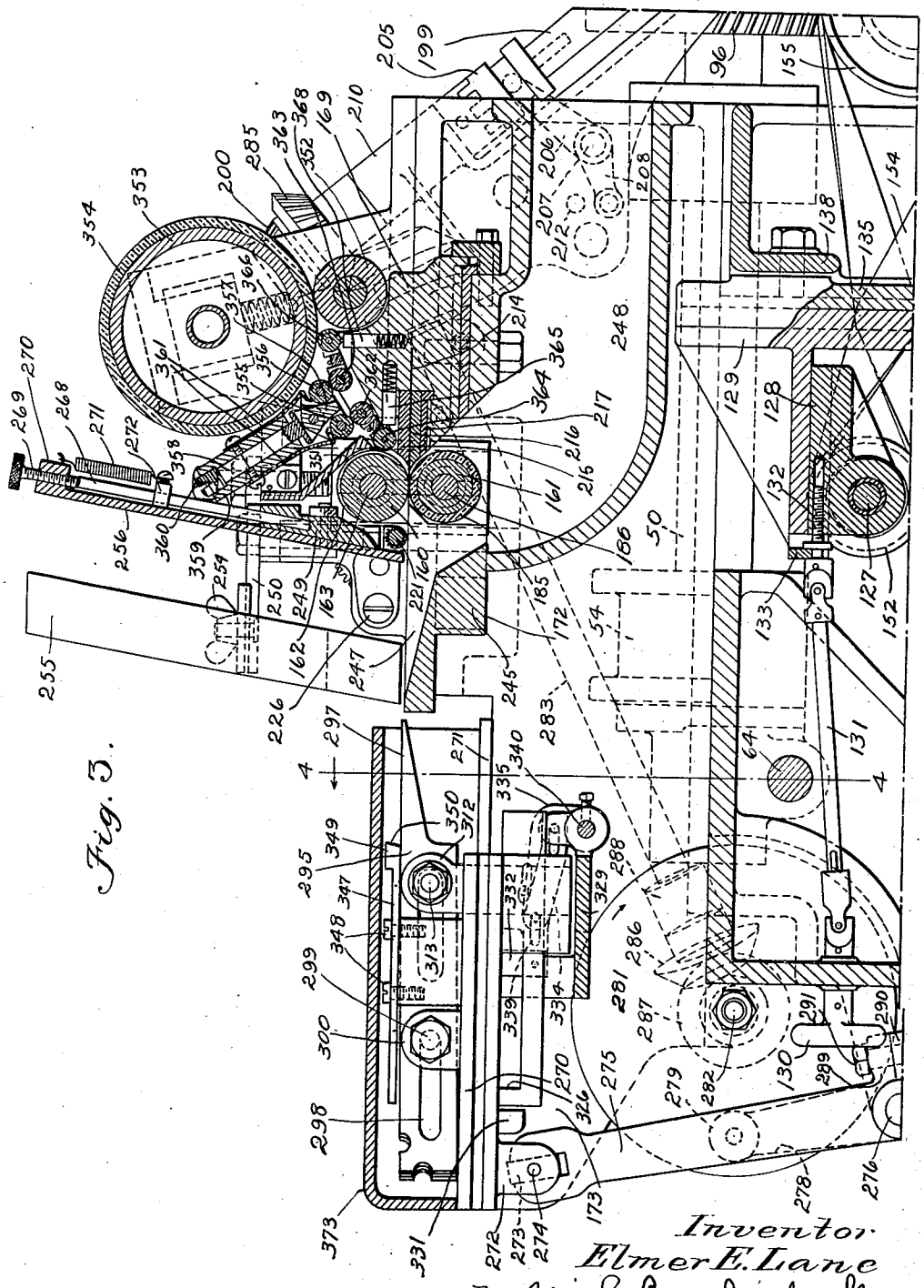


Fig. 5.

Inventor.
Elmer E. Lane
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Attorneys.

May 22, 1928.

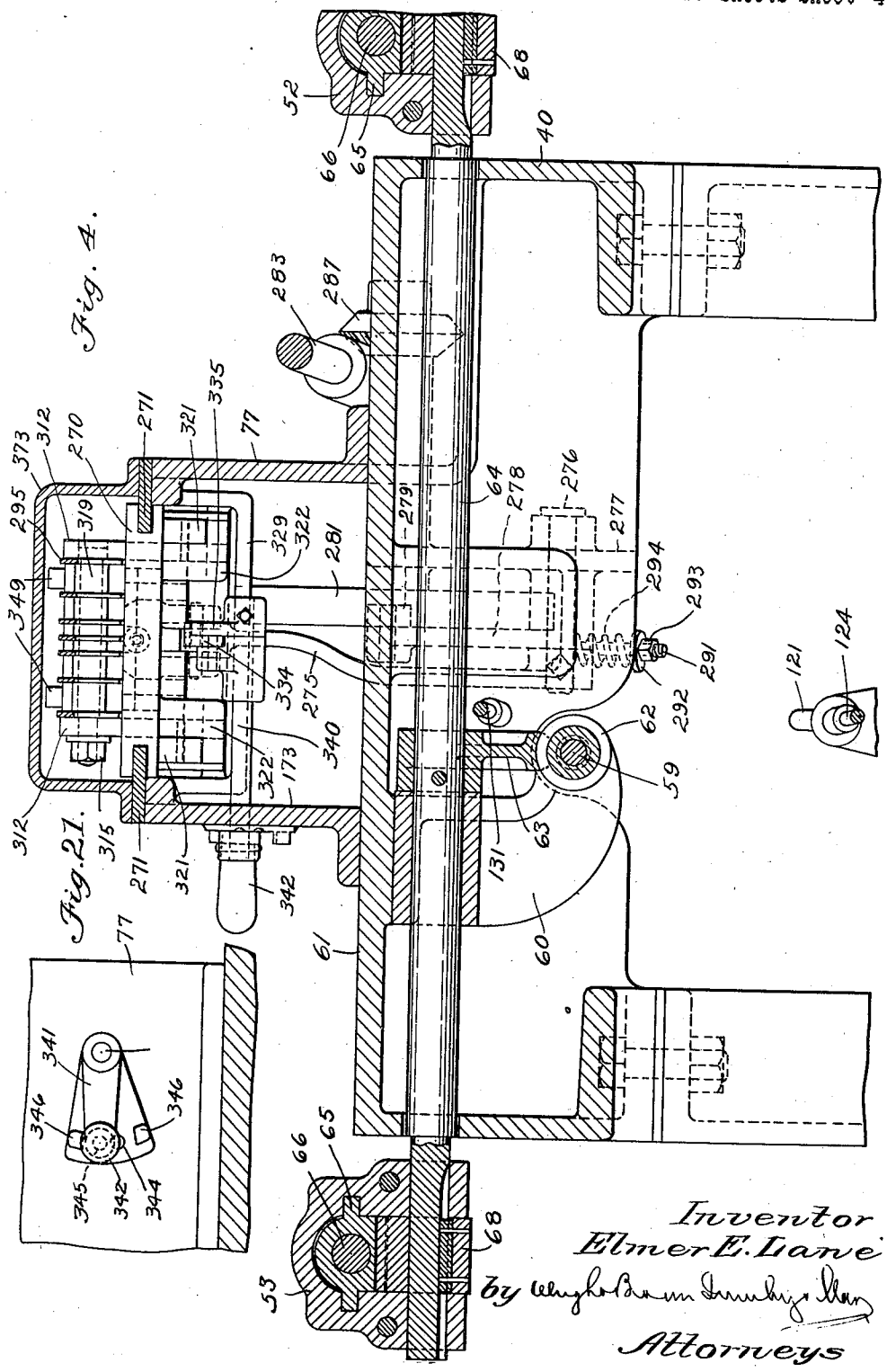
1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921

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May 22, 1928.

1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921

18 Sheets-Sheet 5

Fig. 5.

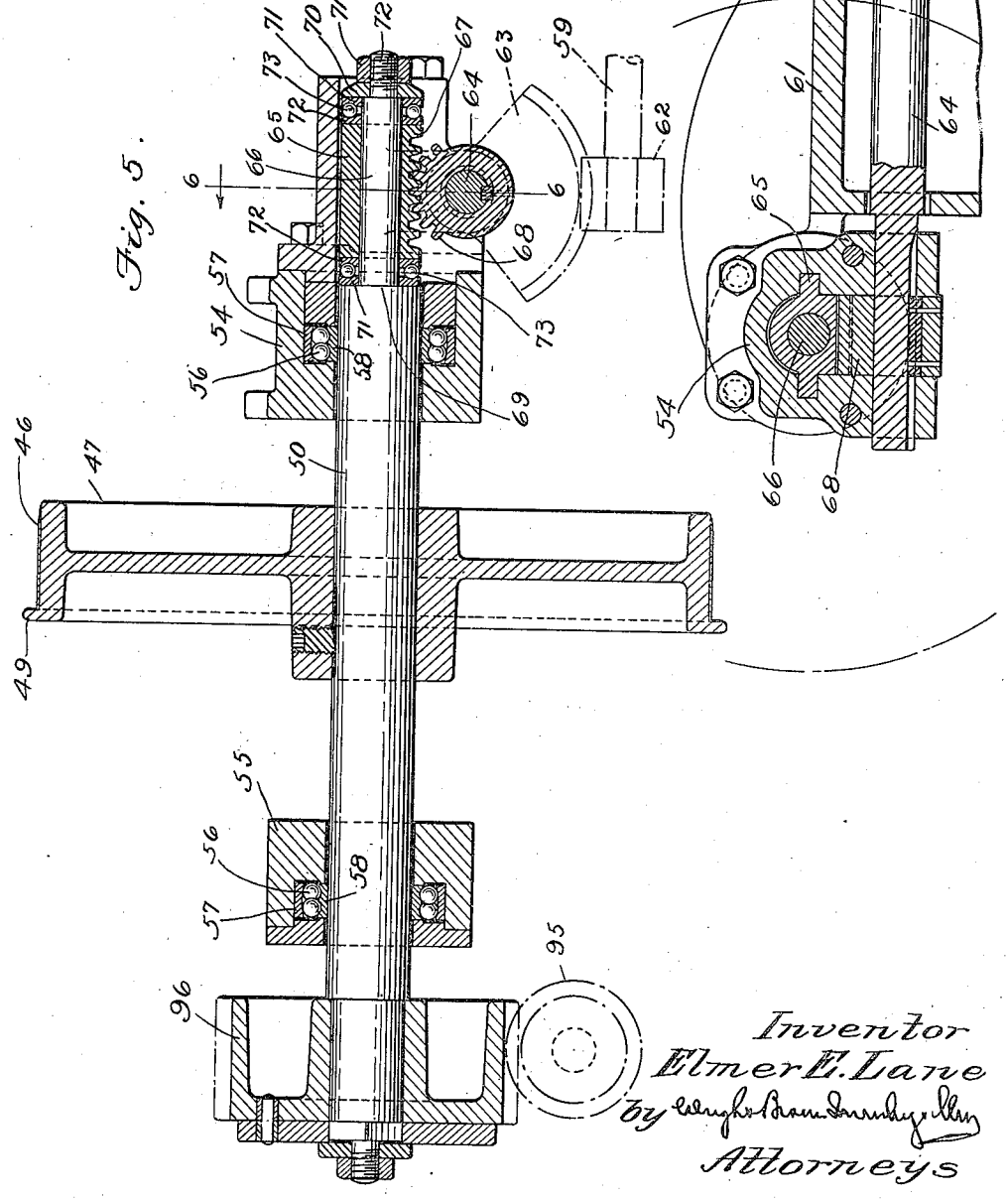


Fig. 6.

Inventor
Elmer E. Lane
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May 22, 1928.

1,670,514

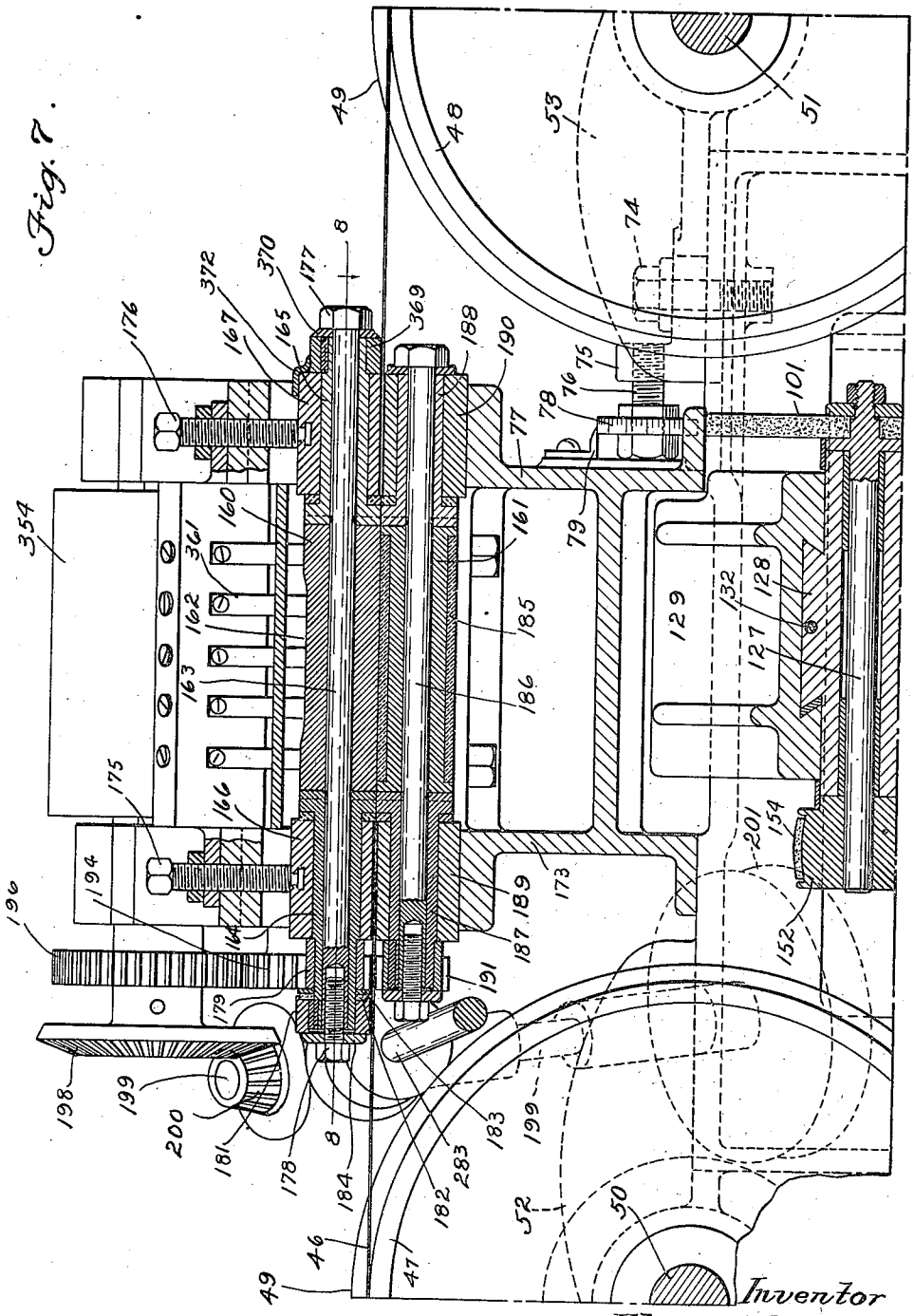
E. E. LANE

SKIVING MACHINE

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Fig. 7.



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May 22, 1928.

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SKIVING MACHINE

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18 Sheets-Sheet 7

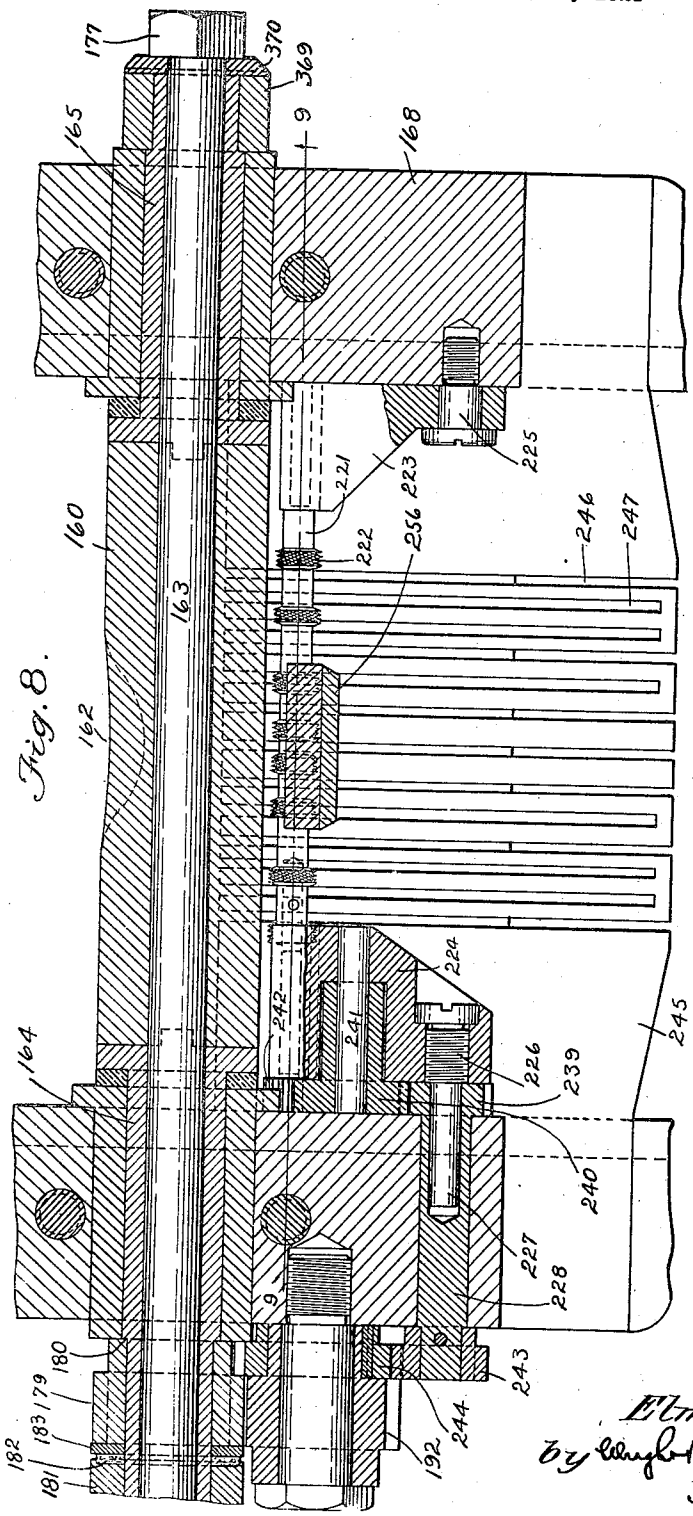


Fig. 8.

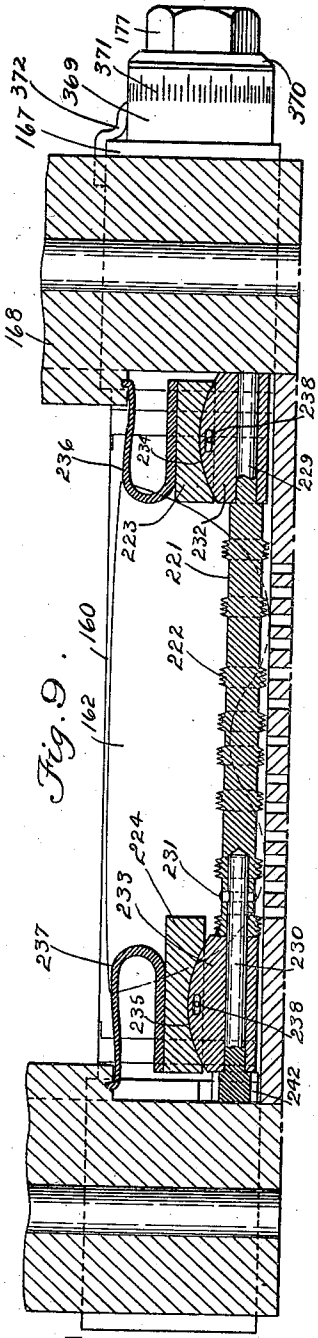


Fig. 9.

Inventor
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May 22, 1928.

1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921

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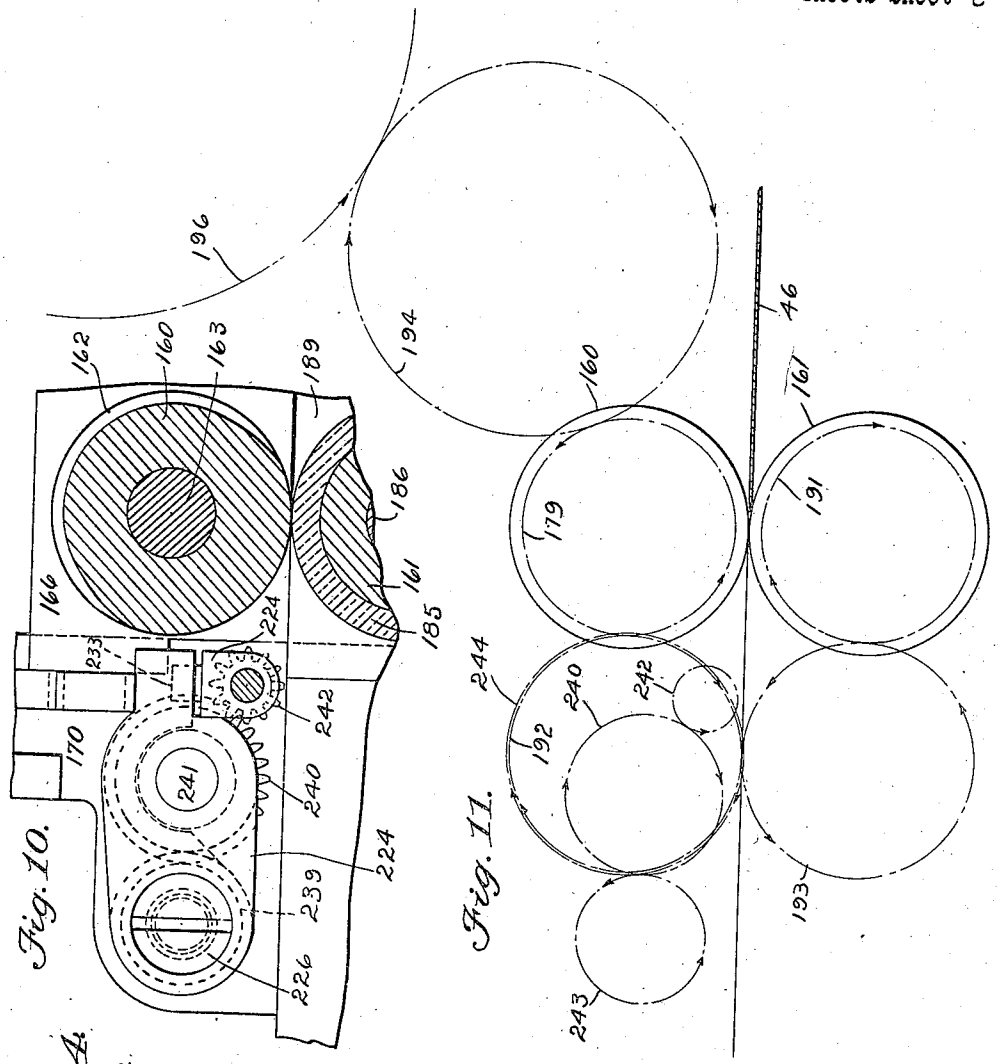


Fig. 10.

Fig. 11.

Fig. 14.

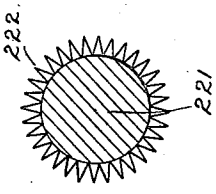


Fig. 12.

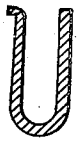
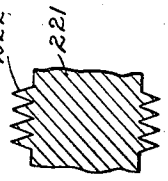


Fig. 13.



Inventor
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SKIVING MACHINE

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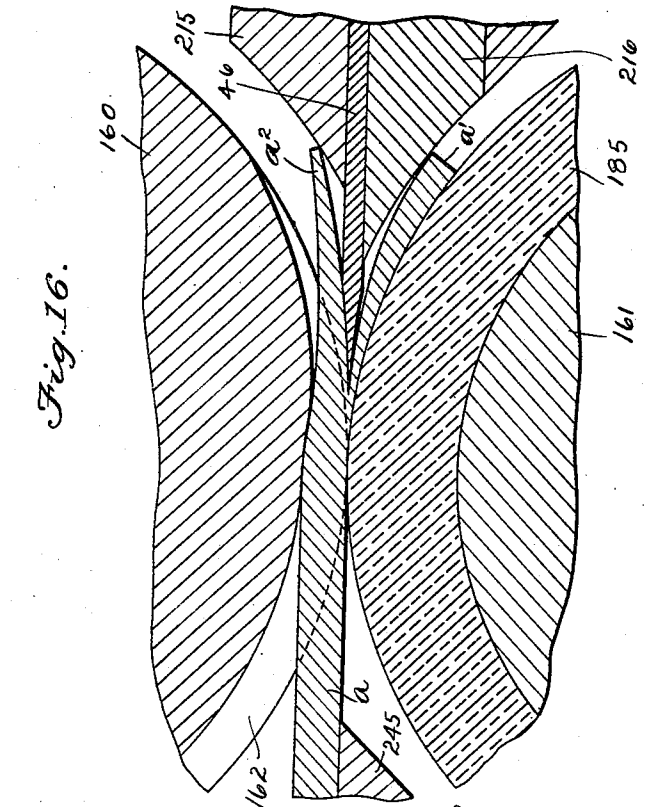


Fig. 16.

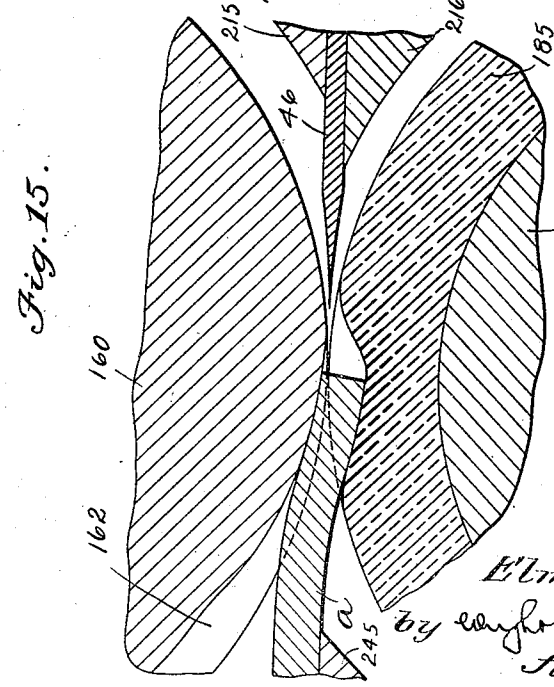


Fig. 15.

Inventor
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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

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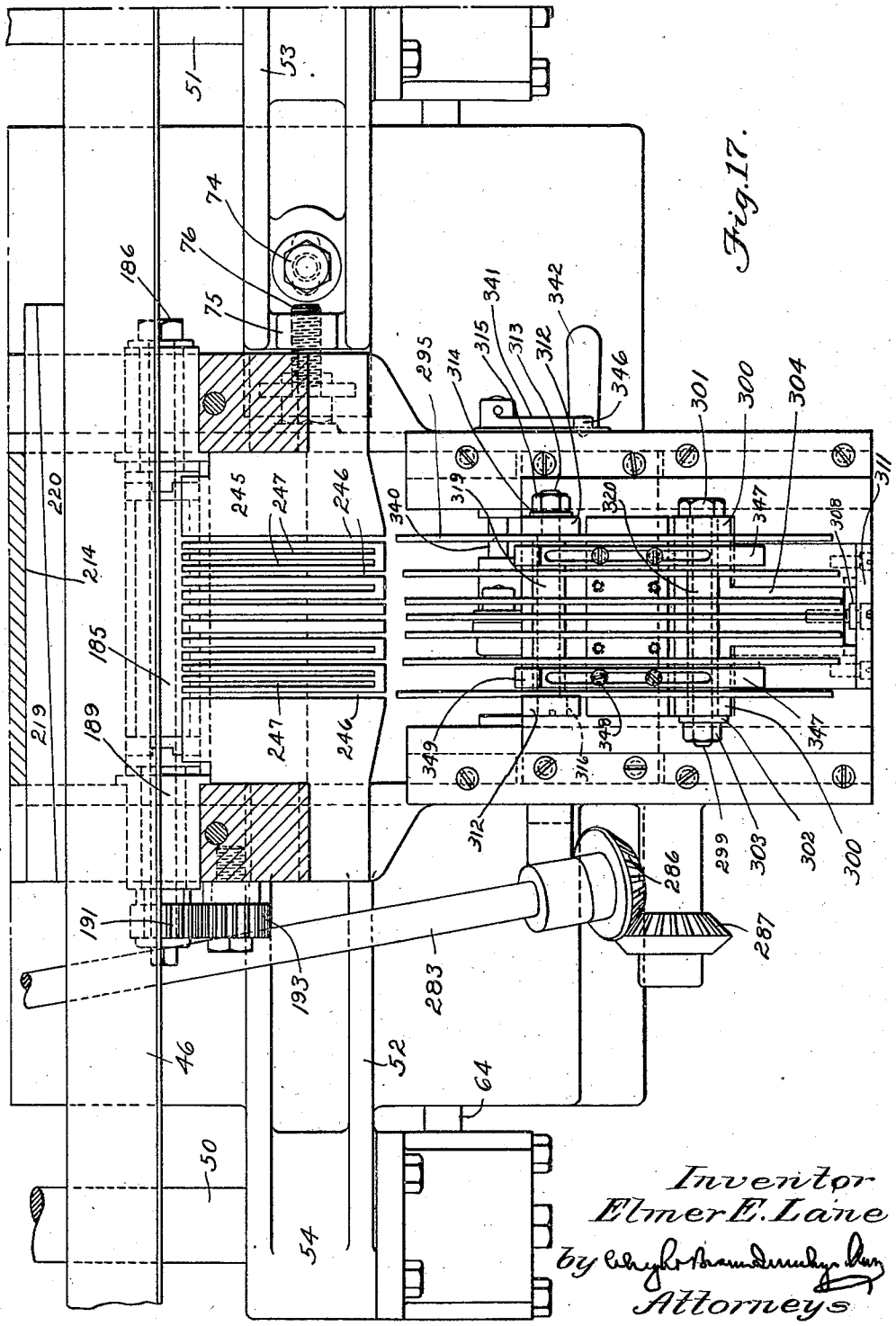


Fig. 17.

Inventor
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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

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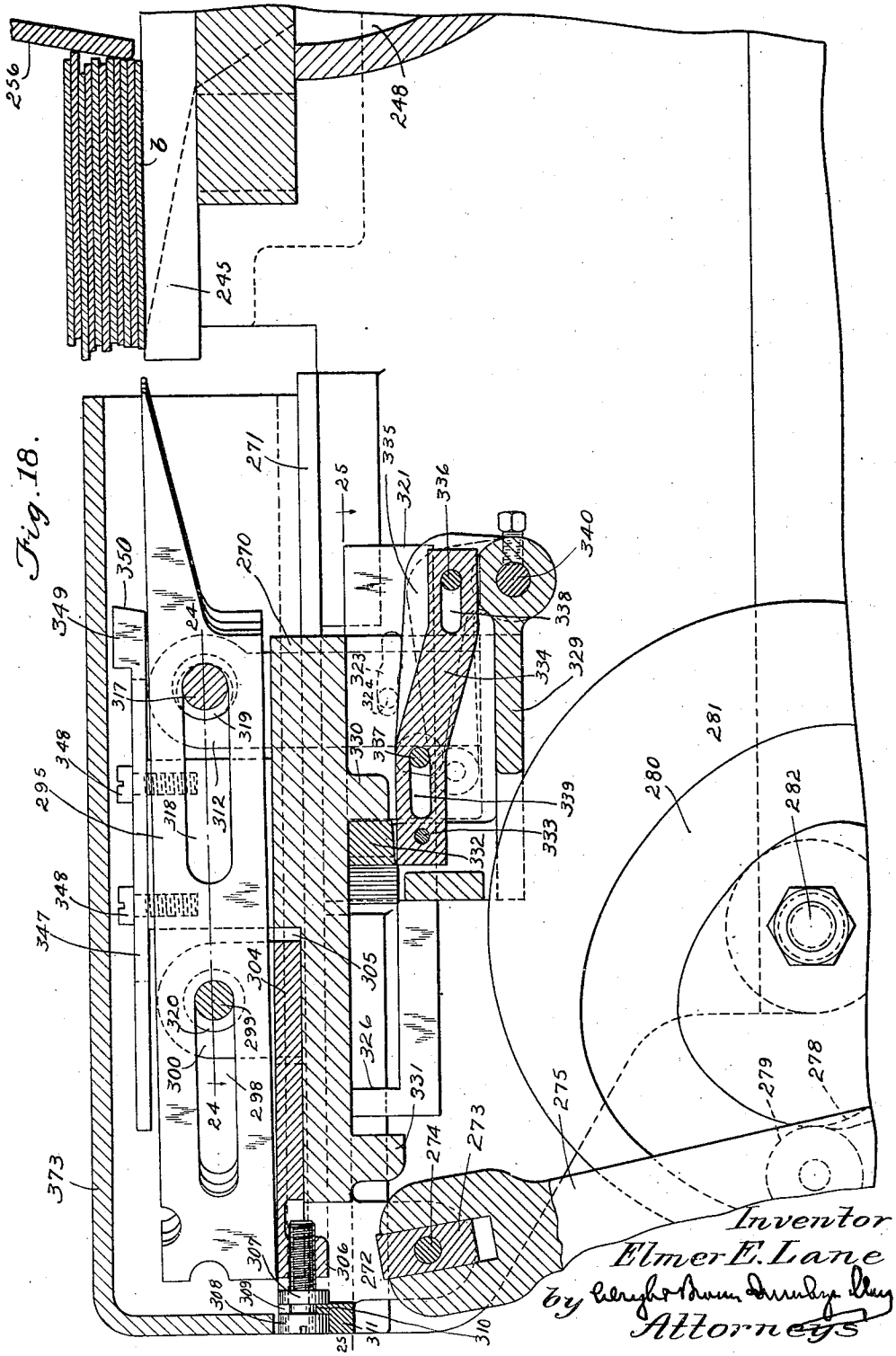


Fig. 18.

Inventor
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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

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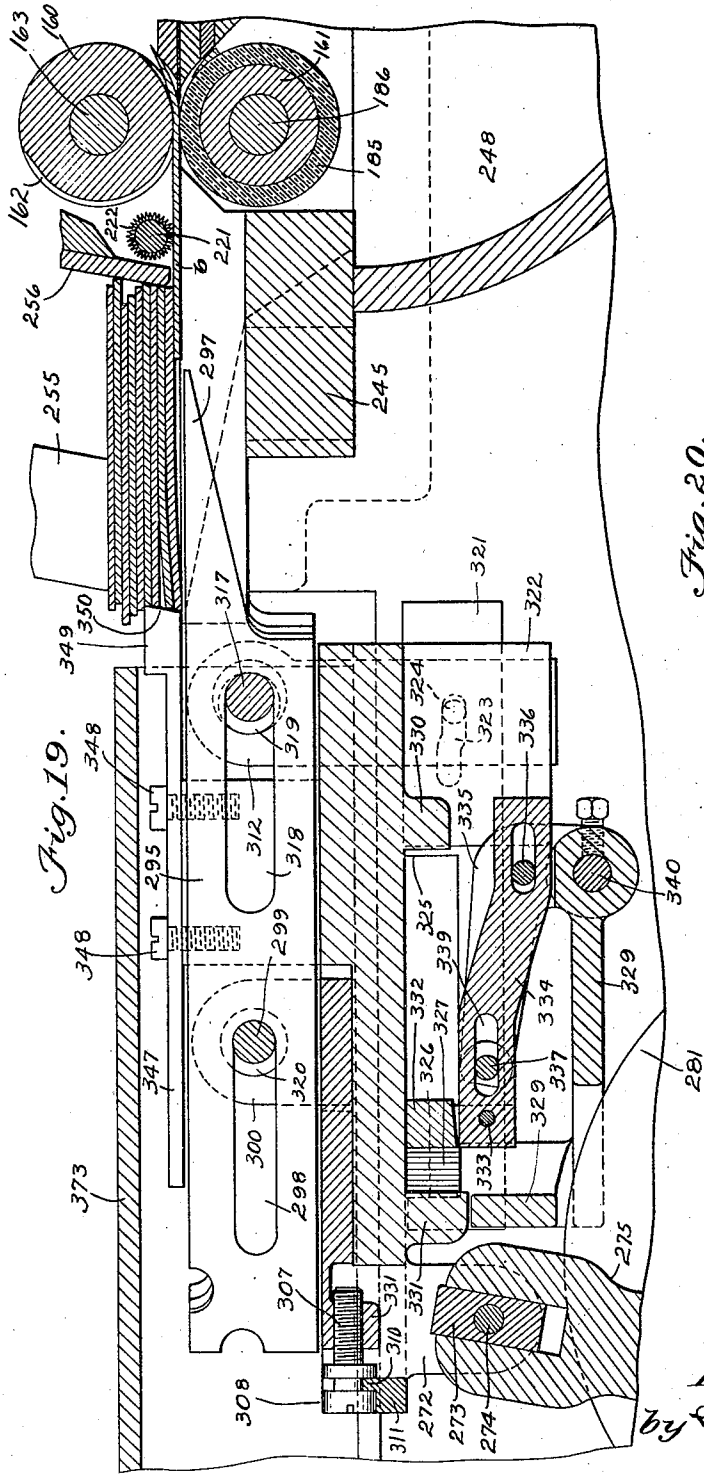


Fig. 19.

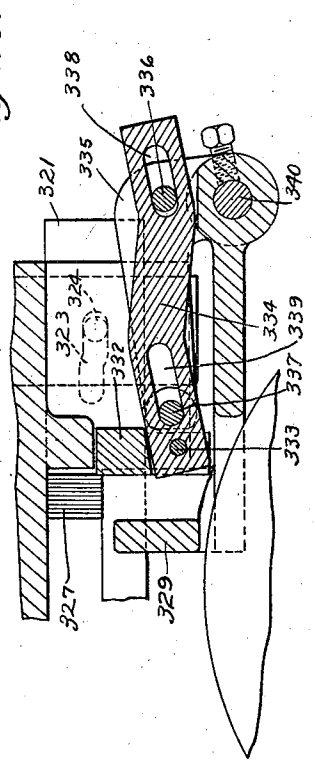


Fig. 20.

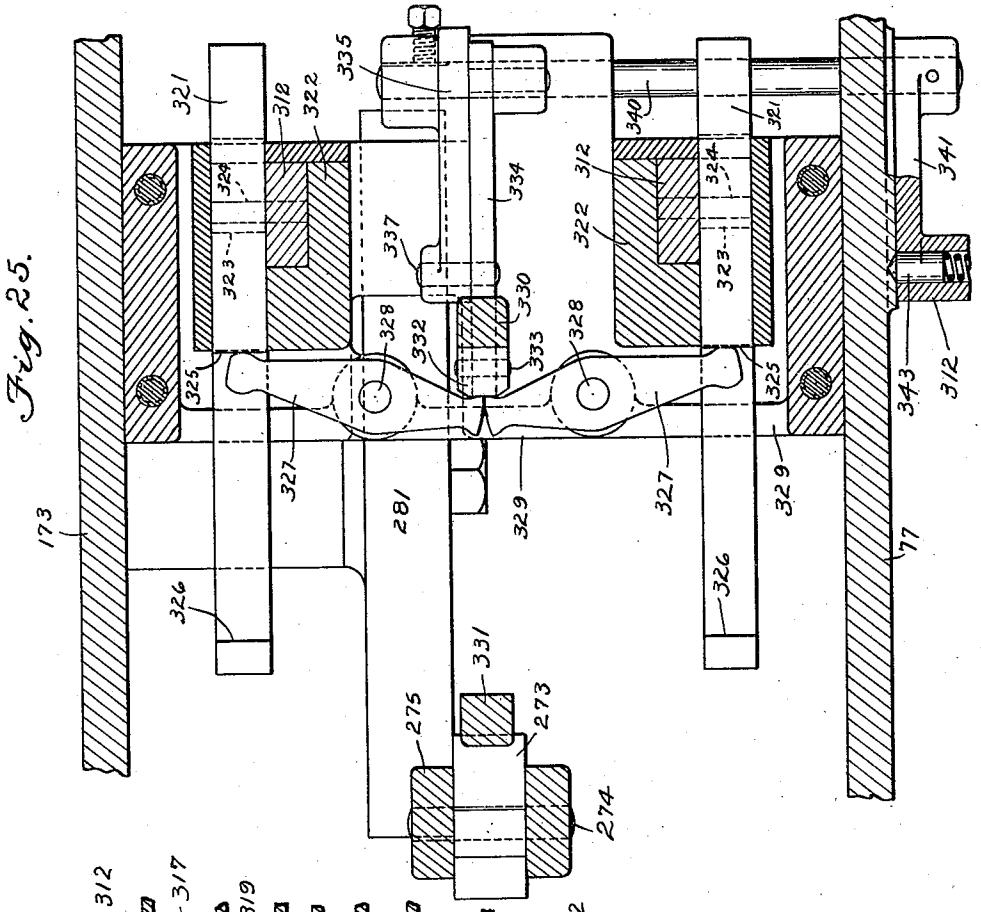
Inventor
Elmer E. Lane
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Attorneys

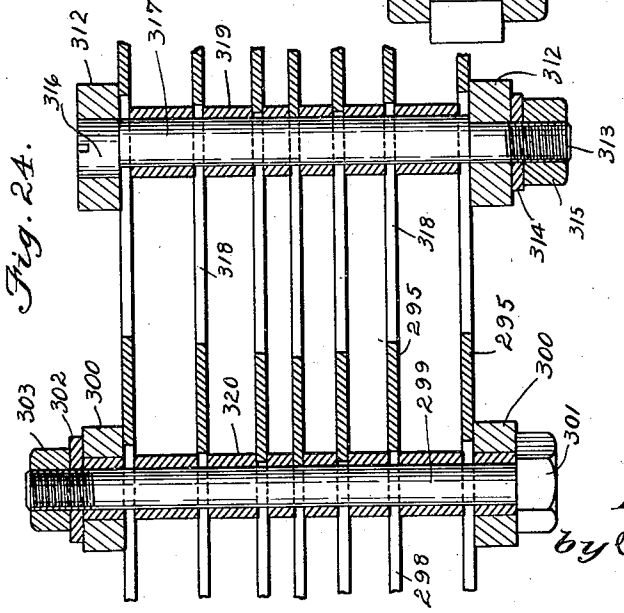
May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921 18 Sheets-Sheet 13





Inventor
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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

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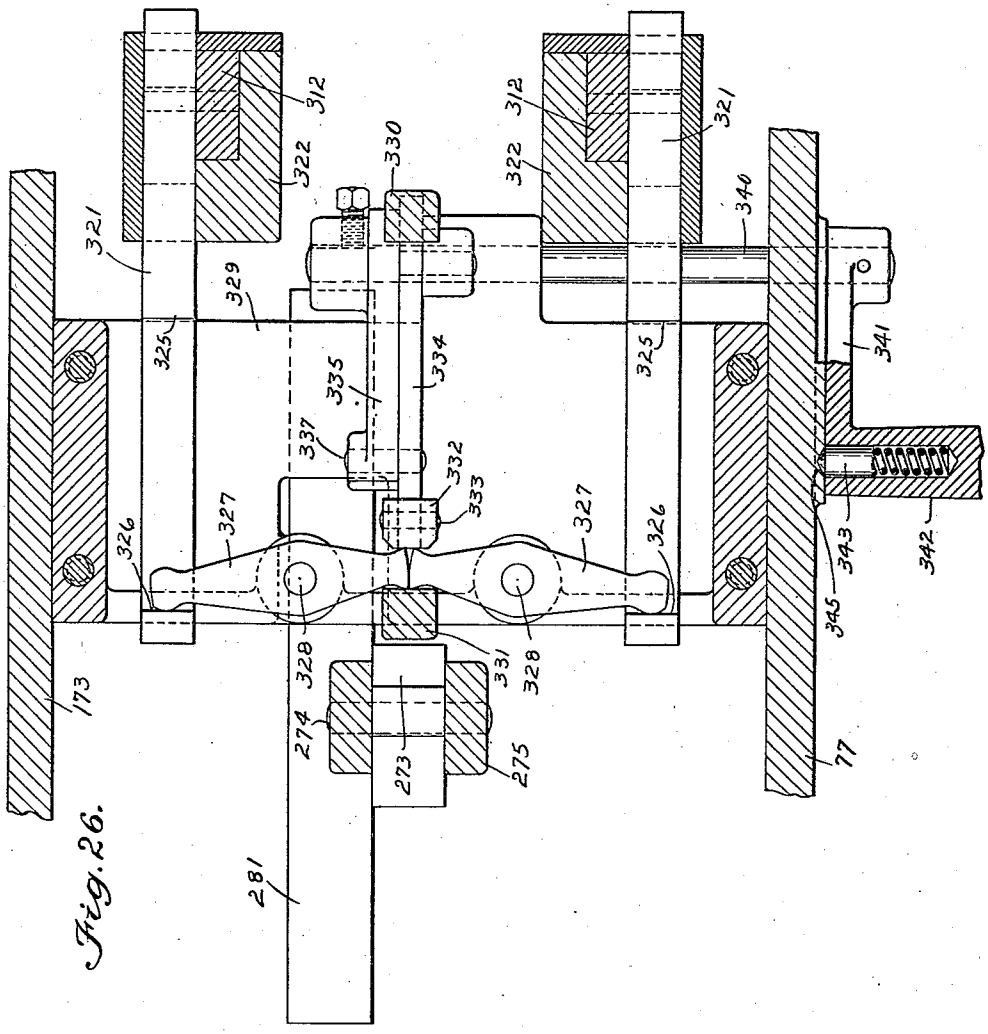


Fig. 26.

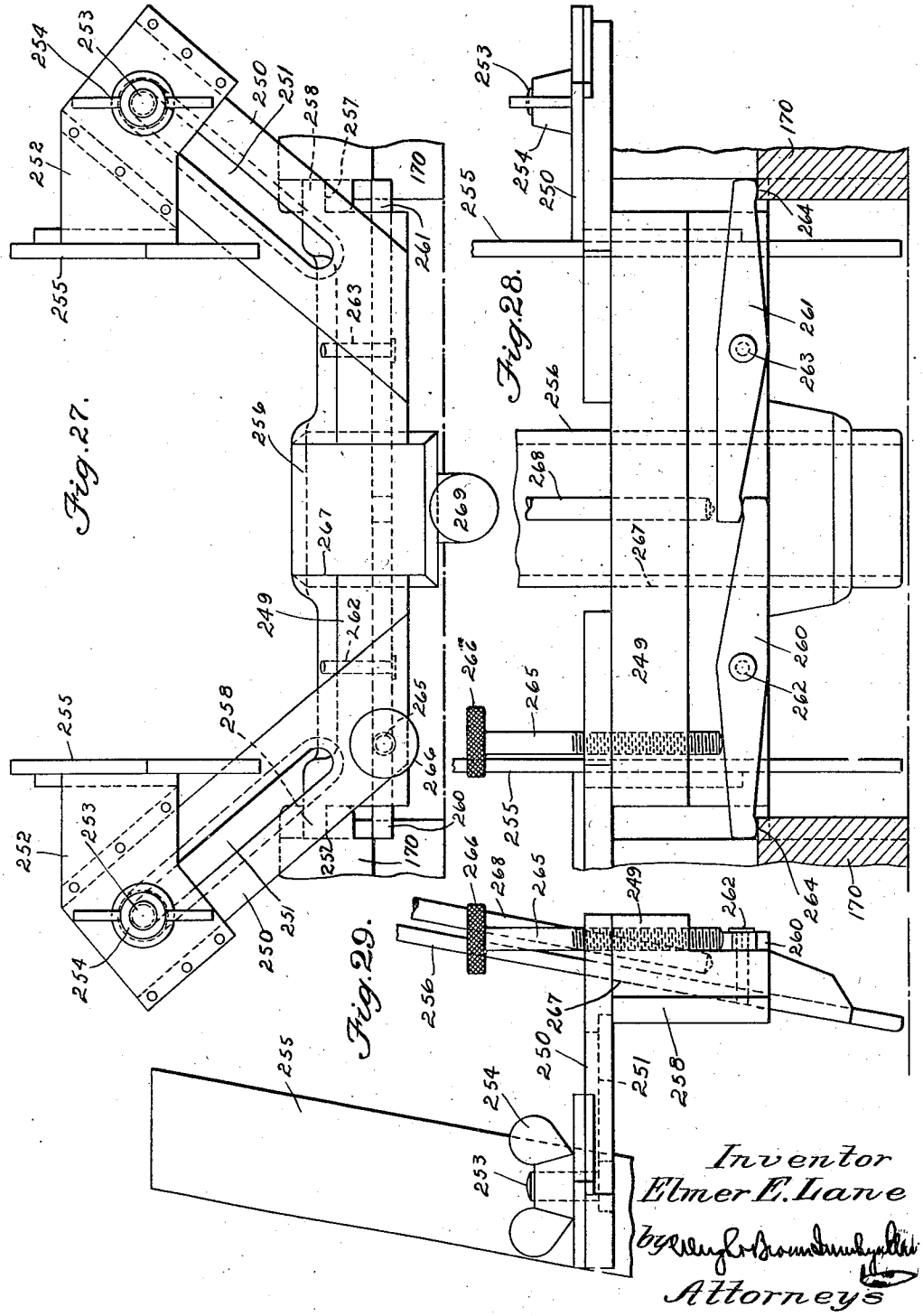
Inventor
Elmer E. Lane
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Attorneys

May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921 18 Sheets-Sheet 15



May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

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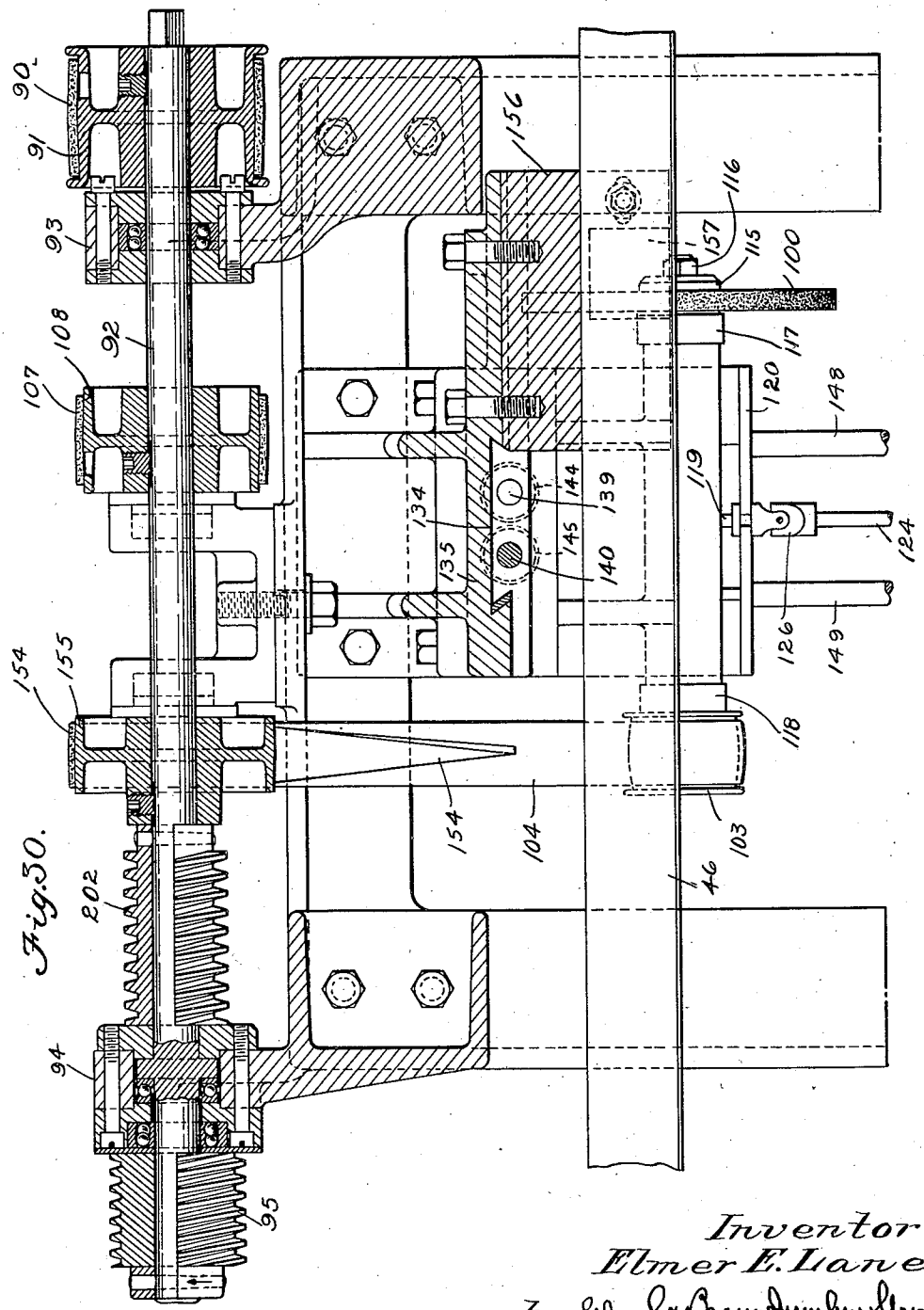


Fig. 30.

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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921 18 Sheets-Sheet 17

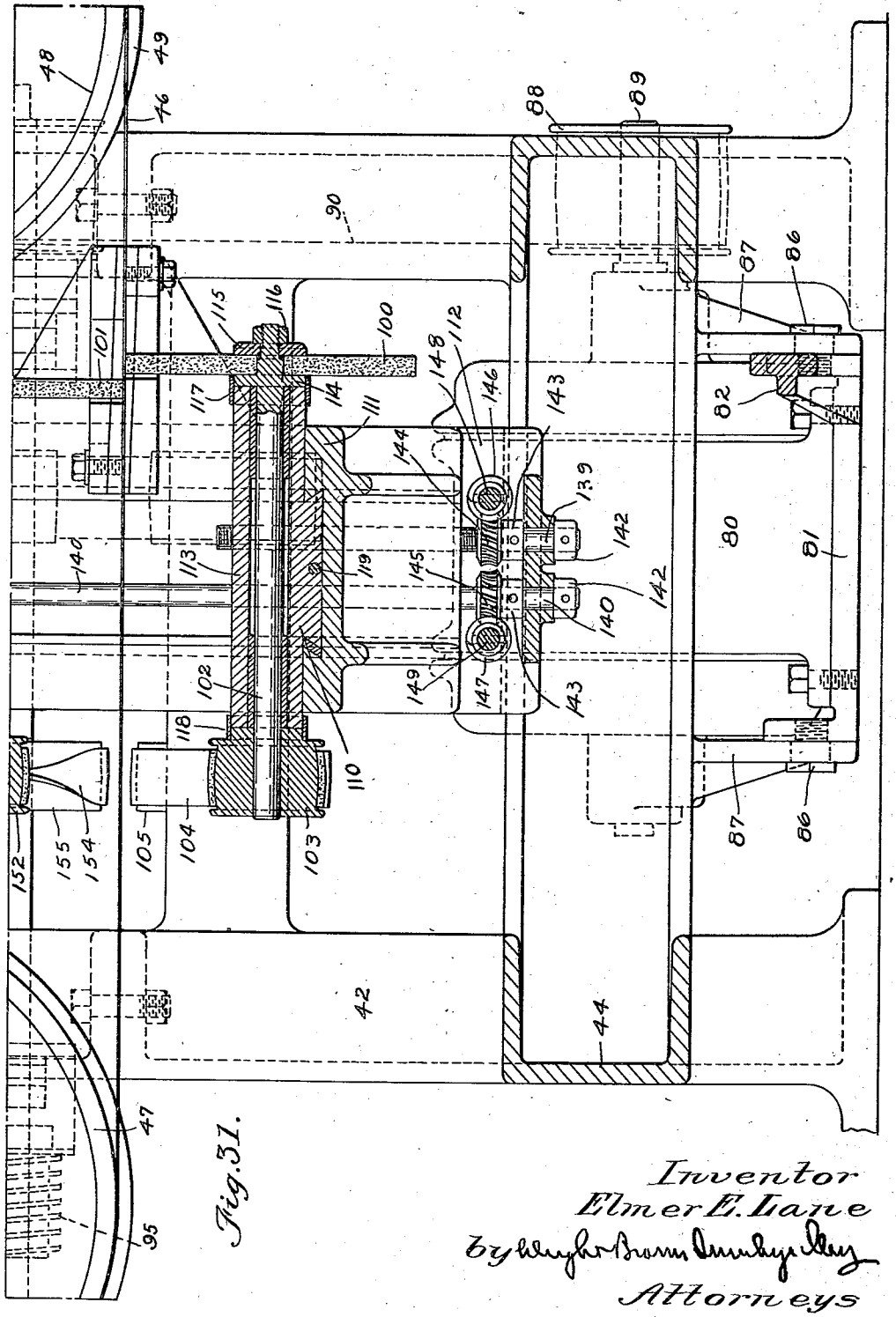


Fig. 31.

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May 22, 1928. 1,670,514

E. E. LANE

SKIVING MACHINE

Filed Feb. 24, 1921 18 Sheets-Sheet 18

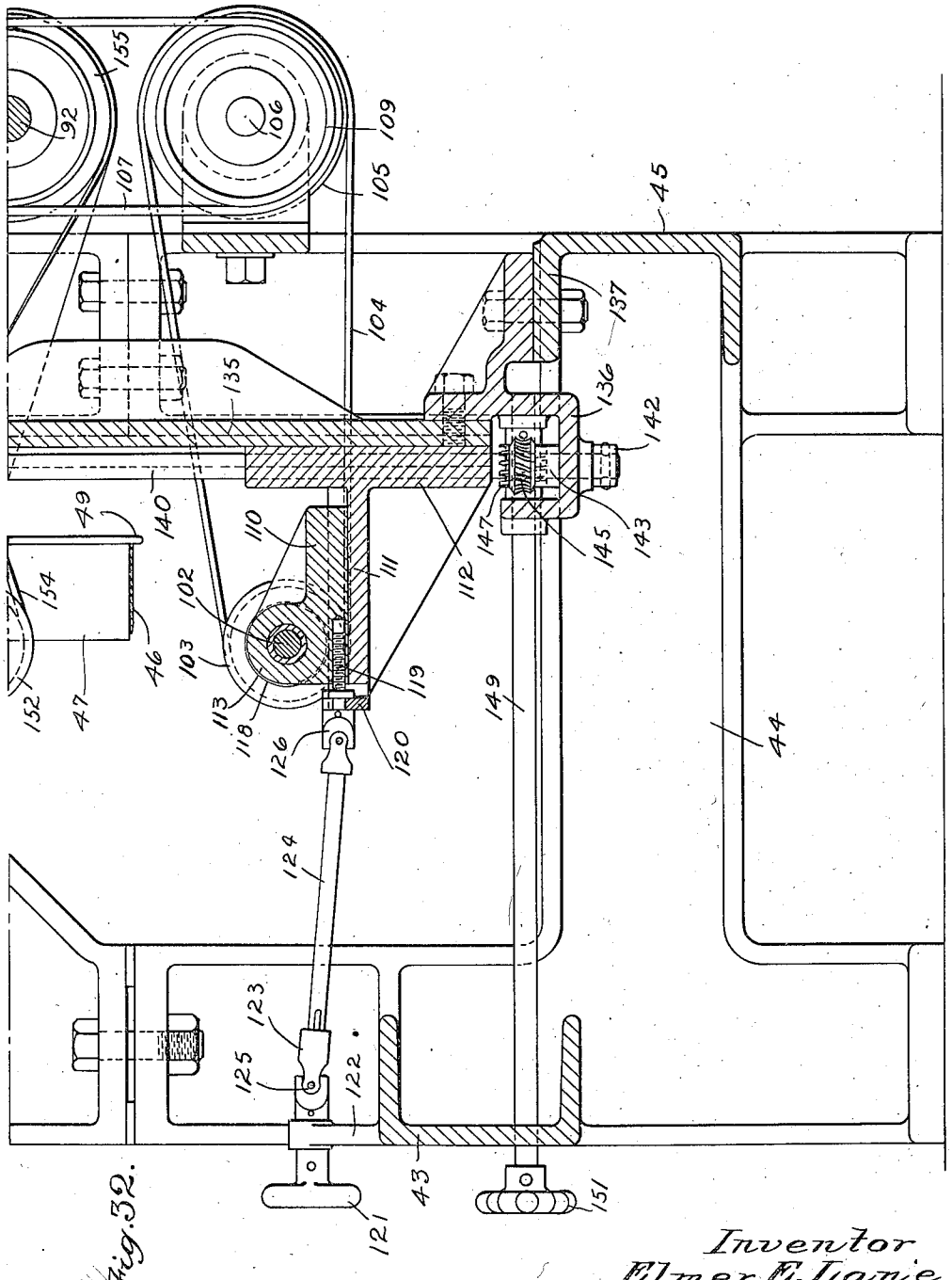


Fig. 52.

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Patented May 22, 1928. 1,670,514

UNITED STATES PATENT OFFICE.

ELMER E. LANE, OF DANVERS, MASSACHUSETTS, ASSIGNOR TO HARRY H. BECKWITH, OF BROOKLINE, MASSACHUSETTS.

SKIVING MACHINE.

Application filed February 24, 1921. Serial No. 447,384.

This invention relates to machines for skiving stiffeners for footwear, such for example as toe boxes, counter stiffeners or other equivalent parts. While the machine, which I have illustrated on the accompanying drawings as embodying my invention, is applicable for use in skiving leather blanks, yet I have had in mind to produce one which is especially applicable for use in connection with blanks of a fibrous material saturated or coated with a waterproof stiffening agent. In accomplishing this result, I employ an endless band knife located close to the nip of a pair of rolls, of which one is recessed to receive the body of the blank and the other is of a yielding character, so that those portions of the blank which are not forced into the recess are skived and removed by the knife. In addition to these elements or instrumentalities, I provide a novel feeding mechanism by which the blanks are fed successively to the rolls, and are squared or trued, so that they may be accurately positioned in reference to the cavity in the recessed roll. As will be explained, this feeding mechanism is manually controlled so that it may be thrown into and out of operation without affecting the rotation of the rolls or the travel of the band knife. In addition to these features, my invention includes numerous others, which I shall subsequently describe in the following specification and set forth in the appended claims.

On the accompanying drawing,—

Figure 1 represents in front elevation a skiving machine embodying my invention.

Figure 2 represents a side elevation of the same.

Figure 3 represents a vertical section through the same from front to rear, omitting the lower portion of the machine.

Figure 4 represents a section on the line 4—4 of Figure 3, and shows a portion of the mechanism for adjusting the band knife wheels.

Figure 5 represents a section on the line 5—5 of Figure 1, and illustrates one of the band knife wheels, its shaft, and a portion of the wheel-adjusting mechanism.

Figure 6 represents a section on the line 6—6 of Figure 5.

Figure 7 represents a vertical section through the rolls on the line 7—7 of Figure 2.

Figure 8 represents a horizontal section on the line 8—8 of Figure 7, through the recessed roll, and shows the supplemental feed roll.

Figure 9 represents a vertical section through the feed roll on the line 9—9 of Figure 8.

Figure 10 is a tranverse vertical section through the main rolls, and illustrates a portion of the gearing for driving the supplemental roll.

Figure 11 is a diagrammatic view of the gearing for driving the supplemental feed roll.

Figure 12 represents in section a spring for holding one end of the supplemental feed roll against the work.

Figures 13 and 14 represent sections through said feed roll.

Figures 15 and 16 are sectional views illustrative of the action of the band knife on the work.

Figure 17 illustrates in plan view the mechanism for feeding the blanks successively from a magazine.

Figure 18 represents a vertical section through said feeding mechanism, and shows the carriage withdrawn with the bars ready to engage a blank.

Figure 19 represents a similar section, but with the bars in dropped position after feeding a blank.

Figure 20 illustrates in section the manually-operated mechanism for controlling the operation of the blank feeder.

Figure 21 (Sheet 4) shows the handle for said last-mentioned mechanism.

Figures 22 and 23 (Sheet 2) show a yielding connection in the mechanism for operating the feed carriage.

Figure 24 represents a section on the lines 24—24 of Figure 18, through the feed bars.

Figure 25 represents a section on the line 25—25 of Figure 18, and shows a portion of the mechanism for actuating the feed bars,

by which a four-way motion is imparted thereto.

Figure 26 represents a similar section with the parts in a different position.

Figure 27 represents a plan view of the magazine for the blanks.

Figure 28 represents a rear elevation of a portion thereof.

Figure 29 illustrates the same in side elevation.

Figure 30 represents a horizontal section on the line 30—30 of Figure 2, through the main power shaft of the machine.

Figure 31 illustrates one of the grinding wheels and the adjacent parts by which it is vertically adjusted.

Figure 32 represents a vertical front to rear section through a portion of the machine, and shows the mechanism for adjusting one of the grinding wheels horizontally.

Before proceeding to a description in detail of the machine which is illustrated by the drawings thus briefly referred to, I desire to have it understood that the machine is but one of various different embodiments of which the invention is capable, that various features thereof may be changed without affecting other features, and that the phraseology herein employed is for the purpose of description and not of limitation.

Of course, any suitable framework may be employed for supporting the operative instrumentalities. As shown, however, the main frame is shown as approximately cubical, and for convenience comprises an upper section 40 and a lower section 41, which are formed of castings bolted or otherwise rigidly secured together. The lower section comprises the four corner or angular uprights 42, with connecting webs 43, 44, 44, 45, at the front and rear sides respectively, as best shown in Figures 1 and 2. The upper section 40 of the main frame supports the feed mechanism, the band knife, the coacting rolls and the other instrumentalities which deal with the blanks as they are skived and finished, and its construction will be described in the subsequent explanation of the machine.

The band knife.—As has been stated, I employ an endless band knife, such as indicated at 46, and it is supported by two large wheels or pulleys 47, 48, each of which has on its rim an upstanding peripheral flange 49, against which the rear or blunt edge of the band knife may bear, to assist in resisting the rearward thrust against the knife when the front cutting edge thereof is in engagement with the work. The pulleys are respectively secured upon shafts 50, 51, which are approximately in parallelism and which are journaled in anti-friction bearings located on brackets 52, 53. The bracket 52 may be formed separately and rigidly secured to the top section of the main frame, or it may be cast integrally therewith as shown in Figures 1 and 2, to afford the two spaced bearings 54, 55 for the pulley shaft 50. The bearings 54 and 55 are each provided with anti-friction balls 56, and races 57, 58, for holding the shaft against side thrusts. The bracket 53 is provided with like bearings for the shaft 51, but it is formed separately from the frame and so secured thereto that it is capable of adjustment, as will be explained, to effect a relative adjustment of the shaft 51 to the shaft 50 and maintain a proper tension on the band knife. The edge of the knife, as it is used, is worn away both by reason of its engagement with the work and of its being ground or sharpened, and consequently the width of the knife is reduced. Moreover, knives of different widths are used from time to time. Hence, as the operating portion of the edge of the knife must be accurately related to the nip of the rolls by which the blank to be skived is presented to it, I provide mechanism by which the knife-supporting shafts 50, 51 and pulleys 47, 48, and the knife may all be adjusted simultaneously in lines longitudinal of said shafts and transverse to the path of movement of the knife. This mechanism comprises a shaft 59 which is journaled in a bracket 60 secured to the under face of the flat top plate 61 of the top section 40 of the main frame, as best shown in Figures 1 and 4. The front end of the shaft extends to the front of the frame and is squared to receive a wrench or crank by which it may be rotated in either direction. At its rear end, the shaft 59 is provided with a worm 62 which engages a worm wheel segment 63 journaled on a cross shaft 64 which extends from end to end of the machine just below the top plate 61 (see Figures 1, 2, 4 and 5). As illustrated in Figure 4, the ends of the shaft 64 project beyond the ends of the frame into the brackets 52, 53, and are journaled in bearings formed in the brackets. Each bracket is formed with a guideway to receive a slide 65 (see Figures 5 and 6), into which a reduced end 66 of the shaft 50 or 51, as the case may be, may project. The under side of each slide is provided with a rack 67 with which intermeshes a gear segment 68 splined on the associated end of the shaft 64. There is, of course, one of these segments on each end of the shaft 64 intermeshing with an associated slide 65, so that, as the adjusting shaft 59 is rocked in one direction or the other, the two slides will be moved longitudinally of the axes of the shafts 50 and 51 to the same extent and will be maintained in their adjusted position by reason of the engagement of the worm segment 63 with the worm 62 on the said shaft 59. On each of the shafts 50, 51, there is a shoulder 69 and also a washer 70, the latter being held in

place by a nut 71 on the threaded extremity 72 of the shaft. Between the slide 65 and the shoulder 69 and the washer 70, there are interposed anti-friction thrust bearings comprising the races 71, 72, and the balls 73. From the construction as thus described, it will be seen that each of the shafts 50, 51 is mounted in anti-friction bearings which resist side thrust, and that anti-friction bearings are provided for withstanding the end thrust thereof.

While the shafts 50, 51 are approximately parallel, nevertheless they should be set at a slight angle so as to ensure that the band knife shall properly track thereon with its blunt or butt edge against the flanges 49 of the pulleys 47, 48. It is also desirable that the bracket 53, in which the pulley shaft 51 is mounted, should also be adjustable to take up slack in the band knife. For this reason, the bracket 53 is adjustably secured on the top of the section 40 of the frame. Of course any suitable means may be utilized for so securing said bracket as to permit it to be adjusted as described. As illustrated in Figure 1, bolts 74 are passed through enlarged apertures in the bracket into the frame for holding the bracket after it has been adjusted. For effecting its adjustment, the bracket is provided with a rib or upright lugs 75, through which abutment screws 76 are passed and which abut against an upright web or frame member 77 formed on or secured to the upper frame member or section 40. Each screw may be rotated by a disk 78 secured thereto and bearing upon its periphery a micrometer scale. An index or pointer 79 may be secured to the frame member 77 to cooperate with the scale on the disk or head 78.

There are preferably two of the screws 76 which are located in parallelism in substantially the same horizontal planes, so that, by adjusting them relatively to each other, the bracket 53 and the shaft 51 may be angularly adjusted in addition to being adjusted bodily towards and from the bracket 52 and shaft 50.

Any suitable mechanism may be employed for transmittting power to either or both of the shafts 50, 51. It is necessary, however, that only one of said shafts shall be positively driven, and I therefore provide mechanism for transmitting power to the shaft 50. The power may be derived initially from any suitable source of power, but I find it convenient to employ an electric motor indicated as a whole at 80 and anchored upon the arm 81 of a lever, the arm 82 of which projects forwardly through the lower portion of the frame where it may be reached by the foot of the operator and depressed. A latch 83 is pivoted at 84 to the front portion of the frame, as shown in Figure 1, and is so located in reference to the arm 82 of the lever when the latter is depressed, that the latch will be caused to engage it by a spring 85 and hold it in its depressed position. The two-armed lever 81, 82, is pivoted by studs 86 in ears or lugs 87 at the rear of the frame. The arm 81 is laterally extended and is of sufficient area to receive and support a motor of proper size to drive the various instrumentalities of the machine. A pulley 88 is on the rotor shaft 89 of the motor and transmits power by a belt 90 to a pulley 91 on a shaft 92, which, as shown in Figure 30, is journaled in anti-friction bearings indicated as a whole at 93, 94, the main supporting portions of which may be integral with the upper section 40 of the main frame, as indicated in Figures 2 and 30. The said shaft 92 is geared to the shaft 50 by any suitable form of gearing, such as a worm and worm wheel or a pair of spiral gears. As shown, the gears employed for this purpose comprise a worm 95 on the shaft 92 and a coacting worm wheel 96 on the shaft 50. When the treadle arm 82 is released, the weight of the motor on the rear arm 81 of the two-armed lever is sufficient to keep the belt 90 taut, and thus I avoid the use of the customary belt tighteners. When the shaft 50 is rotated, the band knife 46 is caused to travel at the proper speed as will be readily understood.

Knife grinding mechanism.—The edge of the knife, of course, should be ground from time to time so that it may be kept in a keen or cutting condition. I therefore provide mechanism comprising grinding wheels for engaging the opposite faces of the band knife at or near the edge thereof, and these grinding wheels are so located as to engage that stretch of the knife between the pulleys which is not in engagement with the work.

Referring to Figures 1, 2, 7, 30, 31 and 32, the two grinding wheels or disks are indicated at 100, 101, respectively, and they are located within the interior of the frame, the former being adapted to engage the under face of the knife and the latter the upper face thereof. As shown in Figures 1 and 31, one is a little to one side of the other, so that, in operation, they will not come into engagement. The grinding wheel 100 is secured in any suitable manner upon a shaft 102 (see Figure 31) to which is also secured a pulley 103 so that it may be driven by a belt 104 from a pulley 105 on a shaft 106 at the rear of the machine (see Figure 2). The shaft 106 is in turn driven from the shaft 92 by a belt 107 passing around a pulley 108 on the shaft 92, and a pulley 109 on the shaft 106 (see Figure 32). The grinding wheel shaft 102 is journaled in a slide 110 adapted to travel horizontally in a guideway 111 in a vertically-movable carriage 112, so that the grinding knife is capable of adjustment up and down and back

and forth to bring the grinding wheel 100 thereon into proper engagement with the knife whenever desired. The slide 110, as shown in Figures 31 and 32, is provided with a suitable bearing 113 for the shaft 102 and is equipped with bushings or the like as may be required. Of course, any suitable mechanism may be utilized for removably securing the grinding disk 100 in place. As shown, the shaft 102 has a peripheral flange 114 against which the grinding disk may be clamped by washer 115 and a nut 116. Any suitable means may be utilized to prevent grit from entering the bearing for the shaft, such as endless bands 117, 118, which span the spaces between the ends of the bearing and the flange 114 and the hub of the pulley 103. For adjusting the slide 110 horizontally upon the guideway afforded by the vertically-movable carriage 112, I have shown a screw bar 119 which is journaled in a lug 120 at the end of the guideway 111 and has a threaded engagement with the slide 110. This screw bar is connected by a flexible shaft with a handle 121 rotatably mounted in a lug 122 projecting upwardly from the cross brace 43 at the front of the machine. As illustrated, the flexible shaft, interposed between the rotatable handle 121 and the screw 119, comprises the two telescoping splined members 123, 124, respectively connected by gimbal joints with the said handle and with the said screw bar as indicated at 125, 126. By manually rotating the handle 121, which is thus located in a convenient position for the operator, the slide 110 and the grinding disk or wheel supported thereby will be adjusted crosswise of the stretch of the knife on which the grinding disk is to operate. The grinding wheel 101 is secured upon a shaft 127 journaled in a horizontal slide 128 mounted in suitable guideways in a vertically movable carriage 129 (see Figure 3). This slide 128 may be moved in its guideway by a handle 130 connected by a flexible shaft 131 with a screw bar 132 journaled in a bearing lug 133 formed on or secured to the carriage 129 and having a threaded engagement with the slide 128. These parts are all substantially identical with the corresponding parts described in connection with the means for adjusting the lower grinding wheel. The two vertically movable carriages 112 and 129 are arranged to slide in guideways 134 formed in a vertical plate 135 which is located within the hollow main frame and bolted or otherwise secured to stationary members therein, as best shown in Figures 2, 3 and 32. The upper carriage 129 is directly above the carriage 112 so that they may both operate in the same dove-tailed guideway formed in the upright plate 135. They are adjusted vertically independently of each other so as to move them towards and from the plane of the travel of the lower stretch of the knife. The means for effecting the adjustment of these two carriages is best shown in Figures 2, 30, 31 and 32. The upright plate 135 is illustrated in Figure 32 as being secured to a cast bracket 136 bolted to a web 137 extending into the main frame; and the upper end of the plate 135 is shown in Figure 3 as being secured by bolts to a depending web 138. Stepped in the bracket 136 are parallel upright screw bars 139, 140, the former having a threaded portion engaging a threaded aperture in the carriage 112, and the latter 140 passing through a non-threaded aperture in the carriage 112 but having threads at its upper end for engaging a threaded aperture in the upper carriage 129. On the lower end of each of these two shafts, there are collars 142, 143 (see Figure 31) which hold the screw bars against vertical movement while permitting them to rotate in their bearings afforded by the bracket 136. These two bars are further provided with worm wheels 144, 145, respectively, which severally engage or intermesh with worms 146, 147, formed on or secured to horizontal shafts 148, 149, which project forwardly so that their front ends pass through the web or front bar 43 of the main frame. The rear ends of these shafts are journaled in bearings afforded by the bracket 136 and their front ends are provided with hand wheels 150, 151, respectively, by which they may be manually rotated. The operator, by manipulating the handles or hand wheels 121, 130, 150 and 151, may adjust the grinding wheels vertically and horizontally so as to locate them accurately in respect of the edge of the knife on which they are to operate. The shaft 127 for the upper grinding wheel 101 is provided with a pulley 152 (see Figure 2) which is driven by a cross belt 154 and a pulley 155 located on the shaft 92 as illustrated in Figure 30. It is desirable that the lower stretch of the band knife should be guided and held against vibration when it is being ground, and consequently the upright plate 135 is provided with a block 156 having a narrow kerf or slot of sufficient depth and width to receive the band knife. As shown in Figure 30, this block is recessed as at 157 so that the peripheral portions of the grinding wheels may enter therein for engagement with the knife. It is also necessary that the upper stretch of the knife should be kept from vibration when it is in engagement with the work, but I will explain the means by which this is accomplished in a subsequent portion of the specification.

The main rolls.—The main rolls, which receive the blank and present it to the action of the knife so that its edges may be skived, comprise a non-yielding recessed roll 160 and a yielding roll 161. The recessed roll

160, which has a cavity 162 of proper contour and depth to receive the blank to be skived, is removably mounted upon a shaft 163, as shown in Figures 3, 7 and 8. The shaft itself is provided with sleeves 164, 165, which are journalled in boxes 166, 167, arranged to slide vertically in a removable frame indicated as a whole at 168. This frame comprises a base 169 and upright side members 170 having the vertical guideways 171 for the boxes 166, 167. The frame as an entirety is placed in recesses indicated at 172 in a top frame supported by the main frame and comprising the upright side plates of members 77 and 173 (see Figure 1), as will be subsequently explained more in detail. The two boxes 166, 167 are vertically adjusted by screws 175, 176, as shown in Figure 7. The shaft 163 for the roll 160 is formed at one end with a head 177 and at its other end is provided with a threaded recess to receive a screw 178. On the reduced end of the sleeve 164 is placed a gear 179 by which the shaft is ultimately driven, and this gear is clamped frictionally against a shoulder 180 on the sleeve by a short sleeve 181 splined on the extremity of the shaft 163, friction washers 182, 183, and an end washer 184 with which the head of the screw 178 is engaged. By adjusting the screw, the spur gear 179 may be secured with sufficient rigidity to the sleeve 164 as to cause the latter to rotate therewith under all ordinary circumstances; but, by frictionally connecting the parts, a slip will occur in case such resistance to the rotation of the roll 160 is encountered as would cause damage or breakage of the parts. The ends of the roll 160 and the confronting ends of the two sleeves 164, 165, are provided with complemental tongues and grooves so that they are normally coupled together. By this construction, on removing the shaft 163, the roll 160 may be removed and a roll having a different form or size of cavity or recess may be substituted therefor.

The yielding roll 161 may be formed in any suitable or convenient way. As illustrated, it is provided with a rubber shoe 185 of sufficient thickness so as to be compressed by those portions of the blank which project outwardly from the periphery of the roll 160. The roll 161 is placed upon a shaft 186, extending through sleeves 187, 188, and the confronting ends of the sleeves and the roll 161 are coupled together by tongues and grooves so that the roll may be disengaged from the sleeves when the shaft 186 is removed. The sleeves 187, 188, are journaled in boxes 189, 190, placed in the same guideways 171 in which the boxes 166, 167 are located, and said boxes 189, 190 are seated in the lower ends of said guideways. The two rolls cannot be connected together by two spur gears located thereon and meshing directly together, because such gears would interfere with the travel of the knife, so that a train of gearing is necessarily interposed between the two rolls to cause them to rotate in peripheral unison. Secured on the sleeve 187 is a spur gear 191 which is spaced from the gear 179 on the sleeve 164 a sufficient distance as not to interfere with the knife, as shown in Figure 7; and between the two gears 179 and 191 are placed two intermeshing gears 192, 193, the former meshing with the gear 179 and the latter meshing with the gear 191, as shown by the diagram in Figure 11 and as also shown in dotted lines in Figure 2; so that, when the gear 179 is rotated to rotate the roll 160, the roll 161 will be rotated in peripheral unison therewith but in the opposite direction so that their contacting surfaces will move in the same direction. Power is imparted to the gear 179 from an idler gear 194 mounted on a stud shaft 195 journaled in the frame 168. The last-mentioned idler gear 194 intermeshes with and is driven by a spur gear 196 on a shaft 197 mounted in bearings afforded by the frame 168. Secured on the shaft 197 is a bevel gear 198 to which power is supplied from the motor-driven shaft 92 by any convenient form of power-transmitting mechanism. For example, I may employ an inclined shaft 199 (see Figure 2) having on its upper end a bevel gear 200 intermeshing with the bevel gear 198 and having on its lower end a worm wheel 201 intermeshing with a worm 202 pinned to the shaft 92 as shown in Figure 30. I prefer that the rotation of the rolls may be stopped independently of the rotation of the shaft 92, and I therefore provide clutch mechanism by which the bevel gear 200 may be clutched to and unclutched from the shaft 199. Consequently the bevel gear 200 is secured upon a sleeve 203 which is loose upon the shaft 199 and which is provided with a clutch member 204 with which a clutch 205 is splined on the shaft 199 may be engaged as desired. This clutch is manually movable into and out of active position by a yoked clutch lever 206 pivoted at 207 and having an arm 208 by which it may be rocked. The shaft 199 and the sleeve 203 are journaled in bearings 209, 210, formed on a bracket 211 secured to the upper side bar 173 of the frame. This bracket has small sockets 212 into which a movable knob 213 on the arm 208 may be engaged so as to hold the clutch 205 in the several positions to which it may be moved. As a result of the construction which I have thus described, it will be apparent that the two rolls, namely the recessed and the yielding rolls 162, 161, will be driven from the motor-driven shaft 92 of the machine.

The recessed and yielding rolls 160, 161, are so located in respect of the upper stretch

of the band knife that their line of nip lies in the horizontal plane of the knife and the edge of the knife is brought close to the line of nip so as to skive from the blank those portions thereof which lie outside of the circumference of the recessed knife as the blank passes between the two rolls. In Figures 15 and 16, the action of the rolls and of the knife upon a blank is illustrated. In Figure 15, the blank, which is indicated at *a*, has just reached the nip of the rolls and is being carried to the right therethrough into engagement with the edge of the knife 46 which extends into the space between the rolls as shown. As the rolls rotate, the blank *a* is carried with them into engagement with the knife so that the knife skives therefrom the cutting *a'* around the marginal edge of the blank so as to bevel the edge of the blank as indicated at a^2 in Figure 16. As previously explained, the knife, during this cutting operation, must be held against vibration, and the removable frame 169 is accordingly recessed to provide a kerf 214 for the knife, as shown in Figure 3. In addition to the kerf 214, the frame 169 is provided with two plates 215, 216, located in a recess therein and between which the knife travels. The lower plate 216 rests upon a wedge 217, so that, by adjusting it lengthwise of the movement of the knife, the plate 216 may be adjusted towards and from the plate 215. The front ends or edges of the plates 215, 216, are beveled as shown in Figures 3, 15 and 16, and they lie a short distance from the cutting edge of the knife. For the purpose of resisting the thrust against the edge of the knife, which would tend to move the knife rearwardly, I employ a wedge abutment which, as shown in Figure 17, comprises the two wedge members 219, 220, which are located in the kerf 214 and have their tapered portions arranged lengthwise of the knife. As the knife is worn away by grinding or by abrasion, the wedge members 219, 220 may be adjusted relatively to each other so as to hold the cutting edge of the knife in proper relation to the nip of the rolls, and to withstand the thrust of the blank thereagainst. These wedge members are of such length as to support the rear edge of the knife throughout substantially the entire length of its active portion.

The two rolls 160, 161 feed the blank to the knife, but in addition I employ mechanism for automatically feeding the blanks to the rolls. This mechanism comprises a main feeding apparatus and also a supplemental feed roll which is located close to the rolls 160, 161. Inasmuch as the last-mentioned feed roll is driven from the roll 160, I will describe it first. The supplemental roll is indicated at 221, and it is provided with knurled or toothed portions 222 as shown in Figure 8. The roll is supported in swinging arms 223, 224, so that it can move up and down in reference to the blanks which are passing therebeneath. The arm 223 is mounted upon a screw stud 225 passed into one of the side uprights of the frame 168. The other arm 224 is adapted to swing about the axis of a stud 226 which is screwed thereinto, and which has a non-threaded end 227 inserted in a socket in a shaft 228 which forms a part of the power-transmitting mechanism for rotating the supplemental feed roll 221, as I will presently explain. The supplemental feed roll has the reduced end portions 229, 230, the latter being removable and being secured ordinarily by a pin 231 to the roll in a recess into the end of which it projects. These ends of the roll are journaled in boxes 232, 233, respectively, which are more or less spherical, and which are engaged with sockets 234, 235, in the under sides of the arms 223, 224. Springs 236, 237 are interposed between the ends of the arms 223, 224, and the stationary upright portions of the frame 168, as shown in Figure 9, so as to press the supplemental feed roll downwardly. The bearings 232, 233, and the arms 223, 224 are connected by a pin and slot connection indicated as a whole at 238. Any suitable stops may be employed for preventing the arms 223, 224 from swinging downwardly too far. For driving the supplemental feed shaft, any suitable power-transmitting mechanism may be interposed between the gear 179, which drives the upper recessed roll, and the end of the supplemental feed roll. As previously stated, the pivot screw pin 226 extends into the shaft 228 which is in axial alinement with the pivot pin 225. This shaft 228 is formed with a gear 239 intermeshing with an idler gear 240 journaled on a shaft 241 mounted in the arm 224, the said gear 240 having a hub extending into a recess in the arm, as best shown in Figure 8. The idler gear 240 intermeshes with a gear 242 formed on the removable end 230 of the supplemental feed roll. The shaft 228 has a gear 243 pinned thereon and intermeshing with a gear 244 which is splined on the hub of the gear 192. By the train of gearing described, the supplemental feed roll is positively driven and yet either end may yield relatively to the other when the blank to be skived is passing thereunder, or the feed roll itself may be bodily lifted by the blank against the pressure of the springs 236, 237.

When it is desired to have access to the main rolls to remove them and replace others, the supplemental feed roll may be easily detached from the machine by removing the studs 225, 226, which permits the arms 223, 224 and the parts carried thereby to be lifted forwardly. The removable frame has also a table 245 which is sepa-

rately detachable or removable. This consists, as shown in Figures 3 and 17, of a metallic block which fits in the sockets 172 in the side members of the top frame 173, and it extends from the lower yielding roll forwardly to provide a flat surface on which the blanks may be fed and which will sustain the pressure of the blanks when engaged by the supplemental feed roll. This block, as shown in Figure 17, is provided with a series of slots 246 to receive feed fingers subsequently to be described. Between the slots 246, which are open from end to end, there are additional slots 247 through which air may pass down to an air duct 248 (see Figure 3), which serves as a conduit for removing the skivings. The slots 247 have inclined lower walls so that there is a direct communication for the atmosphere through the slots to the conduit 248. The inner end of the block 245 is beveled, as shown in Figure 3, so as to extend in as closely as possible to the nip of the rolls 160, 161, and the upper surface of the table formed by the block is in a plane tangential to the two rolls and coincident with the plane of the upper stretch of the knife. This block may be removed to permit access to the roll 161 when it is desired to remove the latter.

The four-motion feeding mechanism and the magazine.—The blanks, which are cut into proper shape (for example, in the shape so as to be used as a toe box), are stacked in a magazine which is best shown in detail in Figures 27 to 29 inclusive, taken in connection with Figures 1 to 3. It comprises a cross block or plate 249 which is arranged at a slight angle from the vertical and which lies in front of the upper roll 160. To the top of this plate are formed or secured the two forwardly-diverging bars 250, 250, which are longitudinally slotted at 251. On these plates are secured adjustable slides 252, 252, into which screws 253, passing through the slots 251, are passed, the heads of the screws being below the plates 250. Wing nuts 254 are located on the upper ends of the screws so that, after the slides have been adjusted to proper position, they may be clamped in place. Each of the slides 252 is angular in plan view, as shown in Figure 27, and to the inner end of each is secured an upright plate 255. The inner faces of these plates are parallel, and in side elevation they are rearwardly inclined so as to form side guide walls for the stack of blanks which is placed in the magazine. To the main plate 249 there is secured an upright bar or plate 256 which forms the rear wall of a chute, the side walls of which are formed by the plates 255. A stack of blanks may be placed in the magazine thus formed, with the lowermost blank resting on the table afforded by the block 245. It is desirable that the entire magazine may be adjusted up and down so as to vary the distance between the lower end of the upright back wall of the chute or magazine from the table. For this purpose, the side walls 170 of the removable frame are formed with grooves 257 into which tongues 258 project from the main back wall or plate 249 of the magazine, so that the magazine as a whole may slide up and down in the grooves or guideways. For the purpose of effecting the vertical adjustment of the entire magazine, any suitable means may be provided. In Figures 27 and 28, however, I have illustrated a mechanism which is applicable for the purpose and which comprises the two two-armed levers 260, 261. These levers are respectively pivoted at 262, 263 to the main back plate 249, and the inner end of the lever 261 rests against the inner end of the lever 260. The outer ends of these levers rest on shoulders 264 formed on the side walls 170. An adjusting screw 265 is threaded through an aperture in the plate 249 and bears against the outer arm of the lever 260. Consequently, by rotating the knurled head 266 of this screw, the two levers 260, 261 may be swung about their respective pivots so as to raise or lower the magazine as may be desired. The upright rear wall or plate 256 is capable of vertical or endwise adjustment relatively to the back plate 249. Its side edges are beveled so that it may slide in a complementally-formed guideway 267 in the back plate 249. The back plate, as shown in Figure 3, is provided with an upright post 268 located in a socket formed therein, and against the end of this post there is located a screw 269 which is passed through a flange 270 formed in the upright rear wall member 256. A coiled tension spring 271 has one end attached to the flange 270 and its other end secured to a collar 272 on the post 268. This spring draws the rear wall 256 of the magazine downwardly until the end of the abutment screw 269 engages the post 268. Consequently, by rotating the screw 269 in one direction or the other, the rear wall 256 may be raised and lowered, and its lower end adjusted towards and from the table.

The magazine, as thus described, is capable of holding a pile of blanks to be skived with the front edges of the blanks resting against the rear wall 256 of the magazine. The side walls 255 engage the ends of the blanks and hold them against endwise dislocation. Inasmuch as the side walls 255 are adjustable longitudinally of the converging plates 250, 250, they may be caused to approach and recede from each other and also to be moved toward the rear wall 256 without affecting the parallel relationship of the said side walls 255. The whole magazine may be easily lifted from the machine to permit access to the supplemental feed roll

and the main rolls. The lower end of the magazine is so adjusted in reference to the table that the lowest blank in the pile may be moved rearwardly to be gripped by the supplemental feed roll, the remainder of the pile being maintained in place.

The main feeding mechanism, by which the blanks are removed successively from the bottom of the pile, comprises a plurality of fingers or feed dogs to which is imparted a four-way motion, so that they can be advanced with their operative ends in the horizontal planes of the lowermost blank, and then dropped so as to be withdrawn below the plane of the table, and consequently out of frictional engagement, with the then lowest blank in the magazine. This feed mechanism is supported by the walls 77, 173 of the frame, which, as shown in Figure 4, are secured upon the flat top of the upper section 40 of the main frame. The feed mechanism comprises a sliding carriage 270 which is movable back and forth on guides 271 secured to the top webs of the walls 77, 173, as best shown in Figures 4 and 18. The rear end of the carriage is provided with depending lugs 272 in which a block 273 is pivoted by a pintle 274. This block is engaged in a slotted end of a cam-operated lever 275 by which the carriage may be reciprocated longitudinally of the guideways 271. The hub of the lever 275 is secured to a rock shaft 276 which is journaled in a bearing bracket 277 formed on or secured to the front face of the top section 40 of the frame. There is loosely mounted on this same shaft 276 another lever 278 having on its end a roll or truck 279 located in a path or groove 280 in a cam disk 281 secured to a shaft 282. This shaft is journaled in a bearing at the front of the machine and is driven by any suitable means from one of the driven shafts in the machine. It may, with convenience, be driven from the inclined shaft 199, as shown in Figure 2. For this purpose, I may use an inclined shaft 283 having on its rear end a bevel gear 284 intermeshing with a complemental gear 285 compounded with the bevel gear 200 hereinbefore described, so as to be rotated when the last-mentioned gear is rotated. At its front end, the shaft 283 is provided with a bevel gear 286 intermeshing with and driving a complemental bevel gear 287 on the shaft 282. The shaft 283 is journaled in suitable bearings afforded by the bracket 211 and by a bracket 288 extending from the side wall 173. It is desirable that a yielding connection be interposed between the two levers 275 and 278, so that, if the feeding fingers to be described encounter abnormal resistance, the lever 275 may yield in its feeding movement. For this purpose, the lever 275 is provided with an angular lug 289 adapted to overlap a similar lug 290 on the lever 278, as best shown in Figures 22 and 23. A bolt 291, having its head resting on the lug 289 and its shank passed loosely through an enlarged aperture therein, extends downwardly through a slot in the lug 290 and is provided at its lower end with a washer 292 and a lock nut 293. A spring 294 is interposed between the washer and the lug 290. By virtue of this arrangement, the lever 275 is rocked in its feeding direction yieldingly as will be readily understood. The mechanism as thus far described provides for the reciprocation of the carriage 270 in timed relation to the rotation of the main rolls 160, 161.

Upon the carriage 270 are located a plurality of feed fingers which are adjustable longitudinally independently of each other so that their ends may be caused simultaneously to engage a curved or irregular edge of the blank to be fed. These feeding fingers are indicated at 295, and, as shown in Figure 17, there are seven of them arranged to enter the slots 246 in the table. One of the fingers is adapted to engage the edge of the blank midway between its ends, and the others are so disposed as to engage the edge of the blank approximately near its ends and at points intermediate of the ends. Each feeding finger consists of a relatively narrow strip of metal having a tapered forwardly-projecting end 297, as shown in Figure 3, the extremity, however, being blunt so as to engage the edge of the blank. The rear portion of each feeding finger has a longitudinal slot 298, and through these slots there extends a bolt 299 which is located in upstanding lugs 300 on the carriage. The bolt is provided with a head 301 at one end, and with a washer 302 and a nut 303 at the other end, so that, after the individual fingers have been adjusted longitudinally, they may be clamped in their adjusted position by tightening the nut 303. The upstanding lugs 300 are not integral with the carriage 270 but are adjustable longitudinally thereof so that the entire group of feeding fingers may be adjusted as a unit. For this purpose, the lugs 300, 300, are formed on a plate 304 which is set in a guideway 305 in the upper portion of the carriage 270. This plate has a depending lug 306 with which a screw 307 is in threaded engagement. The head 308 of the screw has a groove 309 engaging a rib 310 on a short bar 311 secured to the end of the carriage (see Figures 17 and 18). By rotating the screw 307, the plate 304 and the feed fingers may be adjusted longitudinally of the slide so as to vary the limits of their feeding and recessional movements. I employ a novel mechanism for swinging the operative ends of the feed fingers 295 vertically so as to locate them above or below the plane of the table on which the pile of blanks rests, as indicated in Figure 18. This mechanism comprises two upright slides 312

which are vertically movable relatively to the carriage 270 and which are located in grooves formed therein. Passing transversely through the upper ends of these slides 312, there is a bolt 313 having a washer 314 and nut 315 on one end and a head 316 on the other end. Between its ends, this bolt has an eccentric portion 317 which passes through slots 318 formed longitudinally in the forward portions of the feed fingers 295, so that, by rotating the bolt upon its axis, the forward ends of the feed fingers may be bodily adjusted as a unit up and down, after which the bolt may be secured in its adjusted position by tightening the nut 315. On this bolt are strung tubular spacers 319 located between the feed fingers to hold them in proper relation. Similar spacers 320 may be strung on the bolt 299, if desired (see Figure 24). It will thus be seen that the individual fingers are capable, not only of individual longitudinal adjustment, but of such adjustment simultaneously or as a unit, and that they may be adjusted about the axis of the bolt 299 to raise or lower their operative ends all as a unit. I provide means under manual conrol by which the upright sliding members 312 may be raised when the carriage reaches the end of its recessional movement, and lowered when the carriage reaches the end of its feeding movement. These means comprise cam or wedge members 321 which are arranged to slide horizontally in guideways formed in depending portions 322 of the carriage, as best shown in Figures 18 and 25. The members 321 are provided with longitudinal cam grooves 323, through which pins 324 are passed into upright slides 312. These slots are formed, as shown in Figures 18 and 19, so that the forward portions thereof are in a horizontal plane lower than the rear portions, so that, by effecting a relative sliding movement of the members 321 longitudinally of the slots 323, the members 312 may be raised or lowered as the case may be. In plan view, each of these two cam members 321 is provided with two shoulders 325, 326, which are spaced apart as shown in Figures 25 and 26, and into the recesses between the shoulders, there extend the outer ends of two two-armed levers 327 which are respectively pivoted on upright pins 328 extending upwardly from a cross bar 329 formed on or secured to the upright side frames 77, 173, as shown in Figure 4. This cross bar, as shown in the last-mentioned figure, is in the shape of a yoke, and the pins extend upwardly from the lower portion thereof. Consequently the pivot pins 328 are stationary relatively to the travel of the main carriage 270. The inner arms of the two levers 327 are curved about the axes of the pivots 328 and are closely adjacent so that they may be engaged by abutment members movable with the carriage for rocking said levers. If these levers were stationary or immovable and the carriage were moved back and forth relatively to them so that the ends of the levers would be engaged by the shoulders 325, 326, on the cam slide members 321, it would follow, of course, that, as the carriage reached the end of its recessional movement, the slides 321 would be held against movement so that the upright slides 312 would be lowered; and that, when the carriage reached the end of its feeding movement, the upright slides 312 would be raised; and this would cause just the opposite actuation of the feed fingers in respect of their up and down movement that is desired. Of course, it would be possible to change the shape of the slots 323, so that, if the abutment levers 327 were stationary, the feed fingers could be raised at the end of their recessional movement and lowered at the end of their feeding movement, but I prefer to provide the feeding mechanism with devices under manual control by which the feed fingers may travel back and forth with the carriage and remain below the level of the table so as to stop the feed of the blanks; and it is for this reason, among others, that I employ the levers 327 and the mechanism by which they are swung about their centers or pivots 328. It will be observed that the carriage is provided with two depending lugs 330, 331 (see Figure 18), which are spaced apart longitudinally of the travel of the carriage and which are in line with the inner ends of the levers 327, as shown in Figure 25, so that, as the main feeding carriage is reciprocated, these two lugs or abutments are moved back and forth relatively to the inner ends of the levers 327. The parts are so spaced that, when the carriage is reaching the end of its feeding movement so that the shoulders 326 of the cam slide 321 are in engagement with the outer ends of the levers 327, the lug or abutment 331 will engage the inner ends of the levers and swing them forwardly about their pivots 328, so that the outer ends of the levers will move the cam slides 321 rearwardly and thus depress the operative or forward ends of the feed fingers. The abutment 330, however, is spaced such a distance from the abutment 331 that, when the carriage slides rearwardly and stops, the abutment 330 will just engage the inner ends of the levers and not swing them about their pivots, so that thereafter the main carriage may be fed back and forth without effecting any vertical movement of the opposite ends of the feed fingers. A movable abutment 332, however, is provided which may be interposed between the abutment 330 and the inner ends of the levers 327, so that, when the main carriage slides rearwardly, the inner ends of the levers will be engaged by the supplemental abutment 332 and swung about their piv-

ots so as to force the cam slides 321 forwardly and thus raise the forward ends of the feed fingers. This movable abutment 332 is under manual control and it is pivoted by a cross pin 333 to a bar 334. The said bar is supported by a right-angle lever 335 which has pins or studs 336, 337, extending through longitudinal slots 338, 339, in the bar 334. The lever 335 has its hub rigidly secured to a rock shaft 340, which is journaled in the yoke-shaped cross bar 329 and projects through the upright frame member 77. Hence, by rocking the shaft 340, the bar 334 may be moved from the position shown in Figure 20 to the position shown in Figure 19, so as to carry the supplemental abutment 332 from planes below the planes of travel of the abutment lug 330, into the path of movement thereof. In order to hold the bar 334 in this position, the shaft 340 is provided on its end, which extends through the frame member 77, with a crank arm 341 provided with a handle 342. In the handle there is a spring-pressed pin 343 whose pointed end may be caused to engage either of two recesses 344, 345, formed in the outer face of the frame member 77. Adjacent said recesses are stop members 346 to limit the movement of the crank lever 341, as best shown in Figure 21 (sheet 4). It is necessary that the bar 334 should have a limited sliding movement relatively to the angle lever 335 on which it is mounted, as, of course, the supplemental abutment 332 must have a limited sliding movement with the main carriage due to the engagement of the abutment 330 with the supplemental abutment 332.

The operation of the mechanism will be understood in connection with the illustration thereof presented by Figures 18, 19, 20, 25 and 26. In Figure 20, the manually-controlled supplemental abutment 332 is in an inactive position so that the main carriage may slide back and forth with the operative ends of the feed fingers located below the plane of the table on which the pile of blanks rests. If it is desired to impart an up and down movement to the feeding ends of the feed fingers, the operator, at a time when the main carriage has moved forwardly from its rearmost position, swings the rock shaft 340 about its axis so as to raise the bar 334 from the position shown in Figure 20 to the position shown in Figure 19, and thus brings the supplemental abutment member 332 into the path of movement of the abutment lug 330. Then, when the main slide moves rearwardly from the position shown in Figure 19 to the position shown in Figure 18, as it reaches the end of its recessional movement, the abutment 330 engages the supplemental abutment 332 and moves it rearwardly, thereby swinging the levers 327 about their axes so that their outer ends will be moved forwardly while in engagement with the shoulders 325 of the cam slides 321 so as to move said slides forwardly in a direction opposite to the recessional travel of the main carriage, and, through the pin and slot connections 323, 324, raise the vertical slides 312, and thus project the feeding ends of the feed fingers upwardly into the planes of the lowermost blank in the magazine. The extent of this up and down movement of the feed fingers is shown by comparing Figures 18 and 19. In Figure 19, the feed fingers have reached the ends of their forward or feeding movement and have been depressed so that they may be carried rearwardly out of engagement with the then lowest blank in the magazine. In Figure 18, the carriage has reached the end of its recessional movement and the feed fingers have been raised so that they may then engage the bottom blank in the pile and feed it forwardly far enough to be engaged by the supplemental feed roll and the main roll. In Figure 18, the blank *b*, which is resting upon the table and which is at the bottom of the pile, is shown in Figure 19 as having been fed forwardly so that it is in the grip of the rolls 160, 161. At any time when the operator observes that the blanks are not being fed properly, he may depress the crank lever 331 so as to render the feed fingers inactive, whereafter the feed carriage will move back and forth without effecting the feed of the blanks.

Blanks, which are designed for use either for stiffening the counter or the toe of a shoe, are provided with curved edges so that it is quite difficult to present them accurately to the main rolls which in turn present them to the skiving knife, and it is practically impossible to feed them through the magazine so that they will register accurately with the ends of the feed fingers for the feeding mechanism which may be employed. I therefore provide a supplemental positioning mechanism by which the lower blanks of the pile are properly positioned before they are engaged by the ends of the feed fingers. This positioning mechanism comprises two elongated slotted bars 347, 347, which rest upon the main carriage between the two outer pairs of feed fingers 295, as shown in Figures 3 and 17. These bars are longitudinally slotted as stated, and through the slots screws 348 are passed into the carriage, so that, by loosening the screws, the positioning bars may be adjusted endwise. At its front end, each of the bars 347 is provided with a head 349 with its front end beveled at 350. These heads are located just above the feed fingers when the latter are in their highest positions, and they are arranged so that, when the feed carriage is moved forward almost to the extent of its feeding movement, these positioning bars will engage three or four of the lowest

blanks in the pile in the magazine, and, by reason of the fact that they engage the blanks at relatively remotely separated points near the ends of the blanks, they swing the blanks sufficiently so that they will be properly engaged by the feed fingers when they successively reach the bottom of the pile; and thus, as the feed fingers engage each positioned blank, they present it accurately to the rolls 160, 161, so that it will register in the cavity in the roll 160.

This feeding mechanism and the magazine are claimed in my divisional application for patent Serial Number 44,664, filed July 20, 1924, entitled "Feeding mechanism".

The stripping and calendering mechanism.—After each blank has been skived by presentation by the rolls 160, 161 to the band knife, the skiving, which is on the under side of the knife, is guided downwardly by the beveled edge of the shoe 216 and the beveled edge of the support on which it rests and drops into the conduit 248. The rear end of this conduit is connected by any suitable conduit with a fan or blower by which the skivings are removed. The air passes into the upper end of the conduit 248 through the slots in the block or table 245. The skived portion of the blank, which is located above the knife, is guided upwardly by the beveled front end of the shoe 215 and is stripped from the cavity in the roll 60 by a stripper 351, as best shown in Figure 3. The end of the stripper is thickened and it forms a face which guides the blank outwardly from the roll so that it may pass through guide rolls to be described to the nip of a pair of rolls indicated at 352, 353, respectively. The roll 353 is secured upon the shaft 197 hereinbefore described, and it is preferably provided with a peripheral shoe or covering 354 of rubber or other frictional yielding material. The roll 352 may be made of steel or other suitable material, and may, if desired, be driven. I have shown it, however, as an idler roll, the shaft of which is journaled in suitable bearings afforded by the removable frame 168. Between the pair of rolls 160, 161, and the rolls 353, 352, I place a series of guide rolls arranged in two sets. These rolls comprise the two upper rolls 355, 356, which are journaled in a tilting head 357, pivoted in a spindle 358, journaled in a bearing 359 and held against endwise movement therein by a screw 360. The tilting head is held yieldingly in position by springs 361, 361, which are secured to the bearing 359 and engage shoulders on the tilting head. Cooperating with the rolls 355, 356, are rolls 362, 363, which are journaled in suitable bearings. Between the rolls 355, 362, and the roll 160, there is a small yielding roll 364 which is pressed into engagement with the roll 160 by a spring-pressed pin 365. A similar roll 366 bears against the roll 353 under the pressure of a spring-pressed pin 368. As the blank travels with the roll 160 and is stripped therefrom by the stripper 351, it is fed by the nip of the rolls 160, 161, past the series of rolls into engagement with the large roll 353 until it is engaged in the nip of the rolls 352, 353, which feed it out of the machine. All of the various small rolls, such as those at 355, 356, 364, 362, 363 and 366, may be rubber shod or otherwise made of yielding material, and all are mounted to rotate loosely in their bearings, and, as stated, they serve to guide the skived blank to the action of the rolls 352, 353, so that the skived edges may be calendered or smoothed by the roll 352.

It is unnecessary to describe the operation of the entire machine as the operations of the several instrumentalities have been explained in connection with the description thereof. Briefly stated, all the operative has to do is to place a pile of blanks in the magazine and start the machine in operation. Thereafter the blanks are fed successively from the magazine and are skived, and skivings being removed automatically from the machine and the skived blanks being discharged by the rolls 352, 353. As the band knife becomes worn and its width is reduced, the operator adjusts the knife-carrying pulleys so as to move the knife forwardly, and also adjusts the wedges 219, 220 in the rear of that portion of the knife which is operating upon the work. In replacing one cavity roll 160 by another, it becomes necessary at times to adjust the roll rotatively relatively to its driving pinion 179 thereon. In such case, the screw 178 is loosened so as to permit the sleeves 164, 165 to be rotated relatively thereto to the desired extent, after which the screw 178 is again tightened. To assist the operator in making the proper adjustment, there is on the end of sleeve 165 a collar 369 which is keyed thereto and held in place by a washer 370, the collar intervening between the washer and the box 167 in which the sleeve 165 is journaled. This collar 369 is provided with a graduated scale 371 with which cooperates a pointer or index finger 372 secured to the box 167, as best shown in Figure 9.

From the foregoing it will be understood that, while I have described that form of machine which constitutes the best embodiment of the invention with which I am yet familiar, nevertheless various changes may be made in the several features of the machine without departing from the spirit and scope of the invention as defined in the claims. I have not attempted to illustrate or describe the necessary casings or housings that may be employed for covering the ex-

posed portion of the band knife or the gearing which is utilized in the machine, as the addition of the same is a matter of mere mechanical expediency, I have however, illustrated a removable housing or casing 373 which covers the main feed carriage and the parts cooperating therewith. This housing rests upon the guideways 271, as shown in Figures 3 and 4, and may be easily displaced for the adjustment of the feed fingers and of the positioning bars which are mounted on the main feed carriage. I have herein referred to the fact that the table 245, upon which the stack of blanks in the magazine rests, and over which each lowermost blank is fed by the feeding fingers, is provided with slots 246 to receive the feed fingers, and also with additional slots 247 through which the air may pass down through the slots to an air duct 248. I have also referred to the fact that a blower, not shown, is connected to the conduit 248 to exhaust the air therefrom. In addition to exhausting the skivings from the conduit 248, another function is performed by the employment of this conduit and an exhaust or vacuum fan. As the blanks are cut from the sheet, there adhere to the blanks more or less dust, fine chips and the like, especially where the blanks are formed of a fibrous material impregnated or coated with a stiffening compound adapted to be made plastic by the application of heat. Dust therefore tends to accumulate on the table and to pass with the blanks through the skiving mechanism, and, when said blanks are subsequently ironed or calendered, the dust and chips are embedded therein. By providing the table with the slots 246 and 247, the rush of air through such slots carries with it the dust and chips so that the blanks are cleaned, as it were, prior to their delivery to the skiving mechanism. In addition, however, by the employment of a vacuum duct 248 and slots in the table, I provide means by which each blank is held flat upon the table. That is to say, there is sufficient suction to draw each blank down on the table and hold it flat thereagainst as it is being fed to the grip of the auxiliary feeding roll and the main rolls 160, 161. Thus, if the blanks are slightly concavo-convex, they are straightened out and laid flat, thereby avoiding the necessity of weighting the pile in the magazine.

Having thus explained the nature of my invention, without attempting to set forth all of the forms in which it may be made or all the modes of its use, what I claim is:—

1. A skiving machine comprising a pair of blank-feeding rolls of which one is recessed and the other yielding to force the blank into the recess, an endless band knife having its cutting edge parallel to and adjacent the nip of said rolls, actuating wheels for said knife having peripheral flanges for engaging the back edge of said knife, shafts on which said wheels are mounted, mechanism for simultaneously adjusting said shafts axially, and means by which a relative angular adjustment of said shafts may be secured.

2. A skiving machine comprising a pair of blank-feeding rolls of which one is recessed and the other yielding to force the blank into the recess, an endless band knife having its cutting edge parallel to and closely adjacent the nip of said rolls, actuating wheels for said knife having peripheral flanges for engaging the back edge of said knife, shafts on which said wheels are mounted, slides in which said shafts are respectively journalled, a cross shaft geared to said slides, and means for rotatively adadjusting said cross shaft.

3. A skiving machine comprising a pair of blank-feeding rolls of which one is recessed and the other yielding to force the blank into the recess, an endless band knife having its cutting edge parallel to and closely adjacent the nip of said rolls, actuating wheels for said knife having peripheral flanges for engaging the back edge of said knife, shafts on which said wheels are mounted, slides in which said shafts are respectively journalled, a cross shaft geared to said slides, and a manually adjustable shaft geared to said cross shaft.

4. A skiving machine comprising a pair of blank-feeding rolls of which one is recessed and the other yielding to force the blank into the recess, an endless band knife having its cutting edge parallel and closely adjacent the nip of said rolls, means for actuating said band knife, an inclined stationary support in the rear of the band knife, and a wedge abutment for the knife having its tapered portion arranged lengthwise thereof and located between the back edge of the knife and said stationary support, said abutment supporting the knife throughout substantially the entire length of its active portion.

5. In a skiving machine, a frame, a horizontally arranged endless band knife, wheels and shafts therefor mounted on the frame for supporting and operating said band knife, vertically movable slides supported by said frame, manually operated means for moving said slides, horizontally moving carriages slidably supported on said slides, manually operated means for moving said carriages, grinding wheels mounted on said carriages, and power transmitting mechanism for driving said grinding wheels.

6. A skiving machine comprising a work table, a band knife, a pair of coacting rolls, of which one is recessed and the other is yielding, for presenting blanks to said knife from said work table, a feeding roll located

over the table for presenting blanks therefrom to the nip of said rolls, pivoted arms for supporting said feeding roll and springs engaged with said arms for forcing said feeding roll toward the table.

7. A skiving machine comprising a work table, a band knife, a pair of coacting rolls, of which one is recessed and the other is yielding, for presenting blanks to said knife from said work table, a feeding roll located over the table for presenting blanks therefrom to the nip of said rolls, pivoted arms for supporting said feeding roll at their free ends, convex bearings for said feeding roll supported by said arms, and yielding means engaging each of said arms, and pressing said roll toward said table.

8. In a skiving machine, an endless band knife, a pair of coacting main rolls of which one is recessed for presenting blanks successively to said knife, means opposite one face of the knife for withdrawing the skived blanks, and means opposite the other face of the knife for receiving the skivings.

9. In a skiving machine an endless band knife, a pair of coacting main rolls of which one is recessed for presenting blanks successively to said knife, and a pair of rolls opposite one face of the knife for withdrawing the skived blanks.

10. In a skiving machine an endless band knife, a pair of coacting main rolls of which one is recessed for presenting blanks successively to said knife, a pair of rolls opposite one face of the knife for withdrawing the skived blanks, and a conduit opposite the other face of the knife for withdrawing the skivings.

11. In a skiving machine, a knife, a pair of coacting rolls for presenting blanks successively to said knife, a stationary slotted table for said blanks, feeding elements projectable through and movable in said slots for feeding blanks successively to said rolls, and a vacuum duct communicating with the slots in said table.

In testimony whereof I have affixed my signature.

ELMER E. LANE.