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SPLITTING MACHINE

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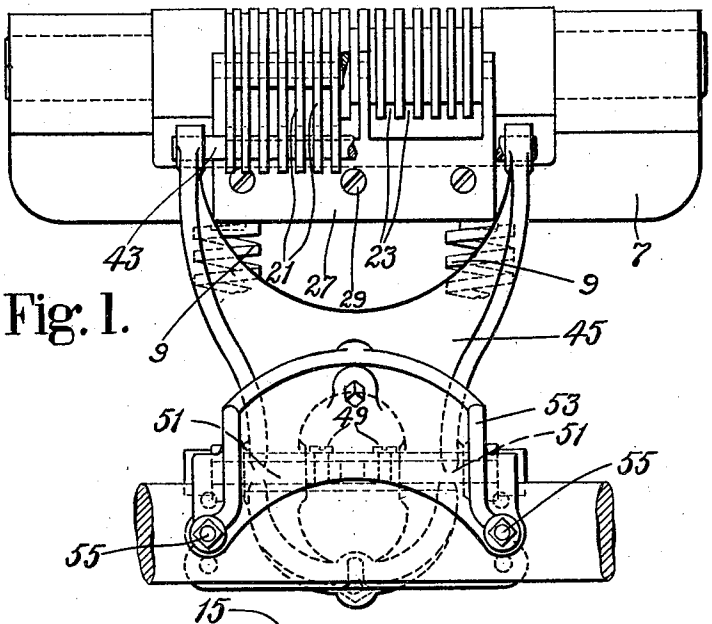


Fig. 1.

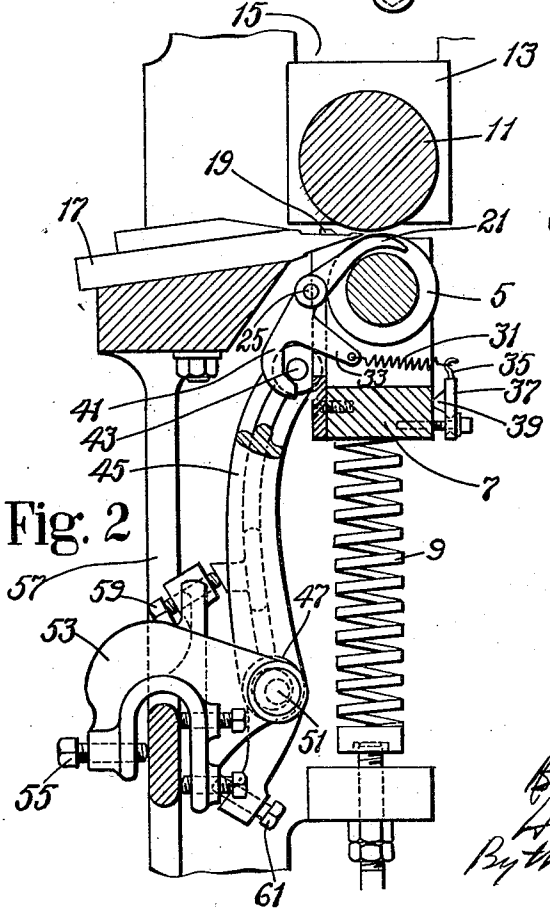


Fig. 2

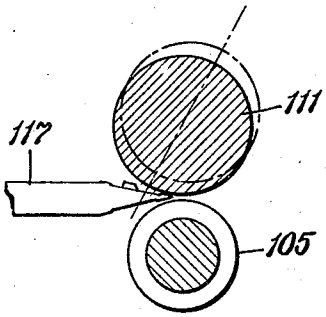


Fig. 3.

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UNITED STATES PATENT OFFICE.

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SPLITTING MACHINE.

Application filed April 30, 1925, Serial No. 26,928, and in Great Britain May 21, 1924.

This invention relates to splitting machines and is herein illustrated as embodied in a machine for splitting soles and similar blanks to reduce them to desired uniform thicknesses throughout.

Leather splitting mechanisms commonly comprise a knife and a pair of separable rolls for feeding the blank to the knife. One of these rolls—commonly called the feed roll—is usually located beneath the knife and urged upwardly by heavy springs against a stop, said roll being designed to yield to irregularities in the thickness of the blank. The other roll—commonly called the gage roll—is adapted to be moved away from the knife until further movement is arrested by a stop which has previously been adjusted into the proper position, after which the roll remains fixed, so far as any movement away from the knife is concerned, the distance between the edge of the knife and the lower surface of the roll determining the thickness to which the blank shall be split. Splitting mechanism of this general type is shown, for example, in British Patent No. 190,241. In this machine the blank is split in accordance with the thickness of its thinnest spot; and the gage roll is raised by the passage of the blank beneath it until further upward movement of said roll is arrested by a pair of wedge-shaped stops which have previously been adjusted into the desired position.

It is desirable in splitting machines that the knife be located as close as possible to the bite of the rolls, or (what amounts to the same thing) to the plane which contains the axes of the rolls so that a blank may be properly held during the splitting operation, and that the mounting of the gage roll be such that the angle between a plane passed through the axis of that roll and the edge of the knife and a plane which coincides with the adjacent face of the knife be equal to or larger than a right angle in order to provide proper clearance for the finished blank to pass between the knife and the roll. In constructions such as that shown in the British patent in which the lower or feed roll is located somewhat in front of the upper or gage roll so as to permit the knife to be inclined downwardly and rearwardly from the bite of the rolls, it will be noted that, as the gage roll is moved up to provide for thicker blanks, the bite of the rolls moves away from the edge of the knife so that a thick blank is not gripped by the rolls in a locality as near to the edge of the knife as is a thin blank.

According to one feature of the invention, means are provided for gripping the blank close to the edge of the knife irrespective of whether it is thin or thick. In the illustrated embodiment of the invention this means takes the form of yielding fingers carried by the bearing of the feed roll, the construction and arrangement being such that the operative portions of these fingers rise as the feed roll is depressed.

This and other features of the invention, including certain details of construction and combinations of parts, will be described as embodied in an illustrative machine and pointed out in the appended claims.

Referring now to the accompanying drawings,

Figure 1 is a rear elevation of a portion of a machine in which the present invention is embodied;

Figure 2 is a vertical longitudinal section through a portion of the machine, and

Figure 3 is a detail partly in section and partly in elevation showing a modification.

Referring first to Figures 1 and 2, there is shown a portion of a splitting mechanism designed for use in a machine of the type disclosed in the patent. The lower or feed roll 5 is mounted in a yoke-like bearing 7 which is vertically slidable in suitable ways formed in the frame of the machine, said yoke being urged upward at all times by heavy springs 9. Stops (not shown) limit the extent of upward movement of the bearing so that the roll cannot at any time contact with the knife. The gage roll 11 is mounted in bearings, one of which is shown at 13, said bearings being vertically slidable in ways, one of which is indicated at 15. This roll normally occupies the position shown, just out of contact with the knife, and is adapted to be lifted by a blank, as it enters between the rolls, until further upward movement is arrested by stops (not shown) which have previously been automatically adjusted in accordance with the thickness of the thinnest spot in the blank by feeler mechanism (also not shown) through which the blank has passed. Located behind the bite of the rolls is a stationary knife 17, so that, as the blank is fed to the knife by the rolls, the blank is split

in accordance with the thickness of its thinnest spot, the finished blank passing over the knife and the comparatively thin waste material passing beneath the knife. During the splitting operation the feed roll yields to inequalities in the thickness of the blank and tilts endwise if the blank is thicker at one edge than at the other.

Referring now more particularly to the arrangement of the knife and rolls, the knife is inclined upward toward the bite of the rolls, as shown, so that a vertical plane through the axis of the gage roll passes very close to the elge of the knife and is substantially perpendicular to the adjacent beveled face of the knife. And inasmuch as the gage roll moves vertically upward, the angle included between the vertical plane through the axis of the roll and the plane of the adjacent face of the knife never becomes smaller. The knife and roll having thus once been set to produce the proper clearance for the blank, no resetting is necessary for thicker blanks.

In order, under these conditions, to provide proper clearance between the lower or feed roll and the adjacent under face of the knife, the lower roll is smaller in diameter than is the upper roll, and its axis, instead of being directly beneath that of the upper roll, is set somewhat forward. With this construction and arrangement of knife and rolls, it will be noted that the plane which passes through the axes of the rolls moves away from and toward the knife edge as the gage roll moves up and down. The general construction and mode of operation of the machine, as thus far described, is or may be substantially like that of the patented machine and will not be further described in detail.

In order to assist in holding the blank against the under surface of the gage roll, a series of fingers 21 are provided. These fingers extend into grooves 23 formed in the roll 5 and are pivoted on a rod 25 which is carried by a bracket 27 fastened by screws 29 to the yoke-like bearing 7 of the roll. With the fingers thus carried by the bearing of the roll, if the roll tilts, due to the presence between the rolls of a blank which is thicker at one edge than at the other, there is no possibility that the fingers will bind in the grooves as might happen if the fingers were carried by the frame of the machine. The operative portions of the fingers are urged to swing upwardly by springs 31 which are fast at one end to arms 33 formed on the fingers and at the other end to hooks 35 projecting upwardly from a bar 37 fixed to the front of the bearing 7. The bar has formed on it at each end a rounded projection 39 which engages the yoke; and below these projections are screws which pass through the bar and are threaded into the bearing. By adjusting these screws, the bar may be rocked about the points of contact of the projections to vary the tension of the springs. The fingers 21 have downwardly extending tails 41 having cam faces which, when the feed roll 5 is in its uppermost position, are held by the springs 31 against a horizontal rod 43 carried at the upper end of a yoke 45 so that the fingers 21 are held by the rod 43 just out of engagement with the knife. As the feed roll 5 moves downward, due to the entry of a blank between the rolls, the fingers 21 also move downward, the cam faces on the tails of the fingers moving with respect to the rod 43, whereupon the springs 31 act to rock the fingers about the rod 25, thereby swinging the blank-engaging portions of the fingers upward until they extend above the periphery of the roll 5. The arrangement is thus such that, as the roll 5 is moved downward and perhaps tilted, the fingers, or those at that end of the roll which is lowest, as the case may be, project more and more above the periphery of the roll to aid in holding the blank firmly against the roll 11 but are never permitted to contact with the knife.

In order to provide means for varying the initial position of the fingers 21 and for controlling their operation, the yoke 45 which carries the rod 43 is adjustably carried by the frame of the machine. To this end the yoke is pivotally mounted on a sleeve 47 which is bored eccentrically and is fastened by screws 49 to alined rods 51 rotatably mounted in a member 53 fastened by screws 55 to the frame 57 of the machine. The yoke 45 is positioned about the sleeve 47 by screws 59 and 61, the screw 59 being threaded through a boss on the member 53 and contacting with a boss on the yoke 45; and the screw 61 being threaded through a boss on the yoke and contacting with a boss on the member 53. By adjusting these screws, the rod 43 may be adjusted laterally; and by changing the angular position of the eccentric sleeve 47 on the rod 51, the rod 43 may be adjusted vertically.

In Figure 3 there is shown a modification of the arrangement of the knife and rolls which will also produce proper clearance conditions. In this modification, the knife is horizontal and the upper or gage roll is so guided that, as it is raised above the knife, it moves forward in the direction indicated by the dot-and-dash line. In its initial lowered position the angle included between the plane passed through the axis of the roll and the edge of the knife and the plane of the adjacent face of the knife is substantially a right angle; and as the roll moves upward and forward, this angle increases.

The knife 17, for convenience in honing, is provided on both beveled faces with recesses extending across the knife parallel to its edge; and that one of the two raised flat faces formed upon the upper side of the knife at the knife edge is about half the

width of the corresponding flat face beneath it, this construction producing a stronger edge than as though both these faces were of the width of the upper one. In order to bend the blank toward the gage roll and thereby to prevent the blank from being drawn away from the roll by the pull of the knife while the blank is being split, a strip 19 may be secured to the knife in the position shown. This strip extends across the knife parallel to the knife edge and may be located at about the middle of the recess between the flat faces of the bevel, the front edge of the strip being inclined upward so as to direct the blank toward the gage roll.

In order to promote brevity, the knife has been shown and described as being ground flat. It should be understood, however, that the same conditions as to clearance apply in the case of a hollow ground knife; and, indeed, that, after a hollow ground knife has been honed a few times, it assumes a shape which is substantially that of the knife illustrated in that each converging face is composed of two flat faces separated by a recess.

Although the invention has been set forth as embodied in a particular machine, it should be understood that the invention is not limited in the scope of its application to the particular machine which has been shown and described.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:—

1. Splitting mechanism comprising a knife, cooperating rolls for feeding a blank to the knife and a series of yielding fingers movable in unison with one of the rolls and arranged to hold the blank against the other roll in the locality in which the splitting takes place.

2. Splitting mechanism comprising a knife, a pair of cooperating rolls for feeding a blank to the knife, a yieldingly sustained slidable member in which one of the rolls is rotatably mounted, and a series of yielding fingers carried by said member and arranged to hold the blank against the other roll close to the edge of the knife.

3. Splitting mechanism comprising a knife, a pair of cooperating rolls for feeding a blank to the knife, a yieldingly sustained slidable member in which one of the rolls is rotatably mounted, a series of fingers pivotally mounted upon said member, and a series of springs, one for each finger, for urging the fingers toward the other roll.

4. Splitting mechanism comprising a knife, cooperating rolls for feeding a blank to the knife, said rolls being movable toward and from the knife, a series of yielding fingers movable in unison with one of said rolls, and a stationary stop adapted to prevent the fingers from contacting with the knife.

5. Splitting mechanism comprising a knife, cooperating rolls for feeding a blank to the knife, said rolls being movable toward and from the knife, a series of yielding fingers movable in unison with one of said rolls, said fingers having tails provided with cam surfaces, and a stationary member adapted to cooperate with said surfaces, the construction of the cam surfaces being such that, as the roll moves away from the knife, the operative portions of the fingers move toward the other roll.

6. Splitting mechanism comprising a knife, cooperating rolls for feeding a blank to the knife, said rolls being movable toward and from the knife, a series of yielding fingers movable in unison with one of said rolls, said fingers having tails provided with cam surfaces, a stationary member adapted to cooperate with said surfaces, the construction of the cam surfaces being such that, as the roll moves away from the knife, the operative portions of the fingers move toward the other roll, and means whereby said stationary member may be adjusted.

7. Splitting mechanism comprising a pair of separable rolls, a knife, one of said rolls being movable toward and from said knife in a path which is substantially perpendicular to that face of the knife which is adjacent to the movable roll, and a series of yielding fingers movable with the other roll.

8. Splitting mechanism comprising a pair of separable rolls, a knife, the arrangement of the knife and one of the rolls being such that as the roll moves to different positions away from the knife, the angle included between the adjacent face of the knife and a line drawn from the axis of the roll to the edge of the knife does not decrease in size, and a series of yielding fingers movable with the other roll.

9. Splitting mechanism comprising a knife, a pair of cooperating rolls for feeding a blank to the knife, one of said rolls being movable toward and from the other during the splitting operation, a movable bearing in which the last-named roll is mounted, and a series of yielding fingers carried by said bearing so as to move in unison with said last-named roll.

In testimony whereof we have signed our names to this specification.

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