Sept. 26, 1950 R. W. HALL 2,524,013

LEATHER SKIVING MACHINE OR SPLITTER

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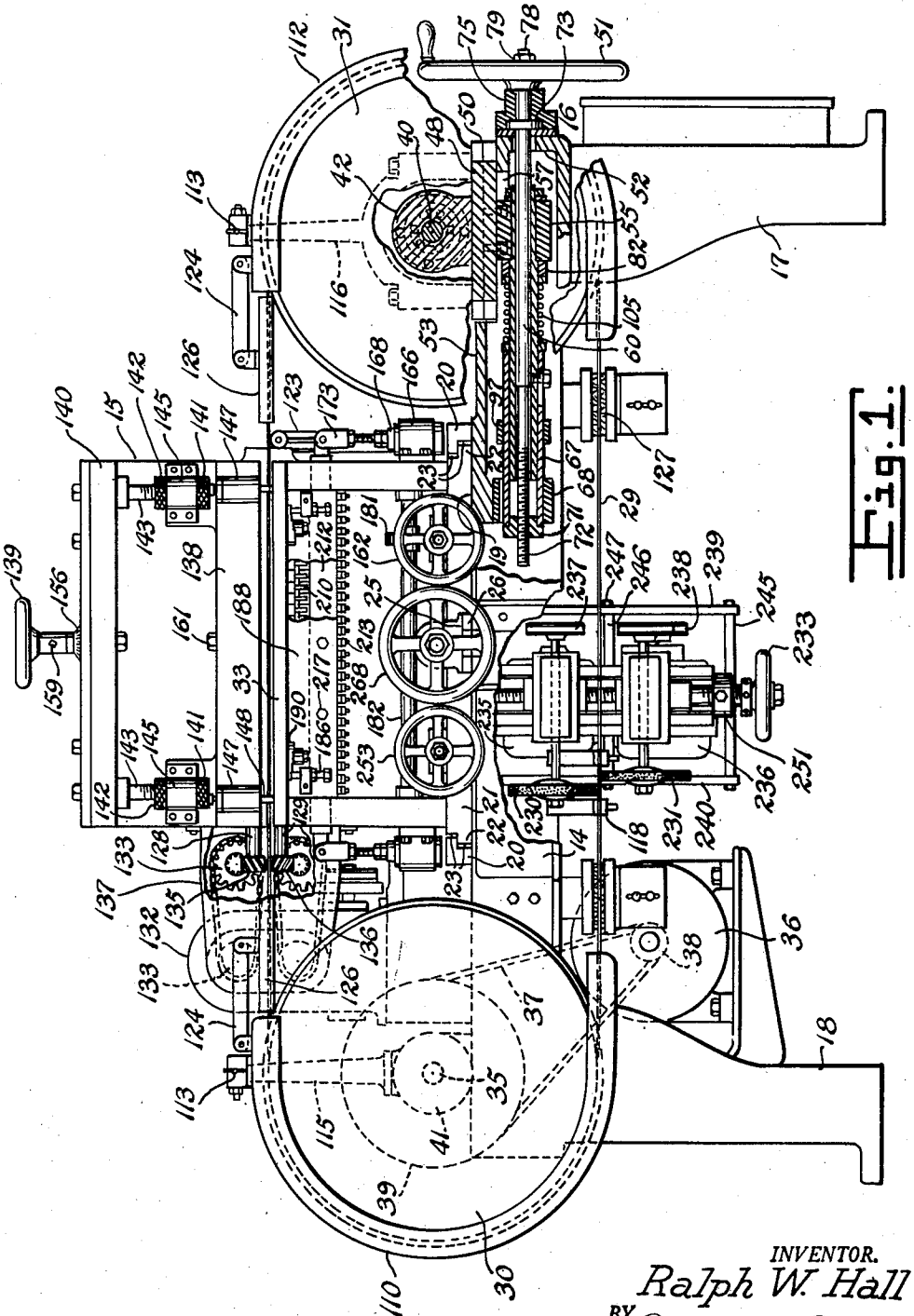


Fig. 1.

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Fig. 2.

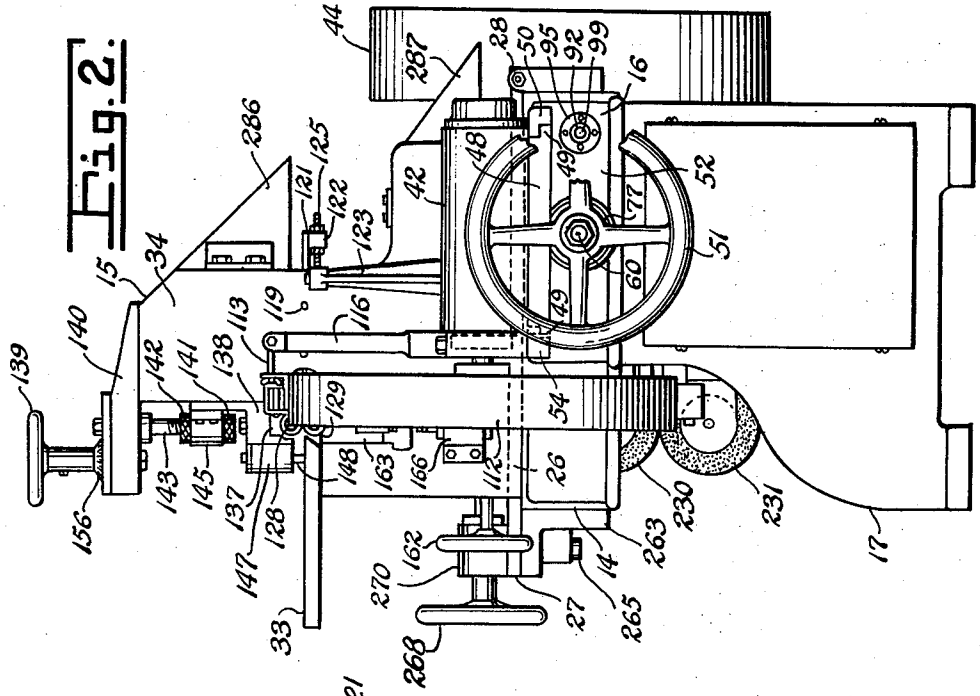
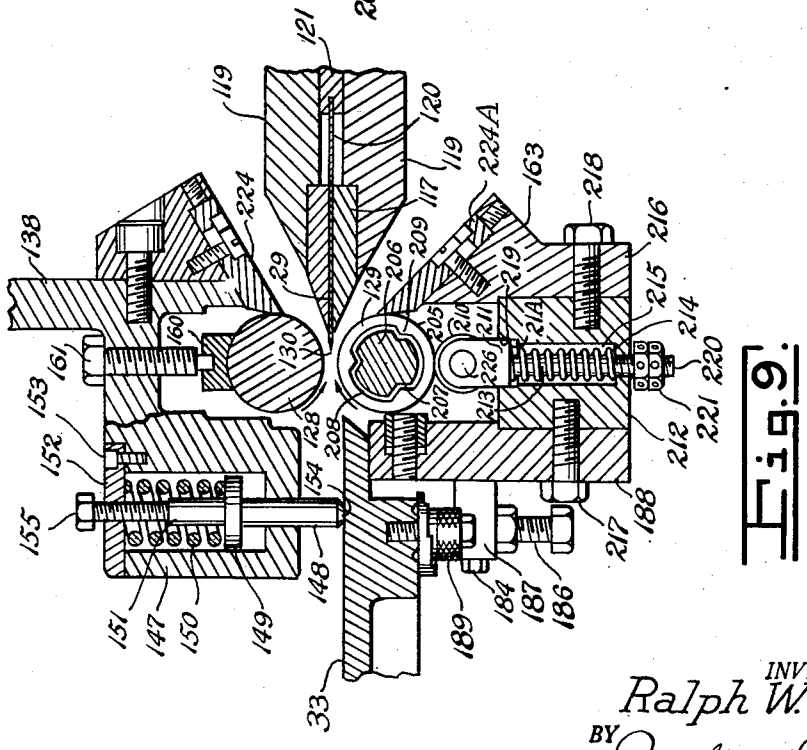


Fig. 9.



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LEATHER SKIVING MACHINE OR SPLITTER

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Fig. 15.

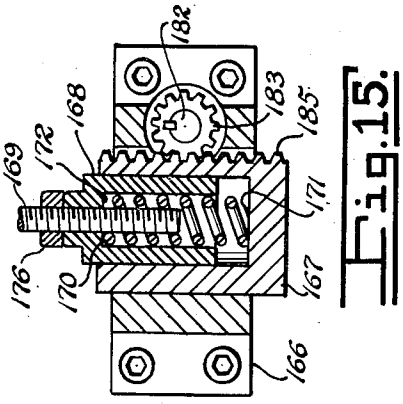
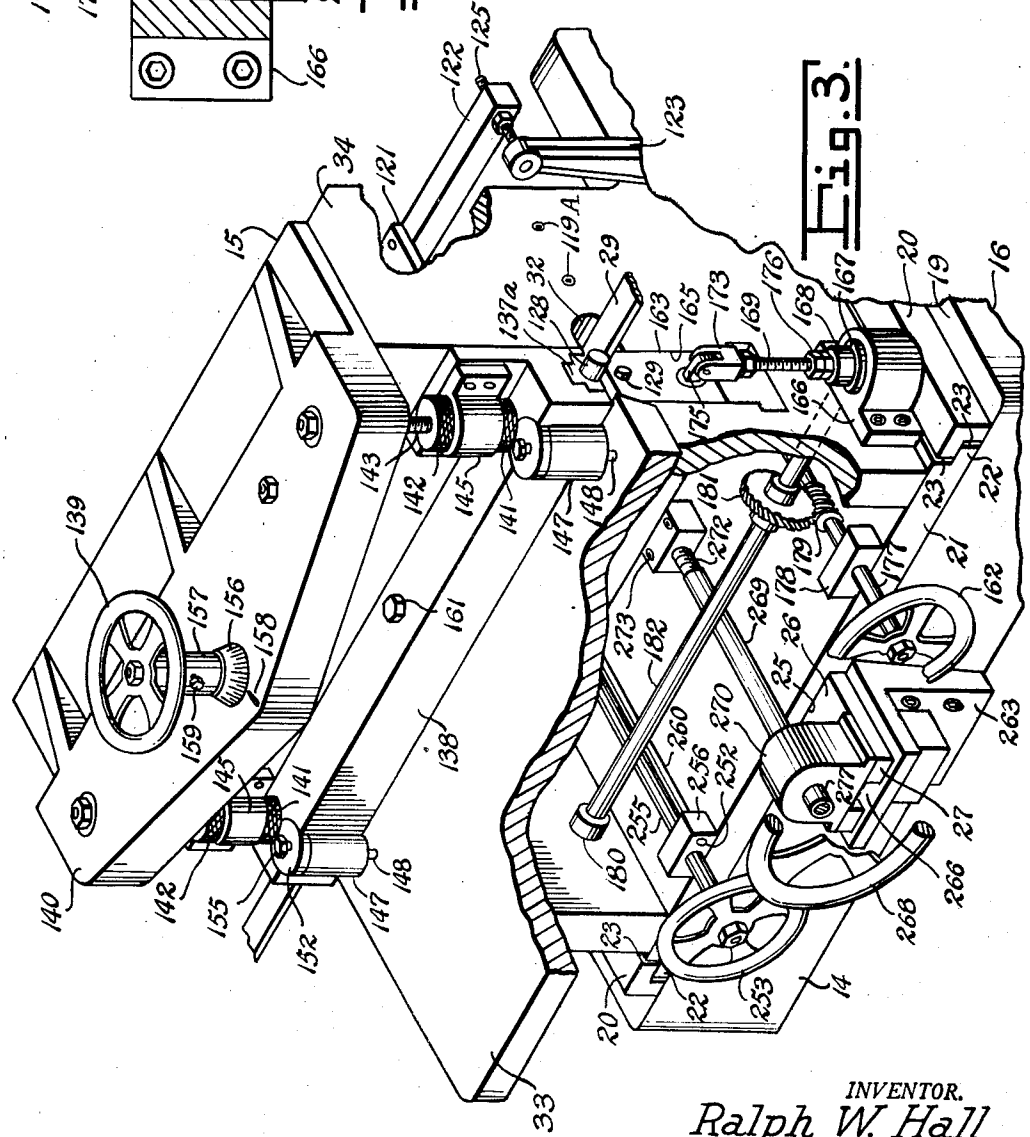


Fig. 3.



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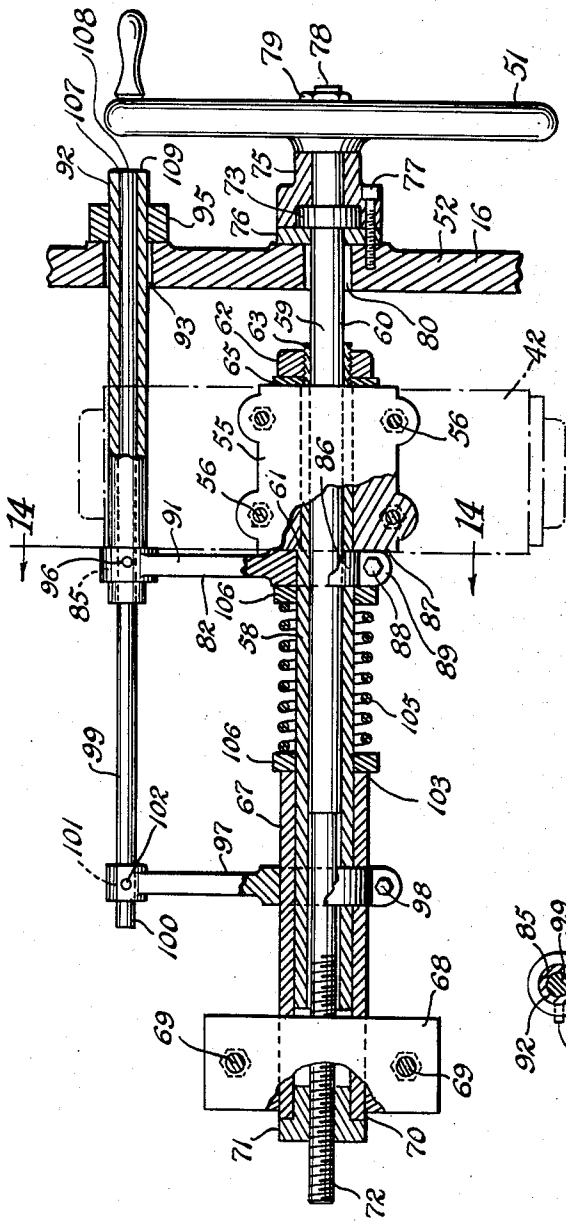


Fig. 4.

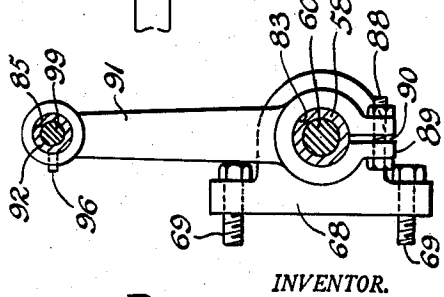


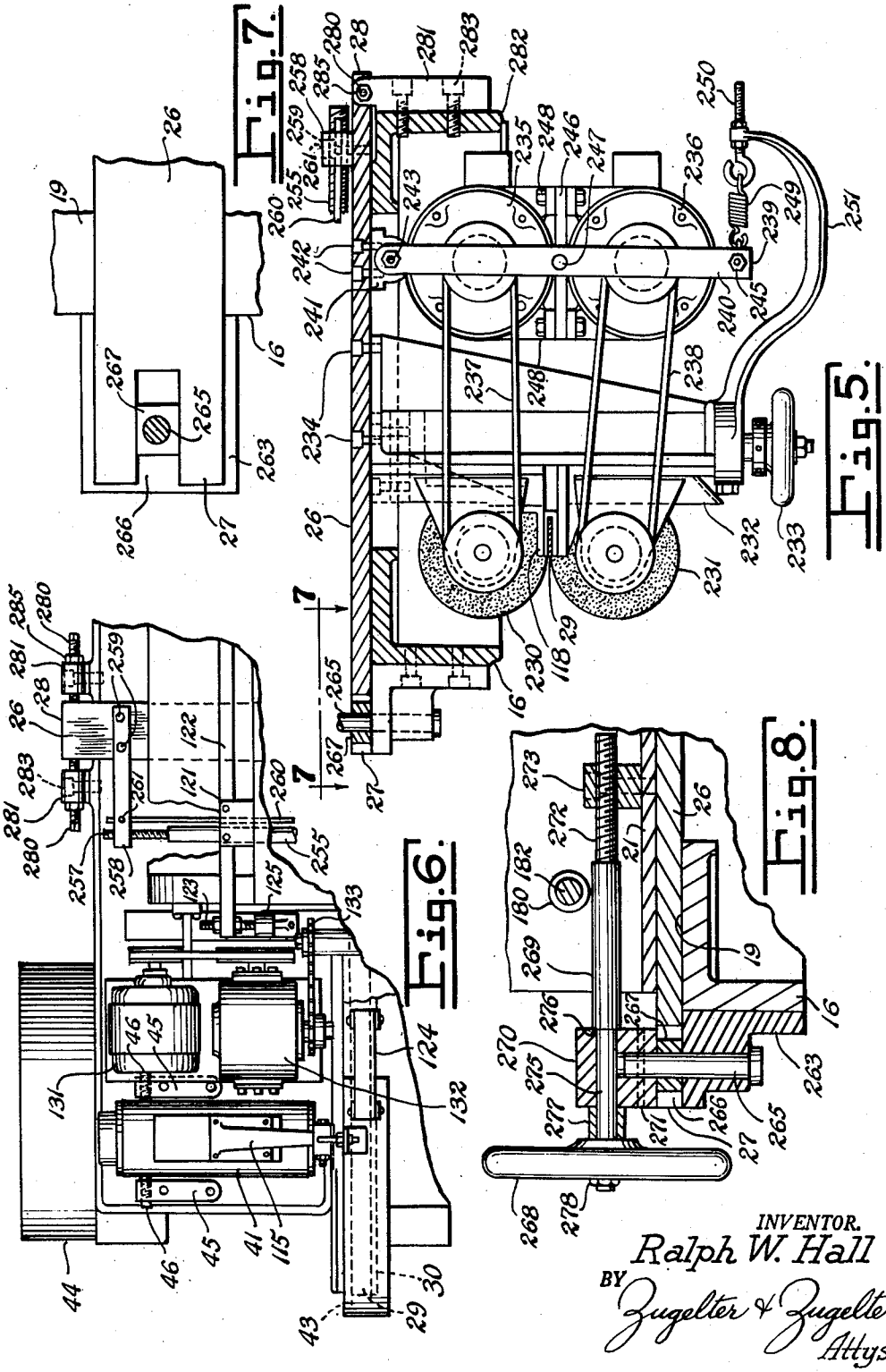
Fig. 14.

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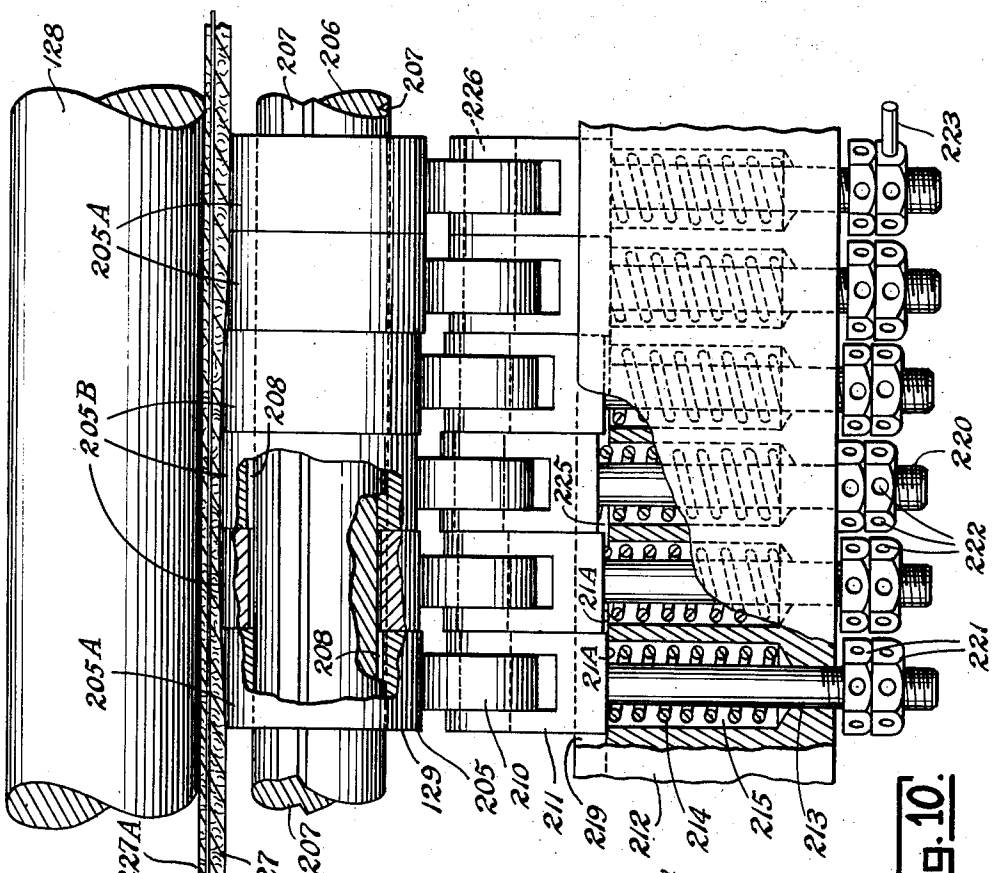


Fig. 10.

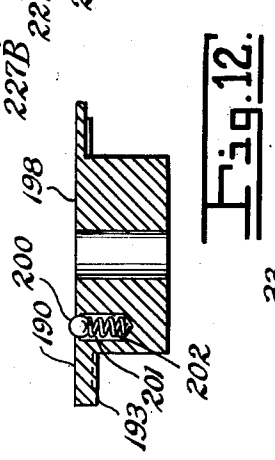


Fig. 12.

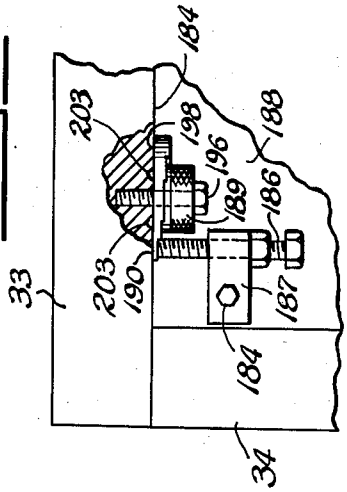


Fig. 13.

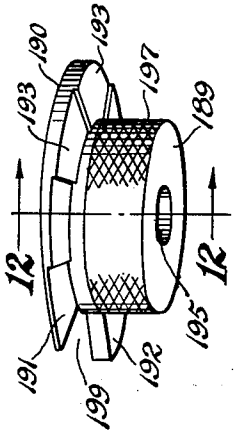


Fig. 11.

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UNITED STATES PATENT OFFICE

2,524,013

LEATHER SKIVING MACHINE OR SPLITTER

Ralph W. Hall, Cincinnati, Ohio, assignor to The Randall Company, Cincinnati, Ohio, a corporation of Ohio

Application July 19, 1947, Serial No. 762,177

9 Claims. (Cl. 69—10)

1

This invention relates to improvements in a leather skiving machine, splitter, or the like.

One object of the invention is the provision of means for gaging or indicating the proper tension of the skiving knife blade or band.

Another object of the invention is the provision of means for indicating the proper tension of skiving knives of varying lengths, said means requiring no adjustments after the completion of the initial assembly.

A further object is the provision of a roller construction whereby roller pressure upon a piece of leather of unequal thickness will be equalized as the skiving operation is performed.

Another object of the invention is the provision of an improved motor suspension whereby the belts of a pair of motor pulleys will automatically equalize their tension in driving a continuous grinding apparatus for the band knife.

Another object is the provision of means, in connection with the grinding wheels, for visually indicating the width of the ground bevel on the cutting edge of the skiving knife blade or band.

Another object is the provision of means for adjusting the head of the skiving machine in relation to the fixed path of the skiving knife, to obtain a square and accurate setting thereof.

Another object of the invention is the provision of means for gaging the maximum width of leather to be fed into the machine for skiving.

A further object is the provision of means for expeditiously adjusting the space between the knife blade and the pressure roller to accommodate a predetermined thickness of leather prior to the skiving operation.

Another object of the invention is the provision of means whereby the head of the machine may be swiveled in relation to the knife blade, making possible the skiving of two or more pieces of leather of different thicknesses at the same time, thus increasing the productivity of the device.

These and other objects and advantages are attained by the means described in the following specifications and illustrated upon the accompanying drawings, in which:

Fig. 1 is a front elevational view of the skiving machine embodying the improvements herein described, parts being broken away for clarity of illustration and description.

Fig. 2 is a side elevation of the skiving machine.

Fig. 3 is an enlarged fragmental perspective view of the swivel head, with parts broken away for clarity.

Fig. 4 is an enlarged cross sectional view of

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the skiving knife blade tensioning mechanism and knife tension indicator.

Fig. 5 is a cross-sectional view showing in side elevation the grinding wheel motor suspension.

Fig. 6 is a fragmental top view of the skiving machine, showing the bevel indicator arrangement and the means for adjusting the swivel plate.

Fig. 7 is an enlarged plan view taken on line 7—7 of Fig. 5, showing the construction of the swivel plate, and its relation to the swivel block and swivel pin.

Fig. 8 is a longitudinal cross-sectional view of the head control mounting means.

Fig. 9 is a transverse cross-sectional view of the roller assembly and knife support.

Fig. 10 is an enlarged fragmental view of the pressure roller assembly in elevation, with parts broken away for clarity of illustration.

Fig. 11 is an enlarged perspective view of a step flange collar used in spacing the pressure roller in relation to the skiving knife.

Fig. 12 is a cross-sectional view of the step flange collar taken on the line 12—12 of Fig. 11.

Fig. 13 is a fragmental view, partly in cross section, showing the application of the step flange collar in relation to the pressure roller setting screw.

Fig. 14 is a cross-sectional view slightly enlarged, taken on line 14—14 of Fig. 4.

Fig. 15 is a vertical cross-sectional view of the pressure roll spring mounting means.

Machines for skiving leather and kindred materials are in general usage for producing thin sheets employed in the manufacture of bill folds, bags and cases of various types, shoe parts, and many other articles of commerce incorporating thin flexible sheet leather and similar materials. Such machines heretofore have given notoriously poor service in the performance of their intended functions, due to their relative inflexibility of operation, their inability to process with equal effectiveness all grades or weights of raw material, and various other limitations most of which result from the varied nature of the materials to be processed. The limitations which impair the usefulness and efficiency of such machines are well known in the trade, and many efforts have been advanced in the past with the purpose of overcoming some of the difficulties, but the market still has been seeking a satisfactorily operative and serviceable machine which is capable of advanced universal usage and productiveness. The machine of the present invention has proven itself greatly superior to others hereto-

fore offered to industry, in its ability to process raw materials varying considerably as to weight, size, hardness, and uniformity of thickness, and in addition, provision has been made for maximum continuity of operation by reason of mechanical improvements, and the incorporation of means permitting a plurality of different skiving operations simultaneously. Various other advantages of merit in the improved machine will become manifest to those skilled in the art, as the description proceeds.

As exemplified in Fig. 1, the head, generally indicated by the character 15, is mounted on the bed 16, which in turn is supported by the legs 17 and 18. The head 15 rests directly upon the upper flat surface 19 of the forwardly extending central portion 14 of bed 16, being universally slidable thereon within defined limits. Clamp rails 20—20 are suitably secured to the upper flat bed surface 19, transversely thereon, one on each side of the head base plate 21. Each of the clamp rails 20 is provided with a rabbet, as shown, to slidably engage the tongues 22 of corresponding rabbets provided on the outer ends of the head base plate 21. The clamp rails serve to prevent vertical displacement of the head 15 from the bed 16 and to limit the swiveling movement of the head. The clamp rails 20—20 are set a sufficient distance from the head base plate 21 to provide spaces 23 therebetween, in order to permit limited swiveling or lateral movement of the head.

The lower face of the head base plate 21 is provided with a transverse groove 25 substantially on the median line of the base plate, into which is slidably disposed the swivel plate 26. This swivel plate, like the head base plate 21, also takes its bearing on the upper flat surface 19 of the bed 16, the swivel plate ends 27 and 28 extending substantially beyond the front and rear respectively, of the head base plate 21, as shown in Figs. 3 and 5. The swivel plate 26 is also slidable upon the upper flat surface 19 of the bed, means being provided for sliding the swivel plate independently of the head 15, as requirements demand in the operation and adjustment of the machine. The manner of swiveling the head and moving the head forwardly and rearwardly upon the bed will be hereinafter fully disclosed.

An endless band knife 29 (Fig. 1) tracks upon a pair of horizontally aligned coplanar rotating drums 30 and 31, mounted at opposite ends of the bed 16. The knife, on its upper run, passes through openings 32 (Fig. 3) provided in the head uprights 34 substantially centrally thereof, then passes under the forwardly extending central portion 14 of the bed 16 on its lower run. The knife 29 performs a splitting or skiving action on leather or other material as said material is fed into the machine from the feeding table 33. Drum 30, mounted on drum shaft 35, is driven by the motor 36 by means of the pulley belt 37 and pulleys 38 and 39. Drum 31, mounted on shaft 40, is free running, and is rotated by means of frictional engagement of the knife blade 29 with the two drums as drum 30 is rotated by the the motor 36. Drum shafts 35 and 40 are mounted for rotation in substantially parallel drum shaft housings 41 and 42 respectively, said shaft housings being swivel mounted upon the bed 16 adjacent the outer ends thereof. The pulley belt 37 and pulleys 38 and 39 may be protected by means of the belt guard 44.

Means may be provided for adjusting the knife blade 29 to track true upon the drums and against the drum flanges 43. Adjusting means in the exemplified form comprises a pair of blocks 45 (Fig. 6) secured at opposite sides of each drum shaft housing and near the outer end thereof. The blocks 45 are provided with tapped holes for the reception of set screws 46. Loosening either screw and tightening the other will swivel the housing about its pivot, the adjustment being completed when the knife tracks true upon the drum and against the flange 43. While Fig. 6 shows only the adjusting means for drum shaft housing 41, it is to be understood that similar adjusting means is provided for drum shaft housing 42 at the opposite end of the bed 16. The knife blade 29 always travels in a fixed path upon the drums 30 and 31 and through the head 15, regardless of the angularly swiveled position of the head 15 or the forward or rearward position of said head upon the bearing surface 19.

In performing the skiving or splitting operation upon leather or other material, the knife blade 29 must be set at the proper tension. It is also necessary, in order to prolong the life of the blade, to release the working tension of the knife when the machine is not in use, as overnight, for instance. It was formerly a matter of guess work to obtain the proper working tension at the beginning of each day's work, an operation which required an undue amount of time on the part of an inexperienced or unskilled operator. With the knife tension indicator about to be described, it is a simple matter for any operator, however inexperienced, to obtain the proper working tension of the knife blade 29, thus obviating the objections encountered in former skiving machines.

While the drum shaft housing 41 is fixed against further movement after the drum adjustment has been made as described in a preceding paragraph, the opposite drum shaft housing 42 is mounted for shifting movement upon the bed 16 for tensioning the knife blade 29. The base plate 48 of the drum shaft housing 42 (Fig. 2) is provided with a rabbet on the front and rear edges thereof, the tongues 49 of the rabbeted edges being slidably engaged by correspondingly rabbeted guide rails 50 and 54, longitudinally bolted or otherwise fixed to the bed 16, as shown. Mechanism for tensioning and untensioning the knife blade 29 and for indicating the proper working tension, shown clearly in Fig. 4, is actuated by rotating the hand wheel 51, the shaft of which extends through the side wall 52 of the bed 16.

Clearance is provided in the upper surface 53 (Fig. 1) of the bed 16 for the free reciprocal movement of the bored sleeve support 55, suitably attached to the drum shaft housing base 48, as by means of the bolts 56, said clearance being indicated at 57 in Fig. 1. The drum shaft housing 42, drum shaft 40, drum 31, and knife blade 29 are indicated by broken lines in Fig. 4. The sleeve support member 55 is rigidly secured to the inner telescoping sleeve 58 which takes a sliding fit on the large diameter 59 of the tension shaft 60. The sleeve support 55 abuts a shoulder 61 on the sleeve 58 and is confined thereon by means of a nut 62 screwed on the threaded end 63 of the sleeve. A lock washer 65 may be interposed between the end 66 of the sleeve support 55 and the nut 62. The outer telescoping sleeve 67 takes a sliding fit on the inner sleeve 58 and is supported at its outer end by the sleeve bearing 68 fixed to the under side of the bed 16 as by means

of bolts 69. The bearing 68, bored to receive the outer sleeve 67 in a sliding fit, is in axial alignment with the sleeve support 55, said alignment being substantially parallel to the travel of the band knife 29.

At the free end 70 of the sleeve 67 is disposed a nut 71, fixed thereto against rotation, as by means of screws, welds, or the like. The nut 71 receives the threaded end 72 of the tension shaft 60. This shaft is confined against longitudinal movement by means of a flange 73 provided near the outer end of the shaft and held against the outer face of the bed wall 52 by the shaft bearing 75 which is recessed to receive the flange 73. To receive the thrust of the shaft 60, a bored plate or washer 76 may be interposed between the outer face of the end wall 52 and the inner face of the shaft bearing 75, these two members being secured to the end wall 52 by means of screws 77. Keyed or otherwise fixed to the outer end 78 of the tension shaft 60 is the hand wheel 61, which may be secured against displacement by the nut 79. A clearance hole in the end wall 52, through which the tension shaft extends, is indicated at 80.

A tension indicator tube carrier 82 (Fig. 4) provided with a large split bore 83 (Fig. 14) is clamped to the inner telescoping sleeve 58. The clamp portion 86 of the tube carrier abuts the inner face 87 of the sleeve support 55. Clamping is obtained by tightening the screw 88 inserted through the apertured ears 89 of the tube carrier 82, the split being indicated at 90 in Fig. 14. The tube carrier arm 91 which extends laterally from the clamping portion 86 of the tube carrier 82 is provided at its outer end with a smaller bore 85, substantially parallel to the split bore 83, into which is inserted the tension indicator tube 92. This indicator tube extends through the clearance hole 93 in the end wall 52, and through the tube support 95, in which it takes a sliding fit, said tube support being secured to the end wall 52 by suitable means, such as screws or the like. The tube support 95, and the bore 85 in the indicator tube carrier 82, are, of course, in axial alignment. The indicator tube 92 is secured to the tube carrier 82 by means of the set screw 96, so that movement of the tube carrier 82 imparts the same movement to the indicator tube 92.

A tension indicator rod carrier 97, similar in construction to the tension indicator tube carrier 82, is clamped to the outer telescoping sleeve 67, substantially midway of the ends thereof, clamping being obtained by tightening the screw 98. The tension indicating rod 99, substantially longer than the tension indicating tube 92, takes a sliding fit through said tube. The end 100 of the indicating tube 99 is inserted through the bore 101 of the tension indicator rod carrier 97, and is secured therein by means of the set screw 102, so that movement of the indicator rod carrier 97 imparts the same movement to the indicator rod 99, which, as shown in Fig. 4, telescopes into the indicator tube 92. Between the tension indicator tube carrier 82 and the end 103 of the outer telescoping sleeve 67, and encircling the inner telescoping sleeve 58, is the compression spring 105. Washers 106 may be provided, against which the ends of the spring abut.

Thus it will be seen that as a clockwise rotation of the hand wheel 61 is initiated, through the threaded engagement of the tension shaft 60 with the nut 71, the first action is the movement of the outer telescoping sleeve 67 to the right, as viewed in Fig. 4, against the force of the spring

105. As the outer sleeve 67 is thus drawn to the right, telescoping on the inner sleeve 58, the clamped-on tension indicator rod carrier 97 also moves in the same direction, taking with it the tension indicator rod 99 which telescopes into the tension indicator tube 92. Continued clockwise rotation of the hand wheel 61 increases the compression of spring 105 against the tension indicator tube carrier 82 fixed to the inner telescoping sleeve 58, and in fixed relation to the drum shaft housing 42, moving the last named sleeve also to the right on the tension shaft 60. Since the drum shaft housing 42 is fixed to the inner telescoping sleeve 58 by means of the shaft housing base 48, and the sleeve support 55, movement of the inner telescoping sleeve 58 to the right takes with it the drum 31, upon which is tracked the band knife 29. As the compression on the spring 105 increases, the tension indicator tube carrier 82 moves the tension indicator tube 92 to the right through the tube support 95. While the tension indicator tube 92 is moving to the right, the tension indicator rod 99 is also moving in the same direction through said tube, but at a faster rate of travel. When the proper adjustment for the working tension for the band knife 29 has been established, the outer faces 108 and 109, respectively, of the tension indicator rod and tube will be in flush relation, as indicated at 107 in Fig. 4.

In setting up the knife tensioning mechanism, the set screws 96 and 102 on the tension indicator tube carrier 82 and the tension indicator rod carrier 97, respectively, are left unscrewed. The hand wheel 61 is then turned until the proper working tension is obtained on the band knife 29. When this has been definitely determined, the indicator tube 92 is positioned to protrude slightly outside the tube support 95 on the wall 52 of the bed 16, as indicated in Fig. 4. The tension indicator rod 99 is then positioned so that the end face 108 thereof is flush with the end face 109 of the tension indicator tube 92. The set screws 96 and 102 are then firmly tightened.

Thereafter, when the tension on the band knife is released, which should be done at the end of each day or whenever the machine is not in use, in order to prolong the life of the knife, the tension indicator tube 92 will recede into the tube support 95, and the tension indicator rod 99 will recede into the tube. It is then a simple matter to re-tension the knife 29 by turning the hand wheel clockwise until the end faces of the indicator rod and tube are flush, as at 107. If the rod protrudes beyond the tube, the tension on the knife is too great. In that case, the hand wheel is turned counter-clockwise to bring the rod end face flush with the tube end face. Thus it will be seen that even the most unskilled operator will be able to obtain quickly the correct working tension of the band knife by means of the tension indicator described above, without the use of guess work or an undue loss of time.

Since band knives vary slightly in length, and these knives must be replaced on the machine from time to time, as they become worn, it is essential that the tension indicator be equally effective on such knives of varying lengths. The design of the present invention positively assures this accurate gaging of the knife tension regardless of length variation which normal trade tolerances allow. The double action of the sleeve 67 compressed against the spring 105 and the said spring compressed against the drum shaft housing 42, with the associated indicator rod and tube,

as built into the present invention, never fails to give a correct reading of the band knife tension, regardless of normal variations in the lengths of such band knives.

As a protective measure, guards may be provided for the drums, such as indicated at 110 and 112 (Fig. 1). These drum guards, arcuate in form, are detachably supported by means of clamp screws 113 pivoted on the drum guard brackets 115 and 116, suitably mounted behind each drum. Drum guard support 115 may be mounted directly upon the drum shaft housing 41. However, in order to provide clearance for any slight movement of the drum shaft housing 42 necessary for tensioning and untensioning the band knife 29, the lower part of the drum guard support 116 may be bifurcate, as indicated in Fig. 1, the legs of the bifurcation spanning the said shaft housing and mounted upon the rabbeted guide rail 54, (Fig. 2).

The machine is provided with two sets of knife guides, one directly behind the feed rolls, as shown at 117 in Fig. 9, and the other at the grinding station, as indicated at 118 in Fig. 1. The knife guides 117 (Fig. 9) are mounted upon the knife guide supports 119, which in turn are supported between the head uprights 34 (Fig. 3) and held against displacement by means of the screws 119a. In order to preclude displacement and distortion of the knife when leather or the like is being fed to the said knife, a backing blade 120 is provided, which is supported by the plate 121 mounted upon an adjustable back bar 122, shown in Figs. 2, 3, and 6. The back bar is mounted on back bar supports 123 by means of adjusting screws 125. The knife guides 118 are mounted in suitable brackets depending from the bed 16 (Fig. 1).

Oil-moistened pads bear upon the upper run of the knife at each side of the head 15, as at 126 (Fig. 1) while the lower run of the knife passes through oil soaked pads 127, depending from the bed 16 and disposed on each side of the grinding station, the purpose of these pads being to remove dust particles and other extraneous matter which might interfere with efficient operation of the machine. The oil pads 126 are mounted on the drum guards by means of pivoted links 124.

A pair of vertically aligned parallel feed rolls 128 and 129 are horizontally mounted in the head 15 (Fig. 9) and rotated in opposite directions toward the beveled forward edge 130 of the knife 29, said rolls being driven by means of the motor 131 (Fig. 6) and gear box 132 through the sprockets 133 and the right and left hand spiral gears 135 and 136 (Fig. 1) keyed to the rolls 128 and 129, respectively. A sprocket guard is indicated at 137.

The upper feed roll 128 is called the gauge roll because it controls the thickness of the split of leather. This roll, which may be solid, is journaled in bearings 131a (Fig. 3) mounted in the vertically adjustable gauge roll carriage 138 mounted upon the head, the up and down movement of which is controlled by the hand wheel 139 centrally disposed upon the sprocket housing 140 atop the head 15. Within the housing is a chain and sprocket mechanism for rotating in unison the screws 143 which elevate and lower the gauge roll carriage 138. Adjusting means for aligning the gauge roll in parallelism with the band knife 29 are indicated as adjusting collars 142 threaded upon the screws 143 and locked by the lock nuts 141 when the proper adjustment has been made by rotating the collars within the smoothly bored brackets 145 fixed to the carriage.

The gauge roll carriage 138 is also provided with pressure pin limit gauges (Fig. 9), one at each end of said carriage. An extension or boss 147, which may be integral with carriage 138, is bored and counterbored to receive the vertical pressure pin 148 having an enlarged flange portion 149 against which the coil spring 150 abuts, as shown in Fig. 9. The pressure pin 148 is also provided with an upper shank 151 encircled by the compression spring 150. The spring is confined against displacement by the cover plate 152, held in place by means of screws, such as 153. Means for setting the pressure pin to limit the downward movement of the gauge roll carriage 138 may be provided, such as the set screw 155, in threaded engagement with a tapped hole in the cover plate 152. The spring 150 constantly urges the lower face 154 of the pressure pin into contact with the feeding table 33. By means of the set screw 155, the end of which abuts the upper face of the pin shank portion 151, the pressure pin 148 may be set to the point where the minimum working space between the gauge roll 128 and the cutting edge of the knife 29 is obtained. Thus, on rotating the hand wheel 139 atop the head 15, maximum downward movement of the carriage and gauge roll is reached when the pressure pin 148 strikes the set screw 155, eliminating the danger of the gauge roll 128 coming into contact with the rotating band knife 29.

The shaft of the hand wheel 139 is provided with a calibrated dial 156 (Fig. 3), mounted upon a sleeve 157 rotatable on said shaft. A pointer or mark 158, on top of the sprocket housing 140 adjacent the calibrated dial, is used in setting the gauge roll 128 for different thicknesses of leather splits. The sleeve 157 may be provided with a lock screw 159 for locking the calibrated dial to the hand wheel shaft when said dial reads zero in relation to the pointer or mark 158. When the gauge roll 128 is set at zero, as explained above, the pressure pins 148 will be in contact with the upper surface of the feeding table 33, and a thin split of leather will result. If a heavier split of leather is desired, the hand wheel 139 is rotated to elevate the gauge roll 128 the desired distance from the blade 29, the calibrations on the dial 156 determining the desired thickness of the split. When the gauge roll is so elevated, the springs 150 will urge the pressure pin 148 into contact with the feeding table 33.

In addition to limiting the downward movement of the carriage 138 with its associated gauge roll 128, the pressure pins 148 serve to act as limit means for determining the maximum width of leather sheet which may be fed into the machine, said pins being spaced in correspondency with the maximum working length of the feed rolls 128 and 129.

In order to prevent upward distortion or bowing of the gauge roll as leather is fed to the knife, an elongated reinforcing means or bar may be provided, such as shown at 160 in Fig. 9. A screw 161 serves to adjust the reinforcing member 160. With the gauge roll 128 thus reinforced against upward distortion or bowing, a uniform thickness of the leather split is assured as leather is fed to the knife 29.

The lower feed roll 129 is called the pressure roll and is yieldably mounted on springs at opposite sides of the head 15, the amount of spring pressure being controlled by the hand wheel 162.

Fig. 3. As shown in Fig. 1, the pressure roll 129 is driven by means of spiral gear 136, said roll being journaled in the pressure roll assembly, generally indicated by the symbol 163 (Figs. 3 and 9). The pressure roll assembly is slidably mounted in the vertical slideways 165 provided in the head uprights 34. A plunger guide 166, bored for slidably receiving the plunger housing 167, is secured to each outer face of the head uprights 34, as indicated in Fig. 3. The cylindrical plunger housing 167 is bored for receiving the plunger 168 (Fig. 15) which is tapped for threadedly engaging the lower end of the stud 169 and counterbored for receiving the compression spring 170. As will be noted in Fig. 15, the spring 170 is confined within the plunger 168 and the plunger housing 167 by abutment with bottom 171 of the plunger housing bore and the shoulder 172 of the plunger counterbore. The upper end of the stud 169 is in engagement with the clevis 173 (Fig. 3) which in turn supports the pressure roller assembly 163 by engaging the laterally extending arm 175 thereof. Means for locking any adjustments made upon the pressure roll spring mount may be provided, such as the lock nut 176 on the stud 169.

As hereinbefore stated, the spring pressure of the pressure roll 129 is controlled by the hand wheel 162, which is keyed to a shaft 177 suitably journaled in bearing blocks, one of which is shown at 178 in Fig. 3. Keyed to the shaft 177 is the worm 179 which meshes with the worm gear 181 keyed to a longitudinal shaft 182 journaled in and extending through the head uprights 34, a bearing being shown at 180. Keyed to each outer end of the longitudinal shaft 182 is a pinion 183 (Fig. 15), the teeth of which engage the rack teeth 185 provided on the outer diameter of the plunger housing 167.

Thus it will be seen that rotation of the hand wheel 162 will act to elevate and lower the pressure roll assembly 163 in the vertical slideways 165.

Means for limiting the upward travel of the pressure roll assembly may be provided, such as the adjusting screws 186, shown in Figs. 1 and 13. A block 187 is suitably fixed, as by means of the screw 184, to each end of the front plate 188 of the pressure roll assembly, said blocks being tapped for the reception of the adjusting screws 186. By means of these adjusting screws, the ends of which abut the under surface 184 of the feeding table 33, the lower pressure roll 129 is prevented from coming into contact with the knife 29 as the pressure roll assembly is elevated. The adjusting screws 186 may be set to receive the minimum thickness of leather fed to the feed rolls.

In order to eliminate guess work and the necessity of re-setting the adjusting screws 129 each time a different thickness of leather is fed to the knife, means for quickly and positively setting the pressure roll 129 may be provided. A step flange collar 189, shown in perspective in Fig. 11, is envisioned for accomplishing this object. The flange 190 of the collar is provided with a series of sector-like steps 193, as shown, the flange becoming progressively thicker with each sector, beginning with the thinnest sector 191 and ending with the heaviest sector 192. The step flange collar 189 is centrally apertured, as at 195, for rotatably mounting same upon the under surface 184 of the feeding table 33, the mounting means being a stud or screw 196, shown in Fig. 13. The collar diameter may be knurled, as at 197, to provide finger gripping means in rotating the collar, said collar being mounted with the upper face 198 thereof in abutment with the under surface 184 of the feeding table 33, in a position whereby the end face of the adjusting screw 186 will contact the substantial median radius of the flange steps 193. A blank or cut-out sector 199 may be provided between the steps or sectors 191 and 192 in order to permit the adjusting screw 186 to directly contact the under surface 184 of the feeding table when the pressure roll 129 is set for the minimum thickness of leather.

Thus it will be seen that it is an easy matter to adapt the pressure roll to various thicknesses of leather by the simple expedient of lowering the pressure roll assembly 163 by means of the hand wheel 162, manually rotating the step flange collars 189 until a predetermined step or sector thickness reaches a point above the adjusting screws 186, and then elevating the pressure roll assembly until the adjusting screws contact the step flange collar 189.

Means for positioning each step or sector substantially centrally of the adjusting screws 186 may be provided, such as the ball 200 peened into a pocket 201 of the collar 189, and backed by the spring 202, the ball being urged by the spring into one of a series of sockets 203 radially disposed upon the under surface of the feeding table 33 in alignment with the steps or sectors 193.

When the pressure roll assembly 163 has been elevated to the point where the adjusting screws 186 contact the feeding table under surface 184 or a step 193 of the flange collar, as the case may be, the hand wheel 162 is given approximately two full turns for the proper working compression of the springs 170 in the plunger housing 167. This compression, of course, may be varied to suit the individual requirements of various types and textures of leather.

In order to compensate for variations of thickness in a piece of leather being fed to the knife, novel compensating means have been provided, as illustrated in Figs. 9 and 10. It will be noted that the pressure roll 129 comprises a plurality of collars 205, each independently yieldable vertically, the collars being mounted upon a roll shaft 206, said shaft being provided with longitudinal grooves 207, which may be substantially V-shaped, as shown in Fig. 9. The inner diameter of the collars is substantially the same in configuration as the outer diameter of the roll shaft 206, but substantially larger in size, to permit vertical movement of the collars upon said shaft. The space between the collars and shaft is indicated at 208. The engagement of the inwardly projecting V-shaped lugs 209 in the collars 205 with the corresponding U-shaped grooves 207 on the roll shaft 206 assures rotation of said collars with rotation of said shaft.

The pressure roll collars 205 are independently urged upwardly by means of frictionally rotatable rollers 210 mounted in spring loaded clevises 211, said rollers being at all times in contact with the roll collars 205, as illustrated, the rollers 210 and the clevises 211 being equal in number to the pressure roll collars 205. As shown in Fig. 9, the clevises are mounted in a clevis block 212, bored to receive the clevis shanks 213 and counterbored as at 215 to receive the springs 214 in encircled relation with the clevis shanks 213.

As illustrated in Fig. 9, the clevis block 212 is interposed between the pressure roll assembly

front plate 188 and back plate 216, said plates being detachably secured to the clevis block by means of the screws 217—218. For purposes of clarity, the front plate 188 is omitted from Fig. 10. A longitudinal slot 219 is machined in the clevis block 212, in alignment with the bores 215, the slot providing a seat for the clevises 211 when downward pressure is exerted upon them. The springs 214 are confined in the bores 215 by the clevises 211. The lower end of each clevis shank 213 is threaded as at 220, and threaded thereon is a pair of perforated jam nuts 221. Means for turning the contiguous pairs of nuts 221 upon the threaded clevis shanks have been provided by the perforations 222 in said nuts, the nuts being rotated by a rod, such as 223, inserted in said perforations. As will be noted in Fig. 10, the jam nuts are adjusted to provide a clearance 225 between the clevis 211 and the clevis block 212 when the clevises are urged upwardly by the springs 214. The clearance 225 is substantially equal to the clearance 208 between the roll shaft 206 and the collars 205. Clevis pins, upon which the small rollers 210 are mounted, are indicated at 226. Adjustable scraper plates 224 and 224A, suitably fixed to the gauge roll carriage 138 and the pressure roll assembly 163, respectively, as shown in Fig. 9, may be provided.

Fig. 10 clearly delineates the function of the pressure roll 129 on a piece of leather 227 being fed to the knife 29. Normally the leather, as it is gripped between the rotating feed rolls, will force the pressure roll collars 205 down upon the roll shaft 206, as shown by the collars 205A. If a thin section in the leather 227 is encounted by the pressure roll 129, the collars which are in contact with the thin portion will force the leather upward against the solid gauge roll 128 by the action of the springs 214, as indicated by the collars 205B in Fig. 10, thus assuring a split of leather of uniform thickness. It might be here stated that the upper or usable part of the skived leather is called the split, while the lower part is scrap or waste. In Fig. 10, the split and scrap are indicated by the symbols 227A and 227B, respectively.

From the foregoing, it will be understood that the arrangement of clevises disclosed herein relieves vital parts of the machine of undue and injurious strains that might otherwise spring the shaft, and particularly the roll shaft 206 which is made relatively light in order to keep the size of collars 205 within reasonable size limits. As previously stated, the collars all have a definite clearance for lateral displacement upon the shaft 206. This clearance is the same as the limit of reciprocation of the clevises. Thus, the lock nuts 221 are adjustable to preclude upward movement of the clevises beyond the free movement of the collars permitted by the collar clearance at the roll shaft 206, so that none of the force of springs 214 is available to arch the shaft upwardly intermediate its ends, when splitting thin leather or when the machine is running idle. Similarly, the shoulders 21A of all the clevises provide definite and substantial stops operative against the heavy rigid clevis block or bar 212, to limit the extent to which a thick or hardened workpiece might force the collars 205 downwardly, thereby avoiding depression of the collars beyond the downward limits established by the collar clearances at 225. Thus, there is no danger of collar shaft 206 being sprung or downwardly arched, by passing an unusually thick or hard workpiece through the machine.

In addition to the advantage of individually yieldingly mounted collars 205 forming the pressure roll 129, the entire pressure roll assembly 163 is yieldably mounted upon the spring loaded plungers 168, as hereinbefore recited and shown in Fig. 3. This pressure roll design assures efficient operation of the machine and a uniform quality of production.

For best results in leather skiving or splitting, the cutting edge of the band knife 29 must be kept keen at all times. For this purpose, grinding wheels 230 and 231 are provided, said wheels being individually motor driven to act upon the lower run of the rotating band knife, as illustrated in Fig. 5. The grinding wheels 230 and 231 are adjustably mounted in a suitable frame, generally indicated by the symbol 232, said frame being rigidly suspended from the swivel plate 26 and movable therewith. The screws for mounting the grinding wheel frame 232 to the swivel plate 26 are indicated at 234.

The grinding wheels are adjusted by means of the hand wheel 233, adjustments being required as the wheels become worn and for the initial setting of new wheels.

As shown, the grinding wheels are mounted to act on both sides of the blade simultaneously to provide a beveled cutting edge, both bevels being substantially equal to produce the best skiving results. These grinding wheels are always in light contact with the band knife when leather is being fed to the knife in order to maintain a keen edge thereon.

Novel means for mounting the motors and equalizing the tension on their respective driving belts have been provided. The motor 235 belt-drives the grinding wheel 230, while the motor 236 simultaneously drives the grinding wheel 231, their respective belts being shown at 237 and 238. As shown in Fig. 5, the motor mount 239, like the grinding wheel frame 232, is suspended from the swivel plate 26, but instead of being rigidly mounted, is pivotally mounted at 243.

Two substantially vertical bars 240, in spaced parallelism, pivotally depend as a cradle from the motor suspension bracket 241, said bracket being fixed to the swivel plate 26 by means of the screws 242, rearwardly of the grinding wheel frame 232. The pivot pin is indicated at 243, while a horizontal spacer bar, at the lower ends of the vertical bars 240, is shown at 245. Substantially midway of the pivot pin 243 and the spacer bar 245, and pivoted to the vertical bars 240 therebetween, is the substantially horizontal grinder motor mounting plate 246, the pivot thereof being shown at 247. Upstanding on the pivoted motor plate 246 is the motor 235, while in inverted position directly beneath it the companion motor 236 is mounted, the two motors being rigidly fixed to the pivoted motor plate by means of the screws 248. Proper tension on the motor belts 237 and 238 is maintained by means of the tension spring 249, one end of which is attached to the spacer bar 245, while the other end is engaged with the adjustable hook screw 250 disposed in the rearwardly extending tension spring supporting arm 251 fixed to the grinding wheel frame 232 adjacent its lower end.

The need for individual adjustment of the belts 237 and 238 has been eliminated, since tension of the belts is automatically equalized by the swivel action of the motor mounting plate 246. Thus if one belt is shorter than the other, the motor plate 246 will swivel to equalize the ten-

sion, the overall tension being achieved through the tension spring 249.

The knife guides 118, one of which is located at each side of the grinding station, support the knife while it is being ground by the grinding wheels 230 and 231, said guides being suitably fixed to the bed 16 in detachable relation to the grinding wheel frame 232.

As hereinbefore recited, the grinding wheels are adjustable to grind a bevel of substantially equal width on each side of the cutting edge of the knife. Means for indicating a standard bevel has been provided, as shown in Fig. 3, wherein the bevel indicator is depicted by the symbol 252. The width of the knife bevel is controlled by the hand wheel 253, keyed to a transverse bevel control shaft 255 having its front end rotatably mounted in the bevel indicator bearing block 256 fixed to the upper surface of the head base plate 21. The outer end 257 (Fig. 6) of the bevel control shaft 255 is threaded, and engages a tapped hole in the free end of a cross block 258 fixed to the upper face of the swivel plate 26, transversely thereof, by means of the screws 259.

Rotation of the hand wheel 253, therefore, will move the swivel plate 26 in the head base plate groove 25. Movement of the swivel plate 26, of course, also moves the grinding wheels and motors depending therefrom, but does not move the band knife 29, which travels in a fixed path. Such movement of the grinding wheels, accompanied by slight separation thereof incident to manipulation of handwheel 253, affects the length of the bevel on the knife blade. Counter-clockwise rotation of the hand wheel 253 shortens the bevel, while clockwise rotation lengthens it. Experience has proved that a bevel of approximately one-eighth of an inch in length is the most satisfactory for average work.

In order to definitely indicate the length of the bevel at all times, the bevel indicator 252 (Fig. 3) has been added to the bevel control means. This comprises a bevel indicator rod 260 having one end in slidable engagement with an aperture provided in the bevel indicator bearing block 256, and its opposite end adjustably fixed to the cross block 258 (Fig. 6) at the rear of the swivel plate 26, as by means of the set screw 261. As shown in Figs. 3 and 6, the indicator rod 260 is in parallel relation to the bevel control shaft 255.

In setting the bevel indicator, the grinding wheels are adjusted by rotating the bevel control hand wheel 253 to provide the desired bevel on the band knife, the set screw 261 in the cross block 256 being left untightened. When the desired bevel has been attained, the end face of the indicator rod 260 is brought flush with the outer face of the bevel indicator bearing block 256 and the set screw 261 tightened upon the opposite end of the bevel indicator rod in the cross block 258 at the rear of the machine.

Thus the bevel indicator may be set to indicate a bevel of substantially one-eighth inch in length upon the band knife cutting edge when the indicator rod end face is flush with the outer face of the bevel indicator bearing block 256. Thereafter, when the bevel control hand wheel 253 is rotated clockwise, the bevel indicator rod 260, in fixed relation to the grinding wheels, will recede into the bevel indicator bearing block 256, the depth of the recession equalling the increase in the length of the bevel. Conversely, counter-clockwise rotation of the hand wheel 253 will cause indicator rod 260 to protrude from the bevel indicator bearing block 256, the length of the protrusion indicating the decrease in the length of the bevel.

As hereinbefore recited, the head 15 is swivel mounted, making possible various adjustments heretofore unattainable in former leather skiving devices. Figs. 7 and 8 show the method of mounting the swivel head. Upon the front wall of the bed 16, substantially centrally thereof, is mounted a swivel bracket 263, vertically apertured to receive the swivel pin 265. The upper surface of the swivel bracket 263 is coplanar with the surface 19 of the bed 16 upon which the swivel plate 26 is disposed. As shown in Figs. 7 and 8, the forward end 27 of the swivel plate rests upon the upper surface of the swivel bracket. The forward end of the swivel plate is slotted, as at 266, to slidably engage the pivot block 267, said block being centrally apertured to rotatably receive the swivel pin 265. The pivot block is of substantially the same thickness as the swivel plate 26.

Forward and rearward movement of the head 15 upon the bed 16 is selectively controlled by means of the head control hand wheel 268, keyed to the shaft 269, said shaft being intermediate the shafts 177 and 255, and parallel therewith. The shaft 269, adjacent its outer end, takes a bearing in the head control bearing block 270, which is in fixed relation with the bed 16 by means of the swivel pin 265. As shown, the bearing block 270 is apertured to receive the upper end of the swivel pin 265 which extends upwardly through the swivel bracket 263 and the pivot block 267. The swivel pin 265 may be secured against displacement in the bearing block 270, as by means of the lock pin 271.

The inner end of the head control shaft 269 is threaded, as at 272, for engagement with the internal threads of a pull block 273 in fixed relation with the head 15, said pull block being in the form of a nut bolted or otherwise secured to the upper surface of the head base plate 21. Means for precluding the shifting of the shaft 269 in the bearing block 270 have been provided. A counterturned diameter 275 extends through the transversely apertured bearing block 270, the shoulder 276 on the shaft abutting the rear face of said block. Interposed between the front face of the bearing 270 and the hand wheel 268 upon the diameter 275, is a spacer collar 277, said hand wheel being held in abutment with the outer end face of said collar by means of the nut 278 turned upon the threaded outer end of the shaft 269.

Thus it will be seen that rotation of the hand wheel 268 transmits movement to the head 15 upon the bed surface 19 by reason of the threaded engagement of the shaft 269 with said head. When the head 15 is thus moved, the swivel plate 26 is also moved in unison, because of the fixed connection of the head 15 and the swivel plate 26 through the bevel control shaft 255. However, rotation of the bevel control hand wheel 253 will transmit motion to the swivel plate 26, but not to the head 15.

When the swivel plate 26 is moved, either independently of the head 15 or in association with the said head, it is guided in its transverse movement by the pivot block 267 which slidably engages the slot 266 in the forward end 27 of said swivel plate, and by the pair of opposed set screws 280, directed at the sides of the swivel plate, at the far end 28 of said swivel plate, as shown in

Figs. 5 and 6. These set screws 280 which control the alignment of the head 15, threadedly engage the vertical blocks 281 mounted upon the rear wall 282 of the bed 16 at opposite sides of the swivel plate 26, the mounting means of which may be screws 283. A slight clearance is maintained between the ends of the set screws 280 and the sides of swivel plate 26 to permit free slidable movement of said swivel plate between said set screws.

The head is swivel mounted to insure that the cutting edge of the band knife 29 is parallel with the center line of the feed rolls 128 and 129 for the full length of the rolls when the machine is set for splitting leather of substantially uniform thickness. Thus the head 15 may be swiveled to the right or left, as the case may be, in aligning the band knife with the feed rolls, by adjusting the set screws 280. After adjustments have been made, the set screws may be locked against rotation by means of the lock nuts 285.

If the operator desires to obtain splits of different thicknesses, the head may be swiveled, by means of the swivel plate adjusting screws 280, to obtain an unparallel or cocked relationship between the cutting edge of the band knife and the center line of the feed rolls. Such an adjustment produces a heavier split at one end of the feed rolls than at the other with the result that individual leather sheets may be fed simultaneously to the knife at both sides of the feeding table 33, making possible the production of several thicknesses of splits with one setting of the machine. Obviously this is an advantage in increasing the production of the operator.

A sheet of leather, on being fed to the machine, is gripped between the feed rolls 128 and 129, and forced against the cutting edge of the knife, being thereby divided into two thinner sheets. The upper or usable sheet, called the split, will be discharged into the top tray 286 (Fig. 2), while the lower or scrap sheet will be discharged into the bottom trap 287, both of said trays being at the rear of the machine, as shown.

As the knife blade 29 becomes worn, the head 15 may be retracted by means of the head control hand wheel 268 to compensate for the knife wear. When the knife blade is replaced with a new one, the head 15 will be brought forward to the original setting by the same means.

The machine constructed as disclosed herein is highly productive and will perform many operations which heretofore had to be assigned to other machines especially adapted for splitting different grades and weights of leather. Repeated handling of the products is thereby avoided, and the machine therefore is kept in continuous operation with a resultant saving of labor and operating expense. Various other advantages have been set forth previously herein, and still others will be evident to those skilled in the art.

It is to be understood that various modifications and changes in the structural details of the machine may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. In a material splitting machine, the combination of a bed, a head superposed upon the bed, a feed table attached to the head, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and supported upon the head, an upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, motion transmission means for elevating and lowering the carriage to vary the spacing of the feed rolls relatively, a vertically bored extension on the carriage overlying the feed table, a vertical pressure pin slidable in the bore of said extension and having an end extending downwardly therefrom into contact with the feed table, yielding means urging the end of the pressure pin against the feed table to urge the carriage and the upper feed roll toward an elevated position to overcome backlash in the motion transmission means, and a stop upon the pin to limit retractile movement of the pin in opposition to the force of the yielding means to preclude contact of the upper feed roll with the lower feed roll and with the band knife.

2. In a material splitting machine, the combination of a bed, a head superposed upon the bed, a feed table attached to the head, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and supported upon the head, an upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, motion transmitting means for elevating and lowering the carriage to vary the spacing of the feed rolls relatively, a vertically bored extension on the carriage overlying the feed table, a vertical pressure pin slidable in the bore of said extension and having an end extending downwardly therefrom into contact with the feed table, and yielding means urging the end of the pressure pin against the feed table to urge the carriage and the upper feed roll toward an elevated position to overcome backlash in the motion transmitting means.

3. In a material-splitting machine, the combination of a bed, a head superposed upon the bed, a feed table attached to the head, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and supported upon the head, an upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, motion transmission means for elevating and lowering the carriage to vary the spacing of the feed rolls relatively, a vertically bored extension on the carriage overlying the feed table, a vertical pressure pin slidable in the bore of said extension and having an end extending downwardly therefrom to contact the feed table, and yielding means constantly urging the end of the pressure pin into forceful contact with said table, thereby to constantly urge the carriage and the upper feed roll toward an elevated position to overcome backlash in the motion transmission means.

4. In a material-splitting machine, the combination of a bed, a head superposed upon the bed, a feed table attached to the head, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and supported upon the head, an upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, motion transmission means for elevating and lowering the carriage to vary the spacing of the feed rolls relatively, a vertically bore extension on the carriage overlying the feed table, a vertical pressure pin slidable in the bore of said extension and having an end extending downwardly therefrom to con-

tact the feed table, yielding means constantly urging the end of the pressure pin into forceful contact with said table, thereby to constantly urge the carriage and the upper feed roll toward an elevated position to overcome backlash in the motion transmission means, and adjustable stop means operative upon the pressure pin to limit retractile movement of the pin in opposition to the force of the yielding means aforesaid.

5. In a material-spliting machine, the combination of a bed, a head superposed upon the bed, a feed table attached to the head, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and supported upon the head, an upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, motion transmission means for elevating and lowering the carriage to vary the spacing of the feed rolls relatively, a vertically bored extension on the carriage overlying the feed table, a vertical pressure pin slidable in the bore of said extension and having an end extending downwardly therefrom to contact the feed table, yielding means constantly urging the end of the pressure pin into forceful contact with said table, thereby to constantly urge the carriage and the upper feed roll toward an elevated position to overcome backlash in the motion transmission means, and stop means operative upon the pressure pin to limit retractile movement of the pin in opposition to the force of the yielding means aforesaid.

6. In a material splitting machine, the combination of a stationary bed, a head superposed upon the bed, a carriage slidable upon the head toward and from the bed, a lower elongate feed roll journaled for rotation and supported upon the head, a driven upper elongate feed roll of substantially the same effective length as the lower feed roll, means rotatably supporting the upper feed roll upon the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, a motion transmitting train for elevating and lowering the carriage to vary the spacing between the feed rolls, a pair of pressure pins mounted upon the carriage for sliding vertical movement, said pins each having a lower end to contact a part of the head, the spacing between said pins being approximately equal to the effective length of the upper and lower rolls so as to limit the width of material insertable between the rolls, and yielding means constantly urging the lower ends of the pins into forceful contact with said part of the head in opposition to the lowering movement of the carriage imparted by the motion transmitting train.

7. In a material splitting machine, the combination of a stationary bed, a head superposed upon the bed, a carriage slidable upon the head toward and from the bed, a lower elongate feed roll journaled for rotation and supported upon the head, a driven upper elongate feed roll of substantially the same effective length as the lower feed roll, means rotatably supporting the upper feed roll upon the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, a motion transmitting train for elevating and lowering the carriage to vary the spacing between the feed rolls, a pair of pressure pins mounted upon the carriage for sliding vertical movement, said pins each having a lower end to contact a part of the head, the spacing between said pins being approximately equal to the effective length of the upper and lower rolls, so as to limit the width of material insertable between the rolls, yielding means constantly urging the lower ends of the pins into forceful contact with said part of the head in opposition to the lowering movement of the carriage imparted by the motion transmitting train, and means limiting said lowering movement of the carriage to preclude contact of the upper driven roll with the moving band knife.

8. In a material splitting machine, the combination of a stationary bed, a head normally stationary upon the bed in elevated position thereon, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and adjustably supported upon the head, a driven upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, a motion transmitting train for elevating and lowering the carriage to vary the spacing between the feed rolls, a pair of pressure pins mounted upon the carriage for sliding vertical movement, said pins each having a lower end to contact a part of the head, the pins being spaced apart a distance for limiting the width of material to be fed to the rolls, yielding means constantly urging the lower ends of the pins into forceful contact with said part of the head in opposition to the lowering movement of the carriage, and step means operated manually to establish the positions of adjustment of the lower feed roll relative to the upper feed roll.

9. In a material splitting machine, the combination of a stationary bed, a head normally stationary upon the bed in elevated position thereon, a carriage slidable upon the head toward and from the bed, a lower feed roll journaled for rotation and adjustably supported upon the head, a driven upper feed roll on the carriage, a continuously moving band knife having a section running in substantial parallelism with one of the feed rolls, a motion transmitting train for elevating and lowering the carriage to vary the spacing between the feed rolls, a pair of pressure pins mounted upon the carriage for sliding vertical movement, said pins each having a lower end to contact a part of the head, the pins being spaced apart a distance for limiting the width of material to be fed to the rolls, yielding means constantly urging the lower ends of the pins into forceful contact with said part of the head in opposition to the lowering movement of the carriage, means yieldingly advancing the lower feed roll toward the upper roll, and manually operative means determining a series of steps of advancement of said lower feed roll.

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