

Dec. 17, 1957

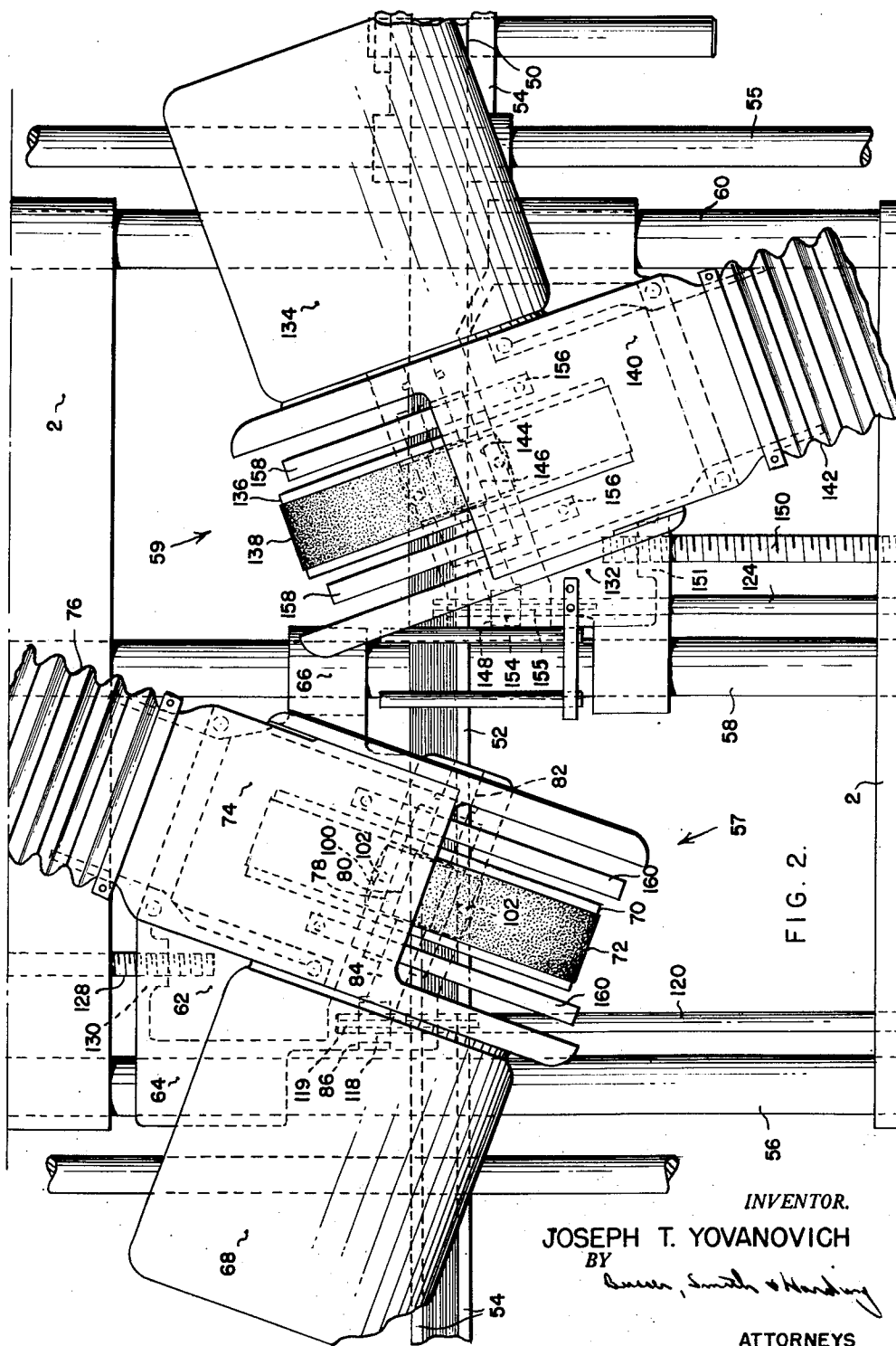
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2,816,400

SKIVING APPARATUS

Filed April 15, 1955

3 Sheets-Sheet 2



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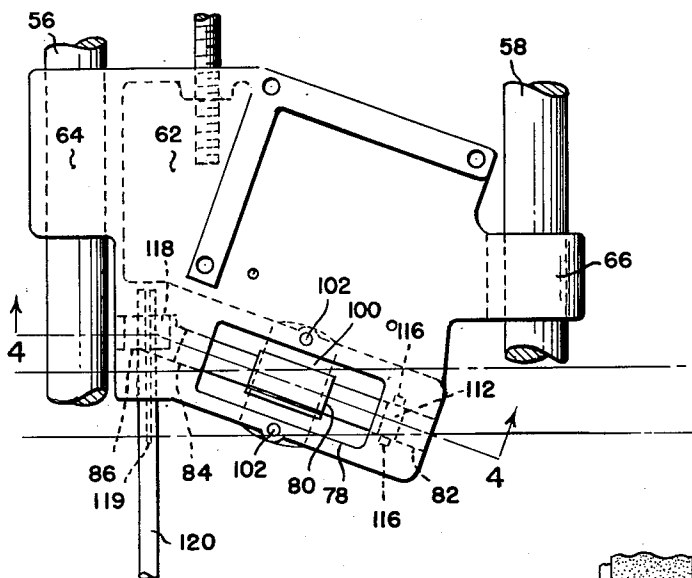


FIG. 3.

FIG. 4.

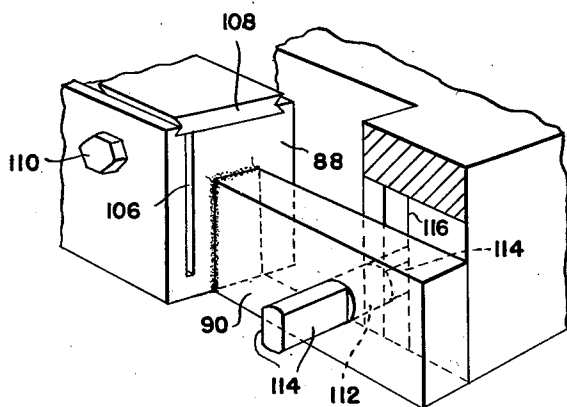
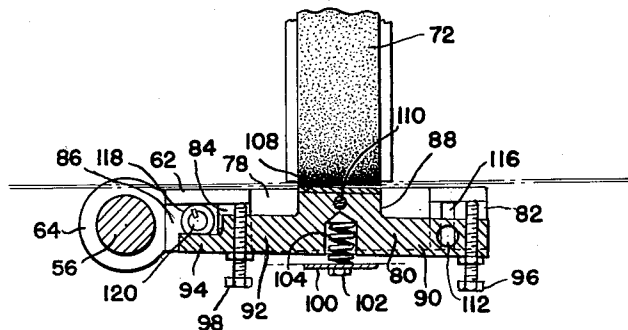


FIG. 5.

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SKIVING APPARATUS

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8 Claims. (Cl. 51-87)

This invention relates to skiving apparatus and, more particularly, to apparatus for skiving or beveling the edges of a moving strip of material such as, for example, paper.

In the past skiving apparatus has been provided in which abrasive wheels having either cylindrically or conically formed surfaces are mounted with their axes of rotation extending transversely of the strip to be skived and positioned with at least a portion of their abrasive surface engaging an edge portion of the strip. Upon rotation of the abrasive surface, a portion of the edge of the strip is removed and with proper clearances being maintained between the rotating abrasive surface and a supporting means for the strip being skived a beveled or feathered edge is produced on the strip.

Operation of the above noted types of apparatus is attended with the difficulty of maintaining properly formed conical abrasive surfaces or of maintaining the proper angular relation between a cylindrical surface and a supporting member which serves to position the strip being skived in order that the desired amount of material is removed from the strip in order to produce the beveled or feathered edge sought after.

It is the principal object of the present invention to provide an improved arrangement for providing a beveled or feathered edge on a strip of moving material which includes a rotating cylindrical abrasive surface having its axis of rotation positioned at an acute angle to direction of travel of the strip, the width of contact of the strip and the abrasive cylindrical surface being selected to produce a bevel extending over a desired portion of the width of the strip being skived. The invention also contemplates the use of adjustable supporting means serving to position the strip with respect to the cylindrical abrasive surface in order to provide for the removal of the necessary amount of material from the strip to produce the desired bevel on the strip.

These and other objects of the invention relating particularly to the construction thereof will become apparent from the following description when read in conjunction with the accompanying drawings, in which:

Figure 1 is an elevation of the apparatus;

Figure 2 is a plan view of the portion of the apparatus in which the strip skiving is accomplished;

Figure 3 is a plan view of a fragmentary portion of the apparatus shown in Figure 2 with a portion of the apparatus removed therefrom;

Figure 4 is a fragmentary vertical section through the apparatus taken on the trace 4-4 shown in Figure 3; and

Figure 5 is a perspective of a portion of the apparatus shown in Figure 4.

As shown in Figure 1, the apparatus includes a supporting framework 2 on the top of which is mounted skiving apparatus indicated generally at 3 in Figure 1 which will be hereinafter described in detail. Horizontally extending framing 4 is supported by the framework 2 and supports at its right-hand end, as viewed in Figure 1, a disc 6 and a hub 8 on which is wound a strip of material 11 to be skived. The hub 8 is mounted on a shaft 10 which is in turn rotatably supported by means of a bearing structure 14 from the framing 4. Suitable

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means including a disc 15 may be provided to secure the hub 8 and disc 6 on the shaft 10 in any conventional manner. A brake 16 is preferably provided on the shaft 10 in order to provide some drag upon the strip as it is being drawn from the hub 8 on shaft 10. The type of unwinding apparatus is entirely conventional and need not be described in detail.

At the left-hand end of the framing 4, as viewed in Figure 1, there is mounted a disc 18 and hub 20 on which the coil 21 of the strip of material is wound after it is skived. The hub 20 is mounted on a shaft 22 which is supported by means of a bearing structure 26 mounted on the framing 4.

A motor 28 is mounted in the framing 4 and is connected by means of a chain belt 30 to drive a speed reducer 32. The output from the speed reducer is transmitted through a sprocket wheel 34 to a chain belt 36 which passes over a sprocket wheel 38 to which there is affixed a roller 40. A pair of rollers 42 is positioned adjacent to the roller 40 and driven by a gear connection therewith. The roller 40 and the rollers 42 serve to draw the strip of material to be skived through the skiving apparatus as will be hereinafter described.

The chain belt 36 also passes over a sprocket 44 connected in driving relation with a clutch 46 through which the shaft 22 is driven. It will be evident that as the skived strip is wound on the hub 20 the rate of rotation of the hub must be diminished. This is accomplished by means of the clutch 46 which provides sufficient tension to insure winding of the strip on the shaft 22 but does not affect the drawing of the strip through the skiving apparatus at a constant rate by the driving rollers 40 and 42. This type of rewinding apparatus is entirely conventional and need not be described in detail.

The strip to be skived which is unwound from the hub 8 is, as indicated at 50, carried over an elevated guide bar 51 and passed under a group of rollers, indicated generally at 52, mounted on a curved arm 53 which is pivotally connected to the framework 2 by means of pivot pin 55. This arrangement provides a floating weight as well as a guide for the strip 50 as it is fed into the skiving apparatus indicated generally at 3 in Figure 1. The strip indicated at 54 passing out of the skiving apparatus passes through the driving rollers 40 and 42, previously described, and is wound on the hub 20.

Three horizontally extending rods 56, 58 and 60 are supported by the framework 2. A mounting plate 62 is slidably mounted on the rods 56 and 58 by means of enlarged portions 64 and 66 which are adapted to embrace and slide upon the rods 56 and 58, respectively. A motor 68 is mounted upon the mounting plate and drives a drum 70 on the surface of which is mounted a strip of abrasive material 72. The strip of abrasive material may be, for example, sandpaper or emery paper or emery cloth which is attached to the peripheral surface drum in any of numerous conventional fashions. An enclosure structure 74 is mounted on the motor 68 and surrounds a substantial portion of the drum 70. The enclosure 74 provides a guard and also provides for the collection and removal of dust and particles of material ground away from the strip being skived through a vacuum hose line 76. The drum 70 is of such a diameter and is so positioned that the lowermost edge of the surface of the drum lies on substantially the same plane as the top surface of the plate 62 as will become evident upon viewing Figure 4.

The plate 62 is provided with an opening 78 in which there is mounted a block 80 best shown in Figure 4. The plate 62 is provided on opposite sides of the cutout 78 with slots 82 and 84, the slot 84 terminating in an angle formed end portion 86. The block 80 has an enlarged and raised central portion 88 and outwardly extending portions 90 and 92 of reduced width. The portion 92

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terminates in a portion 94 which is formed at an angle to the portion 92 and is adapted to enter the angle formed portion 86 of the slot 84. A pair of screws 96 and 98 are threaded into the end portions 90 and 92 of the block 80. The upper ends of the screws are adapted to bear against the upper surfaces of the slots 82 and 84 and thus serve to position the block vertically in the opening 78 in the plate 62.

A plate 100 extends below the block 80 transversely thereof and is affixed to the underside of the plate 62 by a pair of bolts 102. The block 80 is provided with a central bore within which there is positioned a spring 104 which seats in the base or uppermost portion of the bore and acts against the plate 100 serving to urge the block 80 upwardly and thus maintain the uppermost ends of the screws 96 and 98 in engagement with the bases of the slots 82 and 84, respectively. The enlarged central portion 88 of the block 80 is provided with a slot 106 extending vertically downwardly from the top of the central portion 88. The uppermost surface of the enlarged portion 88 is provided with a recess adapted to engage the beveled edges of a wear plate 108. The bolt 110 extending transversely through the enlarged portion 88 of the block 80 serves to clamp the wear plate 108 in the top of the portion of the block 88 by partially closing the vertically extending slot 106.

A pin 112 extends transversely through the reduced width portion 90 of the block 80 and has end portions with flattened vertically extending sides 114 which are adapted to ride in slots 116 in the adjacent sides of the slot 82 in the plate 62. The arrangement of the pin 112 and the slots 116 serves to position the block 80 centrally within the slot 78 while permitting vertical motion of the block.

A cam 118 is positioned between the upper surface of the reduced portion 94 of the block 80 and the upper surface of the slot 84. It will be evident that upon rotation of the cam 118 the left-hand end of the block 80, as viewed in Figure 4, will be moved downwardly against the urging of the spring 104. The cam 118 is slidably but non-rotatably mounted by a sliding key and elongated keyway 119 on a shaft 120 which extends transversely of the frame 2 and passes outwardly through the front of the frame, as viewed in Figure 1, and mounts a sprocket wheel over which there passes a chain belt 122. The chain belt 122 passes over a similar sprocket on a shaft 124 to which is attached an operating lever 126. It will be evident that upon depression of the lever 126 the shaft 120 will be rotated, rotating the cam 118 and depressing the left-hand end of the block 80 as viewed in Figure 4.

As previously noted, the mounting plate 62 is slidably mounted on the rods 56 and 58. The position of the plate on these rods is adjusted by a threaded shaft 128 which is threaded into a downwardly turned flange 130 of the plate 62. The shaft extends through the frame of the machine in which it is mounted for rotation but fixed against longitudinal motion. Externally of the machine the shaft is provided with a hand wheel, not shown, by which it may be rotated.

As will be described in greater detail hereinafter, the frame 62 and the skiving apparatus indicated generally at 57 in Figure 2 mounted thereon are preferably retained in a stationary position and a second skiving apparatus indicated generally at 59 in Figure 2 and which will now be described is adjusted in order to accommodate for the strips of material of various widths to be skived.

The skiving apparatus indicated generally at 59 is mounted on a plate 132 slidably positioned on the rods 58 and 60. A motor 134 is mounted on the plate 132 and drives a drum 136 on the peripheral surface of which there is affixed a strip of abrasive material 138. A housing 140 encloses a substantial portion of the drum 136 and connected to the housing 140 is a flexible conduit 142 through which particles of material removed from the strip being skived are removed.

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The plate 132 is provided with a cutout 144 positioned below the lowermost surface of the drum 136. A block 146 is positioned within the slot 144. The slot 144 is provided with an extended portion 148 within which an extension of the block 146 is positioned. The slot 144 and the block 146 in the skiving assembly indicated generally at 59 are substantially identical to the block and cutout arrangement heretofore described in connection with the skiving arrangement indicated generally at 58 with the exception of the fact that the blocks and slots are of right and left-hand formation respectively. A vertical section through the slots 144 and 148 and the block 146 would have the appearance of the parts shown in Figure 4.

The rod 124 extends through the frame of the machine and has a cam 154 mounted thereon within the portion 148 of the slot 144. The cam is mounted on a sliding keyway indicated at 155 and thus when the plate 132 is moved longitudinally of the rods 58 and 60 the cam 154 is movable therewith along the rod 50 while remaining rotatable by means of the rod 124.

The plate 132 is movable longitudinally of the rods 58 and 60 by means of a rod 150 which is threaded through a flange 151 on the plate 132 and is provided at its outer end with a hand wheel 152. The rod 150 is provided with collars, not shown, to prevent it from moving longitudinally through the frame 2. It will be evident that upon rotation of the hand wheel 152 the plate 132 will move transversely of the machine and carry with it the skiving assembly indicated generally at 59.

The strip of material to be skived indicated at 11 and 50 in Figure 1 passes, as indicated at 50 in Figure 2, under the disc 136 and the abrasive surface 138 mounted thereon. A pair of spring pressure plates 156 is affixed to the plate 132 and have their outer ends 158 extending outwardly beside the disc 136 and adapted to press the strip being skived downwardly against the block 108 and the portion of the plate 132 positioned thereunder. It will be noted from Figure 2 that the end portions 158 of these fingers extend substantially beyond the strip 50. This is, of course, to provide for the holding down of strips of greater width than the strip 50 shown in the drawing. The strip leaving the skiving arrangement indicated at 59 is shown at 52 as having one edge beveled or feathered. The strip leaving the skiving arrangement indicated generally at 57 is shown at 54 as having both edges skived. A pair of pressure fingers 160 are mounted on the plate 62 and serve to hold the strip being skived downwardly in the region of the skiving arrangement 57.

It will be noted that each of the discs 70 and 136 is positioned with its axis of rotation forming an acute angle with the direction of travel of the strip being skived. The plates 62 and 132 are so positioned with respect to the width and position of a strip being skived that the lowermost portion of the abrasive surface on each of the discs is positioned so as to extend over an edge of the strip. It will be evident that by adjustment of the screws 96 and 98 of the block 80 and by adjustment of similar screws in the block 146 the wear plate or platen on each of the blocks which are identical to that indicated at 108 in Figure 4 and 5 can be adjusted to press a selected portion of the edge of the strip upwardly against its associated abrasive surfaced disc. In the particular arrangement shown in Figure 2 each of the platens is adjusted to press the strip into engagement with the abrasive surface of its associated disc for one-half of the longitudinal width of the disc. It will be evident that by variously adjusting the positions of the plates 62 and 132 and by variously positioning the angles of the wear plates on the blocks 80 and 146 beveled or feathered edges may be provided on the strip extending inwardly from the edges of the strip for various extents to the limit as determined by the widths of the abrasive surfaces on the discs 70 and 136. The motors 68 and 134 are connected so as to rotate the discs in directions such that the por-

tions of the surfaces of the discs engaging the strip are moving outwardly of the strip.

The motors 68 and 134 are connected to power through conventional motor controllers contained within enclosures 160 conveniently mounted on the side of the frame 2.

From the foregoing it will be evident that there is provided a skiving apparatus having a high degree of flexibility in that bevels of various widths may be provided on moving strips and, additionally, there is provided a skiving apparatus in which the abrasive surface and the platen which serves to press the work against the abrasive surface may be not only adjusted with facility but may be replaced with facility and which replacement is accompanied by a relatively small expenditure of cost for labor and material.

What is claimed is:

1. Strip skiving apparatus comprising a pair of skiving assemblies, means for guiding a strip to be skived, each of said skiving assemblies including means providing a rotatable surface capable of removing material from a moving strip, and means for adjusting the relative positions of said skiving assemblies and said guiding means to position one of said rotatable surfaces for engagement with one edge of a strip passing over said guiding means and to position the other of said movable surfaces for engagement with the other edge of said strip, said skiving assemblies being mounted to position said rotatable surfaces with their axes of rotation extending at acute angles to the line of travel of the strip and the direction of travel of each of the portions of said rotatable surfaces in engagement with the strip being toward their respective edges of the strip.

2. Strip skiving apparatus comprising a pair of skiving assemblies, means for guiding a strip to be skived, each of said skiving assemblies including means providing a rotatable surface capable of removing material from a moving strip, and means for adjusting the relative positions of said skiving assemblies and said guiding means to position one of said rotatable surfaces for engagement with one edge of a strip passing over said guiding means and to position the other of said movable surfaces for engagement with the other edge of said strip, said guiding means including separate means for positioning each of the edges of the strip in engagement with its adjacent rotatable surface, said positioning means each including means pivoted inwardly of the edge of a strip in said guiding means and vertically movable outwardly of the edge of a strip in said guiding means for adjusting the angular relation between said positioning means and the portion of said rotatable surface engaged by the strip, said skiving assemblies being mounted to position said rotatable surfaces with their axes of rotation extending at acute angles to the line of travel of the strip and the direction of travel of each of the portions of said rotatable surfaces in engagement with the strip being toward their respective edges of the strip.

3. Strip skiving apparatus comprising means for positioning a longitudinally moving strip to be skived, means providing a rotatable drum capable of removing material from a moving strip to be skived and positioned to have a portion of its peripheral surface engaged by an edge portion of a strip positioned by said positioning means with its axis of rotation extending at an acute angle to the line of travel of the strip, movable means for holding a positioning moving strip in engagement with a longitudinally axially extending substantially linear portion of the peripheral surface of the rotatable drum, means for adjusting the angular position of said holding means in a plane extending substantially parallel to the axis of rotation of said rotatable surface for adjusting the angular relation between said holding means and the portion of said rotatable drum engaged by the strip, and separate means for displacing said holding means away from said drum.

4. Strip skiving apparatus comprising supporting means, a pair of skiving assemblies, means mounting said skiving assemblies for independent parallel motion on said supporting means, and means for guiding a moving strip to be skived for movement across said supporting means transversely of the paths of motion of said skiving assemblies, each of said skiving assemblies including means providing a rotatable surface capable of removing material from a moving strip, means for adjusting the relative positions of said skiving assemblies and said supporting means with respect to said strip guiding means to position one of said rotatable surfaces for engagement with one edge of a strip passing over said guiding means and to position the other of said movable surfaces for engagement with the other edge of said strip, and adjustable holding means for positioning a selected portion of a moving strip in said guiding means in engagement with the rotatable surface skiving means.

5. Strip skiving apparatus comprising supporting means, a pair of skiving assemblies, means mounting said skiving assemblies for independent parallel motion on said supporting means, and means for guiding a moving strip to be skived for movement across said supporting means transversely of the paths of motion of said skiving assemblies, each of said skiving assemblies including means providing a rotatable surface capable of removing material from a moving strip, means for adjusting the relative positions of said skiving assemblies and said supporting means with respect to said strip guiding means to position one of said rotatable surfaces for engagement with one edge of a strip passing over said guiding means and to position the other of said movable surfaces for engagement with the other edge of said strip, adjustable holding means for positioning a selected portion of a moving strip in said guiding means in engagement with the rotatable surface skiving means, and separate means for displacing said holding means away from its associated rotatable surface.

6. Strip skiving apparatus comprising means for positioning a longitudinally moving strip to be skived, means providing a rotatable drum capable of removing material from a moving strip to be skived and positioned to have a portion of its peripheral surface engaged by an edge portion of a strip positioned by said positioning means with its axis of rotation extending at an acute angle to the line of travel of the strip, movable means for holding a positioned moving strip in engagement with a portion of the peripheral surface of the rotatable drum, means for adjusting the angular position of said holding means in a plane extending substantially parallel to the axis of rotation of said rotatable drum for adjusting the angular relation between said holding means and the portion of said rotatable drum engaged by the strip.

7. Apparatus in accordance with claim 6 in which said movable means holds a positioned moving strip in engagement with a longitudinally axially extending substantially linear portion of the peripheral surface of the rotating drum.

8. Apparatus in accordance with claim 6 including separate means for displacing said holding means away from said drum.

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