Sept. 26, 1950 R. W. HALL 2,524,015

LEATHER SKIVING MACHINE OR SPLITTER

Original Filed July 19, 1947 3 Sheets-Sheet 1

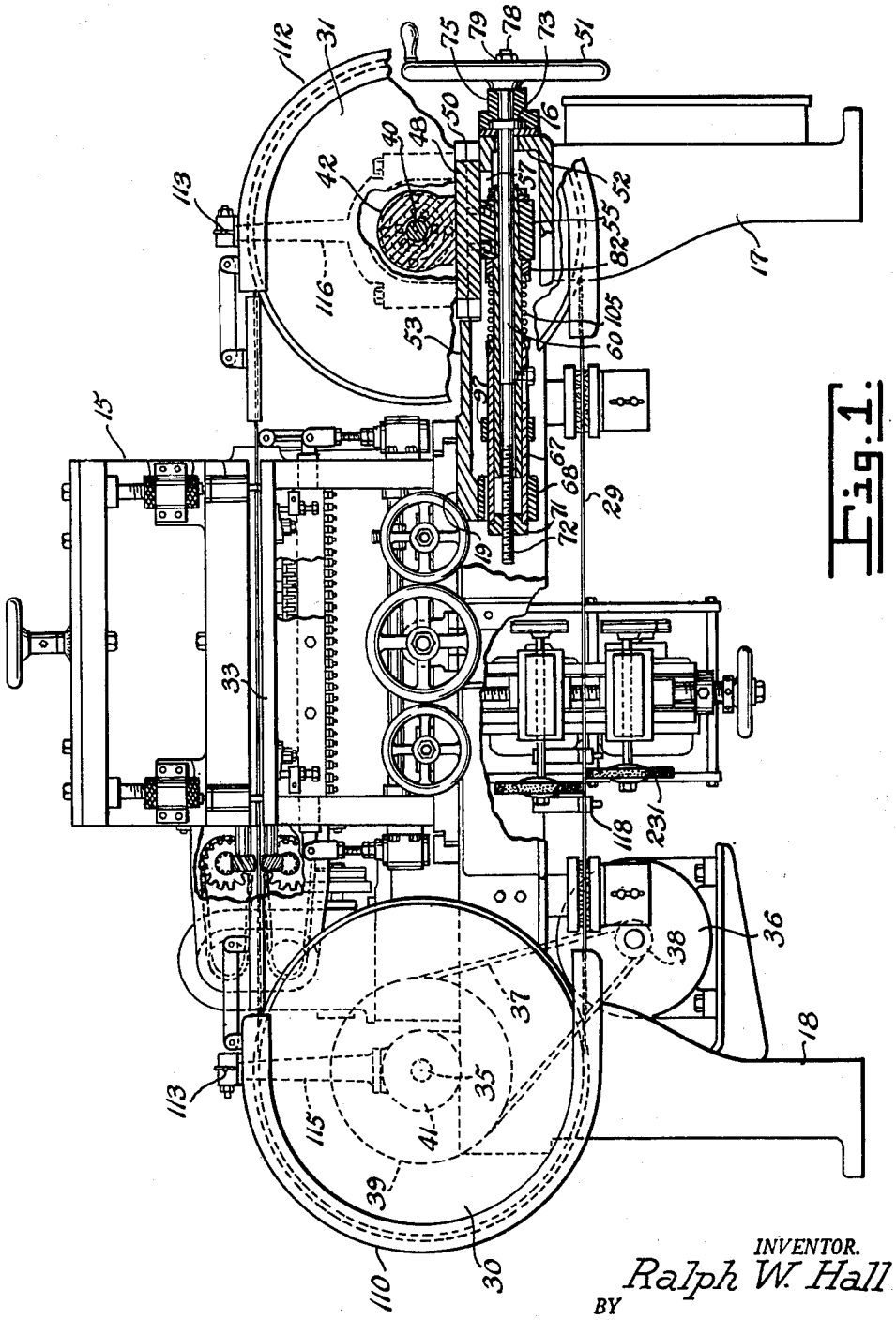

Fig. 1.

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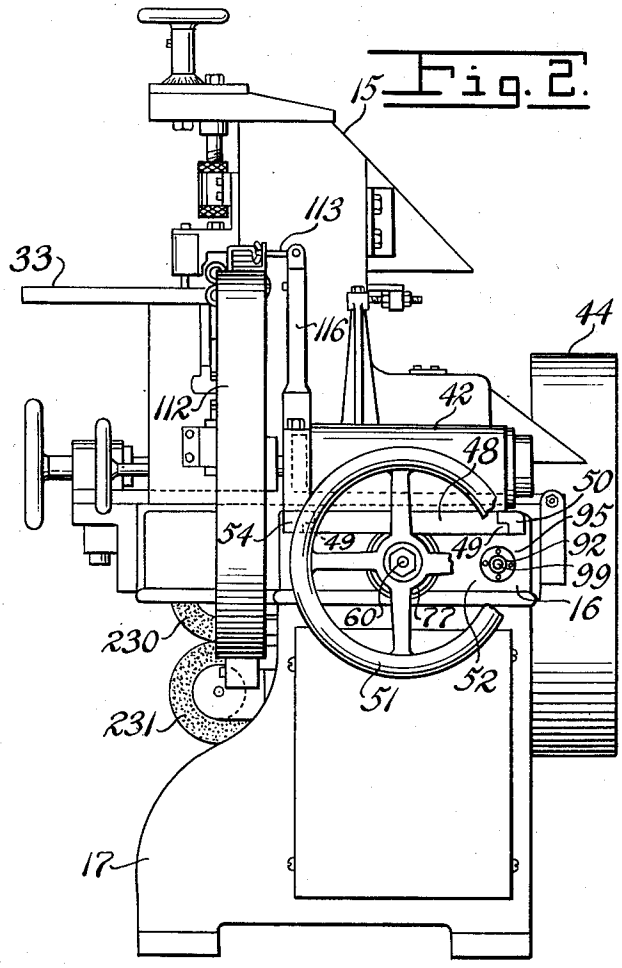
Original Filed July 19, 1947 3 Sheets-Sheet 2

Fig. 2.



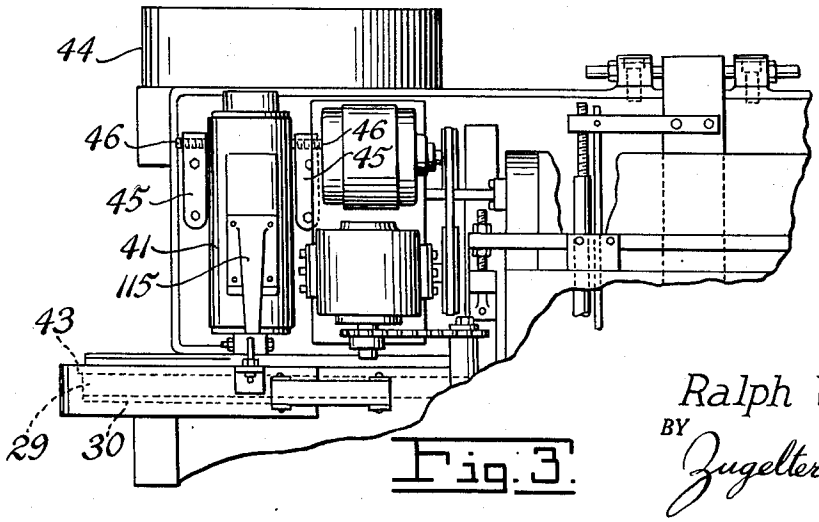


Fig. 3.

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Original Filed July 19, 1947 3 Sheets-Sheet 3

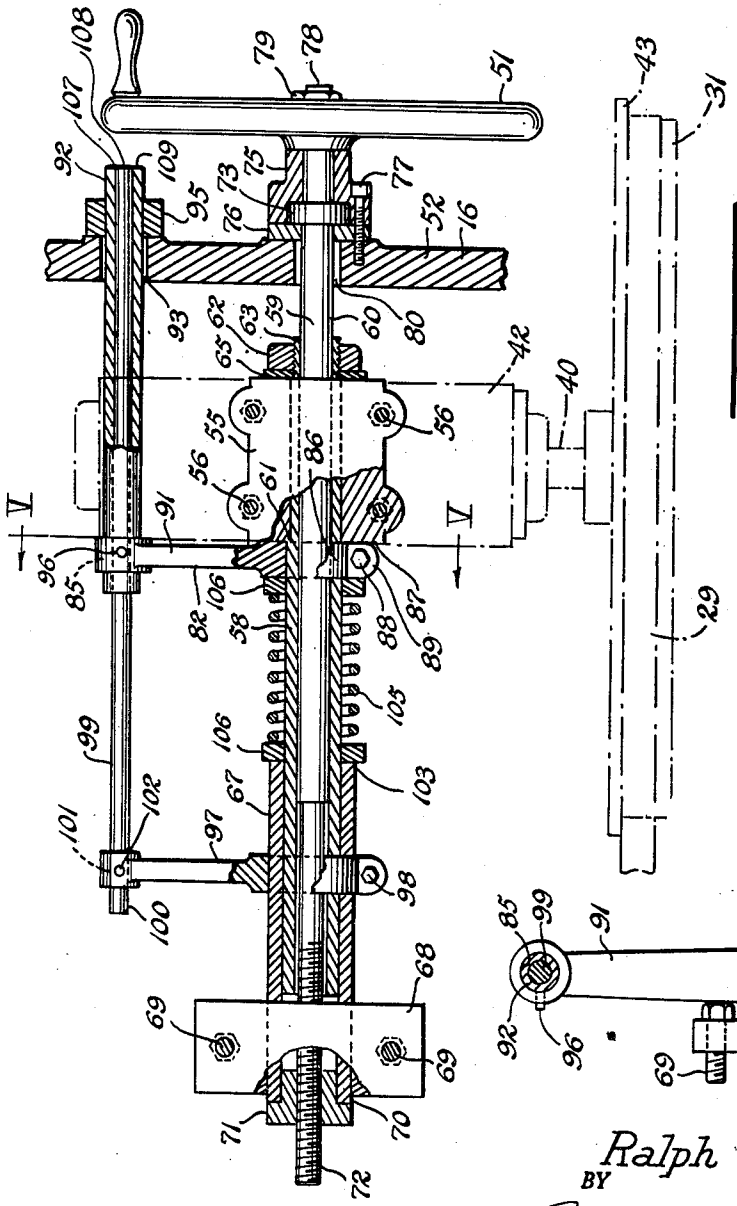

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

2,524,015

LEATHER SKIVING MACHINE OR SPLITTER

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Original application July 19, 1947, Serial No. 762,177. Divided and this application September 13, 1948, Serial No. 49,074

10 Claims. (Cl. 69—10)

1

This invention relates to improvements in a leather skiving machine, splitter, or the like. This application is a division of my pending application Serial No. 762,177 filed July 19, 1947.

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.

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 a fragmentary top plan view of the skiving machine.

Fig. 4 is an enlarged cross sectional view of the skiving knife blade tensioning mechanism and knife tension indicator.

Fig. 5 is a cross sectional view, slightly enlarged, taken along a line V—V in Fig. 4.

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 heretofore 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

2

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.

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 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 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. 3) 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. 3 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 51, 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. 5) 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. 5. 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 95, 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 51 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 51 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 51 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 esssential 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, and the other at the grinding station, as indicated at 118 in Fig. 1.

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. 1.

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 advantage 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 machine of the class described, a bed, a pair of coplanar knife supporting drums vertically mounted upon said bed, means for rotating said drums, an endless band knife spanning both drums for frictional rotation therewith, one of said drums being mounted in fixed relation to said bed, a base plate mounting the other of said drums for sliding movement toward and from said one drum, means in association with said base plate for tensioning and untensioning the knife blade, said means comprising a bored sleeve support fixed to the under surface of the base plate, a bored sleeve bearing fixed to the under surface of the bed, said support and bearing being in axial alignment, inner and outer telescoping sleeves, one end of the inner telescoping sleeve being received in the bore of the sleeve support and rigidly fixed thereto, the outer telescoping sleeve being slidable within the bore of the sleeve bearing, a rotatable shaft slidable within the inner telescoping sleeve, said shaft having one end rotatably mounted against longitudinal movement in a wall of the bed, and having its opposite end threaded and extending beyond the outer telescoping sleeve, a nut in engagement with said threaded shaft end, said nut being fixed to an end of the outer telescoping sleeve in axial alignment therewith, and a compression spring in encircling relation with the inner telescoping sleeve interposed between the sleeve support and the outer telescoping sleeve, and means in association with the tensioning means indicating a proper working tension of the knife blade.

2. In a material splitting machine, the combination of a bed, material feeding means supported upon the bed, a continuous band knife having a cutting edge to split the material advanced thereto by the feeding means, a pair of coplanar rotating drums supporting the continuous band knife, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, a bored support carrying the second bearing, and means slidably mounting the support upon the bed for movement toward and from the first mentioned bearing, an inner sleeve having an end fixed within the bore of the support, with the opposite end of the sleeve extending therefrom, a tension indicator tube carrier fixed relative to said sleeve support, a tension shaft rotatable within the inner sleeve and having one end

rotatably journaled in the bed against longitudinal movement, a screw thread on the opposite end of the tension shaft and extending beyond the inner sleeve, an outer sleeve slidably surrounding the inner sleeve and having an outer end, an internally threaded nut fixed to one end of the outer sleeve for engagement with the thread of the tension shaft, a spring yieldingly urging the outer sleeve in the direction of the extending end of the inner sleeve, a bored sleeve bearing slidably accommodating the outer sleeve and having fixed relation to the machine bed, a tension indicator rod extending in substantial parallelism with the tension shaft and having adjustable connection with the outer sleeve for movement therewith, said rod having an end visible exteriorly of the machine bed, and a tension indicator tube surrounding the indicator rod, said tube having connection with the tension indicator tube carrier aforesaid, for movement therewith, said tube having an end visible exteriorly of the machine bed and resting flush with the visible end of the indicator rod under predetermined tension of the band knife.

3. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, means slidably mounting the second bearing on the bed for movement toward and from the first mentioned bearing, a tension shaft having one end rotatably journaled in the bed against longitudinal movement, an operating handle on said shaft, a spring, means including a nut operative upon rotation of the tension shaft in one direction to impose the force of the spring against the second bearing in a direction to tension the continuous band cutter, a tension indicator rod movable with the nut, a tension indicator tube movable with the slidably mounted bearing, said rod being telescopically received in said tube, the rod and the tube having corresponding ends resting flush with one another under a given tension of the continuous band cutter.

4. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, means slidably mounting the second bearing on the bed for movement toward and from the first mentioned bearing, a tension shaft having one end rotatably journaled in the bed against longitudinal movement, an operating handle on said shaft, a spring, means including a nut operative upon rotation of the tension shaft in one direction to impose the force of the spring against the second bearing in a direction to tension the continuous band cutter, a pair of elongate tension indicating elements extending in a common direction substantially parallel to the tension shaft, means enforcing movement of one indicating element with the nut, and means enforcing movement of the other indicating element with the slidably mounted bearing, the length of said elements being gauged to effect registry of corresponding ends thereof at a given tension of the continuous band cutter.

5. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, means slidably mounting the second bearing on the bed for movement toward and from the first mentioned bearing, a tension shaft having one end rotatably journaled in the bed against longitudinal movement, an operating handle on said shaft, a spring, means including a nut operative upon rotation of the tension shaft in one direction to impose the force of the spring against the second bearing in a direction to tension the continuous band cutter, a pair of elongate tension indicating elements extending in a common direction substantially parallel to the tension shaft, means enforcing movement of one indicating element with the nut, and means enforcing movement of the other indicating element with the slidably mounted bearing, the length of said elements being gauged to effect registry of corresponding ends thereof at a given tension of the continuous band cutter, and means for independently varying the effective lengths of the indicating elements, to effect registry of their corresponding ends at different tensions of said cutter.

6. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, means slidably mounting the second bearing on the bed for movement toward and from the first mentioned bearing, a tension shaft having one end rotatably journaled in the bed against longitudinal movement, an operating handle on said shaft, a spring, means including a nut operative upon rotation of the tension shaft in one direction to impose the force of the spring against the second bearing in a direction to tension the continuous band cutter, a pair of elongate tension indicating elements extending in a common direction substantially parallel to the tension shaft, means enforcing movement of one indicating element with the nut, and means enforcing movement of the other indicating element with the slidably mounted bearing, the length of said elements being gauged to effect registry of corresponding ends thereof at a given tension of the continuous band cutter, and means for independently varying the effective lengths of the indicating elements, to effect registry of their corresponding ends at different tensions of said cutter, one of said indicating elements being telescopically slidable within the other.

7. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, means slidably mounting the second bearing on the bed for movement toward and from the first mentioned bearing, a tension shaft having one end rotatably journaled in the bed against longitudinal movement, an operating handle on said shaft, a spring, means including a nut operative upon rotation of the tension shaft in one direction to impose the force of the spring against the second bearing in a direction to tension the continuous band cutter, and a flush pin indicator associated with the nut and the slidably mounted bearing, for visually indicating a given tension of the continuous band cutter.

8. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a

bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, means slidably mounting the second bearing on the bed for movement toward and from the first mentioned bearing, a tension shaft having one end rotatably journaled in the bed against longitudinal movement, an operating handle on said shaft, a spring, means including a nut operative upon rotation of the tension shaft in one direction to impose the force of the spring against the second bearing in a direction to tension the continuous band cutter, and a flush pin indicator associated with the nut and the slidably mounted bearing, for visually indicating a given tension of the continuous band cutter, and means for coordinating the flush pin indicator to various band tension values.

9. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, a support carrying the second bearing, and means for slidably mounting the support upon the bed for movement toward and from the first mentioned bearing, an inner sleeve having an end fixed to said support, with the opposite end of the sleeve extending therefrom, a tension indicator tube carrier fixed relative to said support, a tension shaft rotatable within the inner sleeve and having one end rotatably journaled in the bed against longitudinal movement, a screw thread on the opposite end of the tension shaft and extending beyond the inner sleeve, an outer sleeve loosely surrounding the inner sleeve and having an outer end, an internally threaded nut fixed to one end of the outer sleeve for engagement with the thread of the tension shaft, a spring yieldingly urging the outer sleeve in the direction of the extending end of the inner sleeve, a pair of tension indicating elements extending in a common direction substantially parallel to the tension shaft, means enforcing movement of one indicating element with the outer sleeve, and means enforcing movement of the other indicating element with the slidably mounted bearing support, the length of said indicating elements being gauged to effect registry of corresponding ends

thereof at a given tension of the continuous band cutter.

10. A machine comprising in combination, a bed, a pair of coplanar rotating drums, a continuous band cutter trained over the drums, a bearing on the machine bed for rotatably mounting one of the drums, a second bearing for rotatably mounting the other drum, a support carrying the second bearing, and means for slidably mounting the support upon the bed for movement toward and from the first mentioned bearing, an inner sleeve having an end fixed to said support, with the opposite end of the sleeve extending therefrom, a tension indicator tube carrier fixed relative to said support, a tension shaft rotatable within the inner sleeve and having one end rotatably journaled in the bed against longitudinal movement, a screw thread on the opposite end of the tension shaft and extending beyond the inner sleeve, an outer sleeve loosely surrounding the inner sleeve and having an outer end, an internally threaded nut fixed to one end of the outer sleeve for engagement with the thread of the tension shaft, a spring yieldingly urging the outer sleeve in the direction of the extending end of the inner sleeve, a tension indicator rod extending in substantial parallelism with the tension shaft and having adjustable connection with the outer sleeve for movement therewith, said rod having an end visible exteriorly of the machine bed, and a tension indicator tube loosely surrounding the indicator rod, and connected with the aforesaid tension indicator tube carrier for movement therewith, said tube having an end resting flush with the visible end of the indicator rod at a given tension of the band cutter.

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