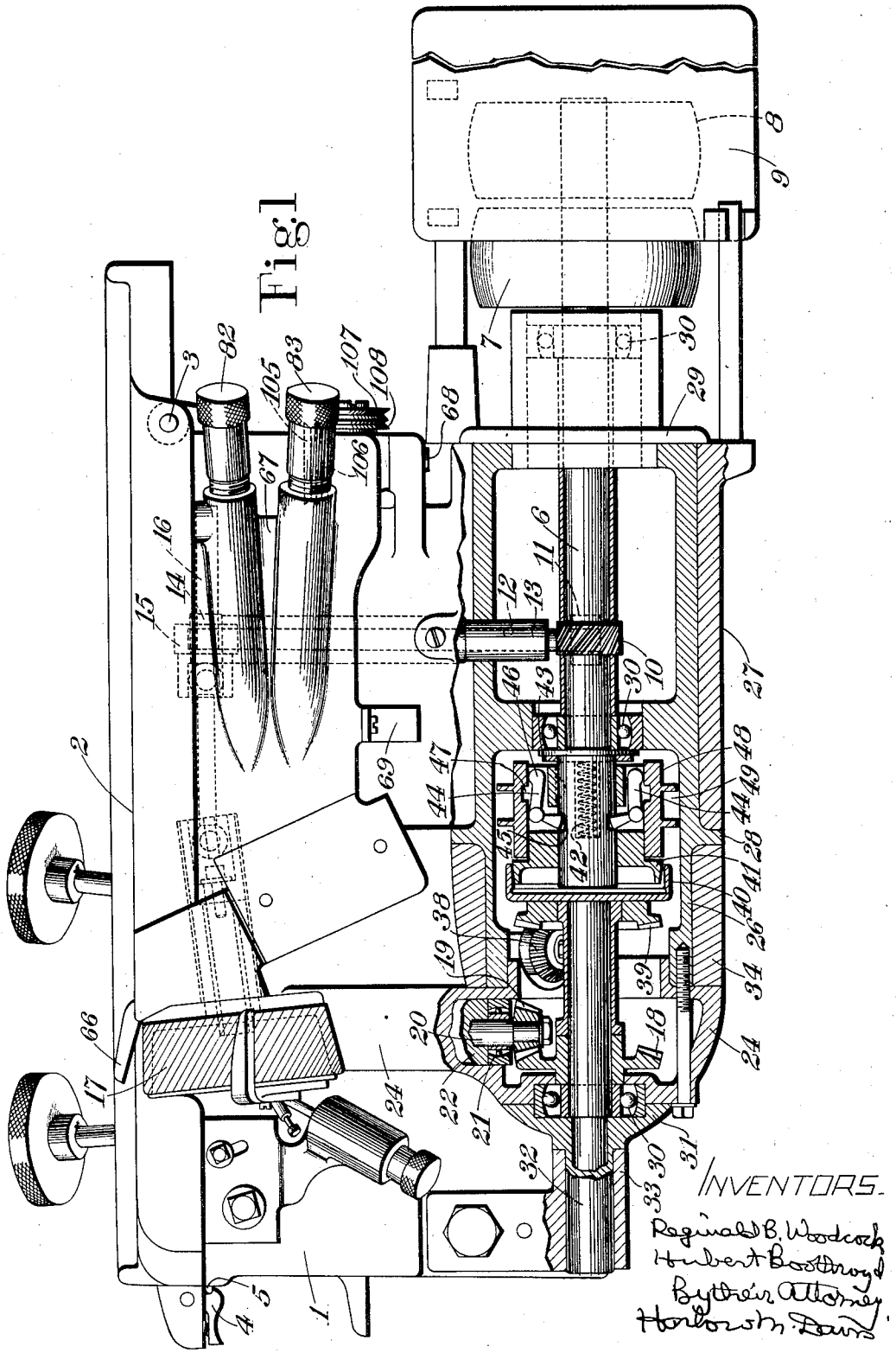
Jan. 23, 1934. R. B. WOODCOCK ET AL 1,944,311

SKIVING MACHINE

Filed April 21, 1932 3 Sheets-Sheet 1

Fig. 1



Jan. 23, 1934. R. B. WOODCOCK ET AL 1,944,311

SKIVING MACHINE

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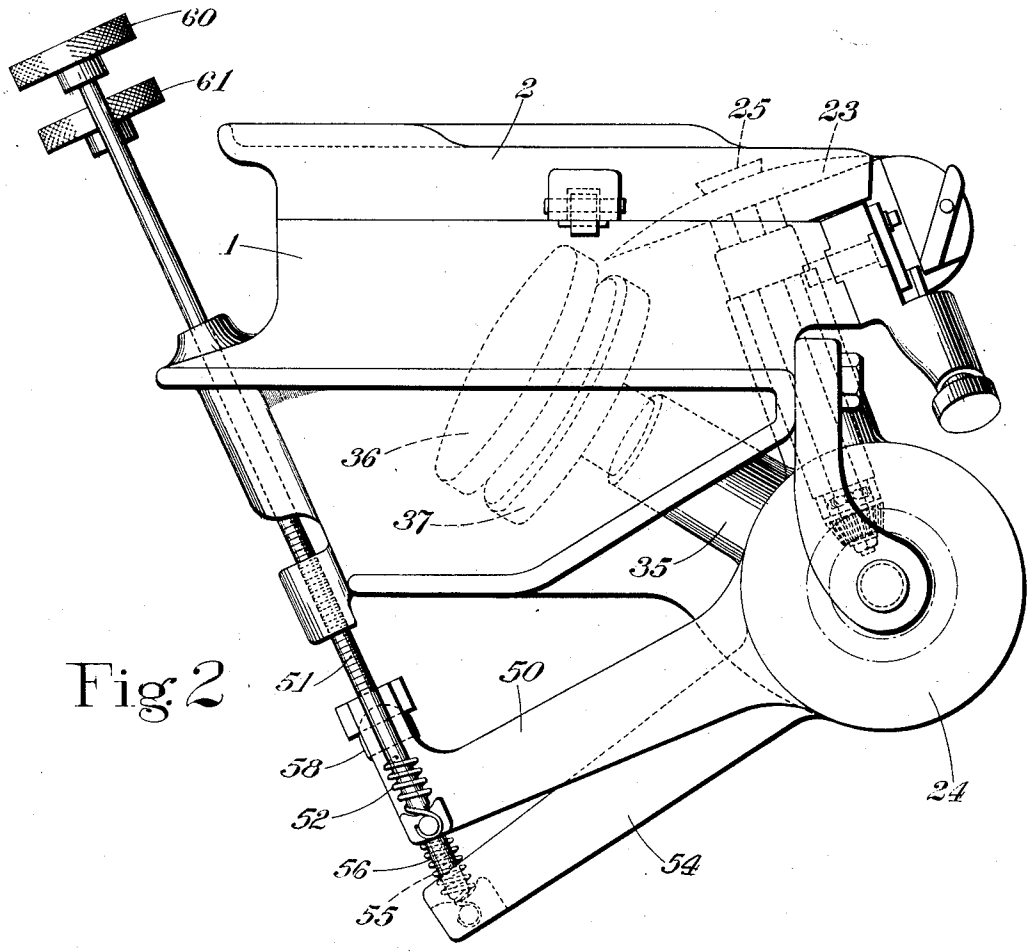


Fig. 2

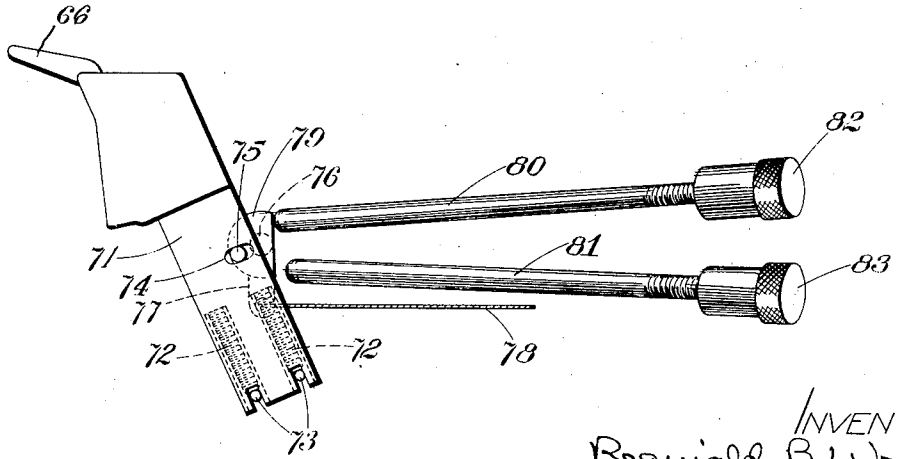


Fig. 3

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SKIVING MACHINE

Filed April 21, 1932 3 Sheets-Sheet 3

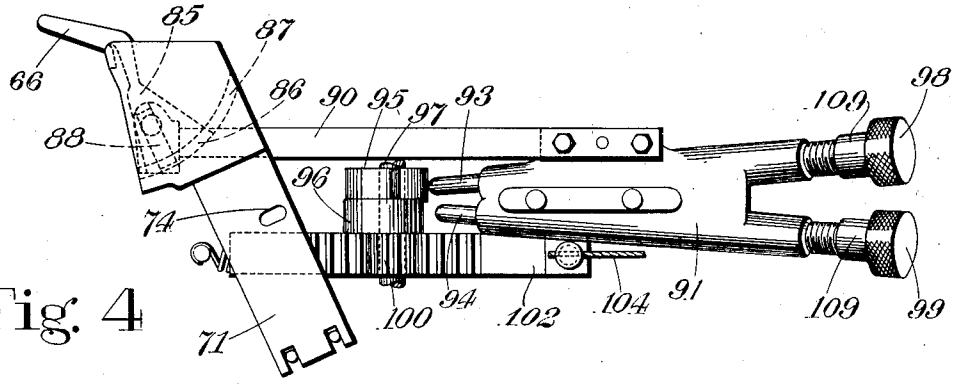


Fig. 4

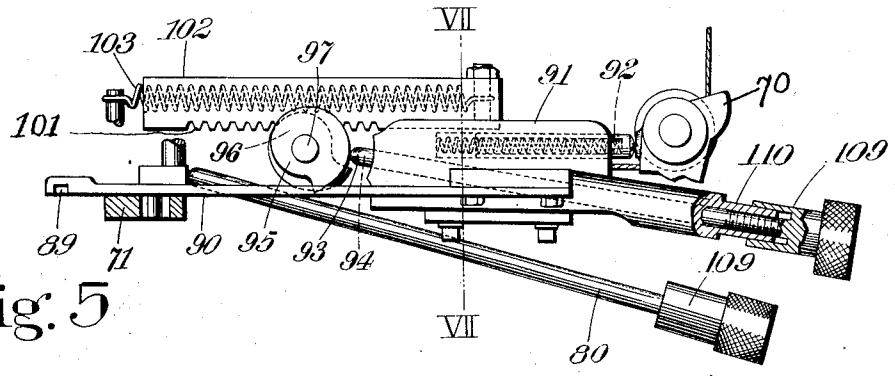


Fig. 5

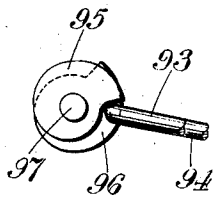


Fig. 6

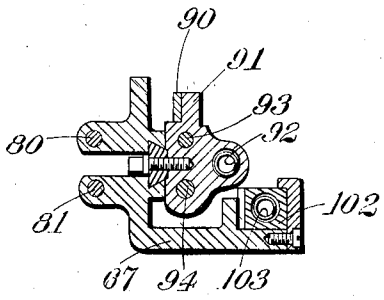


Fig. 7

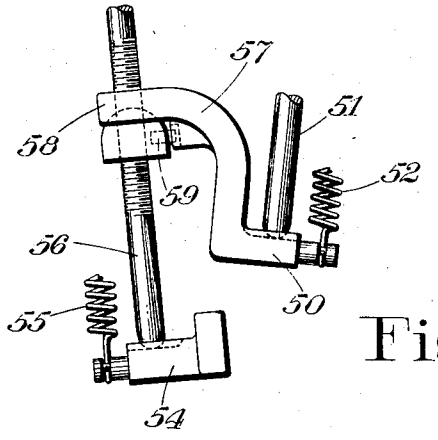


Fig. 8

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Patented Jan. 23, 1934 1,944,311

UNITED STATES PATENT OFFICE

1,944,311

SKIVING MACHINE

Reginald Boyd Woodcock and Hubert Boothroyd, Leicester, England, assignors to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application April 21, 1932, Serial No. 606,678, and in Great Britain June 4, 1931

11 Claims. (Cl. 69—9.5)

This invention relates to skiving machines and is herein illustrated as embodied in a machine for skiving the margins of parts of the uppers of boots and shoes.

In the manufacture of boots and shoes it is customary to skive the margins of certain parts of the uppers; and in some cases it is desirable to produce upon a single shoe part, such for example as a quarter, two scarfs upon two margins thereof which differ in character, for example in the angles of their bevels or in the thicknesses of their edges or in both characteristics. In order to facilitate such work there is provided in accordance with one feature of the invention a knife, a yielding feed roll, an adjustable work guide or presser which is unyielding during the skiving operation and determines by its position the character of the scarf produced, and a single readily manipulated means for adjusting the presser from one predetermined position to another to vary quickly and accurately the character of the scarf produced. In the illustrated machine, the knife is of the rotary dished type, the feed roll is a bodily and angularly yielding one, and the presser may be adjusted instantly by treadle-controlled means either heightwise or angularly or in both directions from a position in which it is normally held and in which it causes the production of a scarf of one predetermined character to a second predetermined position in which it causes the production of a second scarf of a different but also predetermined character.

These and other features of the invention will be described as embodied in an illustrated machine and pointed out in the appended claims.

Referring to the accompanying drawings,

Fig. 1 is a front elevation, partly in section, of the said preferred form of machine;

Fig. 2 is a left-hand end view of said machine;

Fig. 3 is a front view of mechanism for adjusting vertically a work guide or presser of the said machine;

Fig. 4 is a front elevation of mechanism of said machine for adjusting said work guide or presser angularly;

Fig. 5 is a plan view, partly in section, illustrating the said mechanisms for adjusting the work guide or presser vertically and angularly, the parts being in the position they occupy when a treadle of the machine for adjusting them is raised;

Fig. 6 is a detail of cams and adjusting screws shown in Fig. 5 in the position they occupy when the treadle is depressed;

Fig. 7 is a section on the line 7—7 in Fig. 5; and

Fig. 8 is a rear elevation of part of knife and grinding wheel mechanism of the machine.

The said preferred form of machine comprises a base adapted to be fixed to a work bench or other support, a frame 1 fixed to the base and a lid 2 pivoted to the frame by a horizontal forwardly and rearwardly extending pivot 3 situated at the right-hand side of the frame 1 near the top of the frame. The lid 2 is held down in closed position by a latch 4 at its left-hand side which engages a block 5 on the frame, and a coil spring (not shown) round the pivot 3 more or less balances the weight of the lid. The top of the lid is about eighteen inches wide and about twelve inches from front to back and its upper surface is quite flat except for a wall three-eighths of an inch high running along its rear edge and forwardly part way along its side edges.

At the front of the frame and about eight inches below the top of the lid is a driving shaft 6 rotatably mounted in bearings in the frame and extending horizontally from right to left of the machine. The driving shaft has on it at its right-hand end a pair of fast and loose pulleys 7 and 8 which are driven from any suitable source of power. A combined guard and belt-shifter 9 is slidingly mounted on the machine frame and is moved by a spring in a direction to hold the belt on the loose pulley. The guard and belt shifter 9 is moved in the opposite direction to move the belt on to the fast pulley to drive the machine by means of a treadle.

The driving shaft has fixed to it, about halfway along it, a spiral gear 10 which meshes with a second spiral gear 11 fixed on the lower end of a vertical shaft 12 rotatably mounted in a sleeve 13 fixed in the machine frame. The vertical shaft 12 at its upper end has fixed to it another spiral gear 14 which meshes with a spiral gear 15 fixed on a horizontal shaft 16 parallel to the driving shaft 6, rotatably mounted in the upper front part of the machine frame. The shaft 16 as will hereinafter be described, drives a work feed roll 17 of the machine.

The driving shaft at its left-hand ends has fixed on it a bevel gear 18 which meshes with a bevel gear 19 fixed on the lower end of a knife shaft 20 which extends upwardly and to the rear. The knife shaft 20 near its upper and lower ends is supported by ball bearings, the lower one of which is shown at 21, carried at the ends of a sleeve 22 through which the shaft 20 passes, and the shaft has fixed to its upper end a circular dished knife 23 (Fig. 2). The knife shaft sleeve 22 is clamped in a knife-carrying

member 24 pivoted to the machine frame so as to turn about the axis of the driving shaft 6. When the sleeve is unclamped the knife 23, sleeve 22, ball bearings 21 and bevel gear 19 on the lower end of the shaft 20 may be bodily withdrawn from the member. The knife has on its upper side an undercut boss 25 which may be gripped by a suitable tool; and the knife, when released from the spindle, may be removed without danger of injury to the operator. The knife-carrying member 24 is fixed to the left-hand end of a sleeve 26 rotatably mounted in a bearing 27 on the machine frame coaxial with the driving shaft which passes through the sleeve. The sleeve 26 has on it a flange 28 which engages the left-hand end of the sleeve bearing 27 and has fixed to its other end a collar 29 which engages the right-hand end of the bearing 27, the flange 28 and collar 29 preventing endwise movement of the sleeve 27 in its bearing. Three ball bearings 30 for the driving shaft are provided, one in the collar 29 at the right-hand end of the sleeve, a second in the sleeve itself and about halfway along the shaft, and the third in the knife-carrying member 24. The member 24 has fixed to its left-hand end a cap 31, covering the ball bearing 30 in the member 24, into which the reduced left-hand end of the shaft 6 projects. The cap 31 has formed on it a stub shaft 32 which is freely rotatable in a bearing 33 fixed on the frame 1.

Rotatably mounted on the sleeve 26, between the knife-carrying member 24 and the flange 28 on the sleeve and prevented from endwise movement thereby is a grinding wheel carrier 34. This carrier 34 has an upwardly and rearwardly extending bearing 35 (Fig. 2) in which is clamped a sleeve, similar to the sleeve 22, and the sleeve carries at the top and bottom of it ball bearings for a grinding wheel shaft having fixed to its upper end two grinding wheels 36, 37 (Fig. 2) which are arranged to engage the upper and lower faces of the cutting edge of the knife 23. The grinding wheel shaft has fixed to its lower end a bevel gear 38 (Fig. 1) which meshes with a bevel gear 39 fixed to an internally coned member 40 of a clutch rotatably mounted on the driving shaft 6. The externally coned member 41 of the clutch member is slidingly mounted on and keyed to the driving shaft 6 and is urged by springs one of which is shown at 42 towards the internally coned member 40. The springs 42 are carried in the externally coned member 41 and bear against a washer 43 which is held against a flange on the driving shaft 6. The externally coned member 41 has pivotally mounted in it two small bell-crank levers 44, 44 one at each side of its axis. One arm of each bell-crank lever is radial to the driving shaft axis and enters a recess 45 cut in the driving shaft and the other arm of each bell-crank lever is substantially parallel to the axis of the driving shaft and has at its outer end a rounded projection 46 adapted to enter a recess 47 in a clutch collar 48 slidingly mounted on the externally coned member 41. The clutch collar 48 has on its outer side a circumferential groove 49 which is engaged by the eccentric end of a horizontal shaft extending to the front of the machine and having fixed to its forward end an arm by which the eccentric shaft may be rotated by the operator. When the coned clutch members are in engagement and the grinding wheels are being driven the rounded projections 46 on the arms of the bell-crank levers 44 are in the recesses 47 in the clutch collar 48 and the springs 42 are pressing the externally coned clutch member 41 against the internally coned member 40. When the clutch collar 48 is moved to the left, by means of the hand operated eccentric shaft, on the externally coned clutch member the rounded projections 46 on the substantially horizontal arms of the bell-crank levers 44 are pressed inwardly out of the recesses 47 in the clutch collar. By this means the bell-crank levers 44 are swung about the connections of their radial arms with the recesses 45 on the driving shaft and the pivotal connections of the bell-crank levers with the externally coned clutch member 41 and the latter member are moved to the right and the externally coned member 41 is withdrawn from the internally coned member to open the clutch. The pressure of the clutch springs 42 tending to close the clutch is, when the clutch is open, taken at one end by the washer 43 and flange on the driving shaft and at the other end by the rounded projections 46 on the arms of the bell-crank levers 44 pressing against the inside surface of the clutch ring 48 with a radially directed pressure. When the clutch is open there is therefore no pressure tending to move the clutch ring 48 axially on the driving shaft and therefore no pressure on the eccentric shaft. The externally coned member 41, bell-crank levers 44 and clutch collar 48 rotate with the driving shaft 6 whenever that shaft is being driven. The housing of the driving mechanism and clutch in the sleeve 26 as above described prevents oil or grease from escaping on to the operator's clothing.

The knife-carrying member 24 has extending rearwardly from it an arm 50 (Figs. 2 and 8) which is held up against the lower end of a knife adjusting screw 51, threaded through a lug on the frame 1, by a spring 52 attached at one end to the arm and at the other end to the frame, the spring tending to swing the knife forwardly about the axis of the driving shaft. A rearwardly extending arm 54 of the grinding wheel carrier 34 is held by a spring 55 connected to the arm and frame, up against the lower end of an adjusting screw 56. The latter spring 55 tends to swing the grinding wheels towards the knife about the axis of the driving shaft 6. The grinding wheel adjusting screw 56 passes freely through an arm 57 projecting laterally from the knife carrier arm 50 and is threaded through a block 58 beneath the projecting arm which is held up against the arm by the grinding wheel spring 55. The block 58 is prevented from rotating relatively to the projecting arm 57 by a pin 59 projecting from it into a recess in the arm 57 and the upper face of the block is semispherical and seats in a recess in the under face of the laterally projecting arm 57. The upper ends of the knife and grinding wheel adjusting screws, which viewed from the front, spread relatively upwardly at an angle of about ten degrees to one another, have on them hand wheels 60, 61 by which they may be rotated and the hand wheels are positioned behind and above the lid. By this arrangement when the knife adjusting screw 51 is adjusted both the knife and grinding wheels are adjusted forwardly or rearwardly about the axis of the driving shaft 6 and if the grinding wheel adjusting screw 56 is adjusted the grinding wheels only are adjusted towards or from the knife. The rounded upper face of the block 58 through which the grinding wheel adjusting screw 56 is threaded and its seating provide for relative tipping movement between the latter screw and the projecting arm 57 during adjustment of the knife and grinding wheels.

At the front of and just beneath the knife is

the feed roll 17 hereinbefore referred to. This feed roll is arranged, in respect to the knife, is driven, adjusted and mounted on the frame for removal and replacement substantially in the same way as is the feed roll of the machine described in United States Letters Patent No. 1,840,344, granted January 12, 1932, upon an application filed in the names of Reginald B. Woodcock and Thomas A. Kestell, but the feed roll is arranged to yield downwardly at an angle to the vertical so as to provide adequate clearance behind the edge of the knife when the roll is pressed down by the work, the knife in the present machine having been positioned somewhat downwardly round the axis of the feed roll as compared with its position in the machine disclosed in the patent for the purpose of obtaining a flat-topped lid. The feed roll is driven by universal connections from the horizontal shaft 16 hereinbefore referred to.

A work edge guide or presser 66 similar in shape, as regards its upper portion, to the work edge guide or presser described in the patent is arranged above the feed roll and knife in the same relation to these parts as is the guide or presser in the patented machine. The edge guide of presser 66 its mounting and adjusting mechanism are, as in the machine disclosed in the patent, carried by a swing frame 67 pivoted on a vertical shaft 68 at the right-hand front corner of the machine frame so that the guide or presser and its supporting and adjusting mechanism may be swung forwardly and rearwardly for the purpose described in said patent without changing the position of adjustment of the guide or presser. The swing frame 67 is locked in its closed position by a spring latch 69 carried on the swing frame 67 and engaging the hooked end of a rod similar to that shown in the patent adjustably mounted in the machine frame, and its outward movement is limited by lugs one of which is shown at 70 (Fig. 5) on the swing frame which engage stop faces on the machine frame.

The slide 71 on which the edge guide or presser 66 is pivoted is slidingly mounted in the swing frame 67 and is urged upwardly by springs 72, 72 housed in bores in the slide and bearing against pins 73, 73 fixed in the swing frame 67 and extending across the bores through recesses in the slide. The slide 71 has formed in it a horizontal slot 74 which receives a crank pin 75 formed on the forward end of a horizontal shaft 76 rotatably mounted in the swing frame 67. The crankshaft 76 has a depending arm 77 which is connected by a wire 78 to an edge guide or presser controlling treadle. The arrangement is such that when the treadle is depressed the crankshaft 76 is rotated and through its crank-pin 75 depresses the guide or presser slide 66 against the action of its springs 72, 72. To determine the raised or lowered position of the guide or presser 66 the crankshaft 76 has on it a flange 79 which is shaped to provide two substantially vertical stop faces one above and the other below the axis of the crank-shaft, which faces engage respectively the left-hand ends of substantially horizontal screws 80, 81 threaded in the swing frame 67 which have at their right-hand ends knurled heads 82, 83 by which they may be rotated to adjust the position of the guide or presser 66 when raised by the springs 72, 72 or when moved down by the operator.

The guide or presser 66 has a depending arm 85 (Fig. 4) which at its lower end has formed on it an arcuate rib 86 which enters an arcuate guideway 87 in the guide or presser slide 71. The depending arm 85 has pivoted to it a block 88 which enters a guideway in the left-hand end of a horizontal bar 90 extending across the machine. The block 88 and its guideway are substantially parallel to the path of movement of the guide or presser slide 71 as it is moved up or down. The bar 90 is fixed at its right-hand end to a slide member 91 mounted for horizontal sliding movement across the machine on the swing frame 67. The slide member 91 is urged towards the left by a spring plunger 92 housed in a horizontal bore in the slide member 91 and bearing against the swing frame 67 and therefore in a direction to move the guide or presser 66 upwardly about its pivot. Movement to the left of the slide member 91 under the influence of its spring plunger 92 is limited by one of two substantially horizontal screws 93, 94 threaded through the slide member 91, the left-hand ends of which engage respectively one of two cams 95, 96 mounted one above the other on a vertical shaft 97 rotatably mounted in the swing frame 67. The right-hand ends of the screws 93, 94 have on them knurled heads 98, 99 by which they may be rotated to adjust the angular position of the guide or presser 66. The cam shaft 97 has fixed on it below the cams 95, 96 a pinion 100 which meshes with a rack 101 formed on a horizontal rack slide 102 extending across the machine and slidingly mounted in the swing frame 67. The rack slide 102 is urged to the left by a spring 103 one end of which is fixed in a bore in the rack slide and the other end of which is connected to the swing frame, and the rack slide may be moved to the right by a wire 104 connected to the treadle hereinbefore described as moving down the guide or presser slide 71 when depressed. The wires described as being connected to the treadle for moving down the guide or presser 66 and moving the rack slide 102 are in one piece and the wire is looped round a pulley on the treadle so as to allow for different amounts of movement of the parts moved thereby when the treadle is depressed. From the arm 77 and slide 102 the wire passes round guide pulleys 105, 106 on the pivot 68 of the swing frame 67, so that they do not slacken or tighten when the swing frame is swung forwardly, and then round guide pulleys 107, 108 on the machine frame down to the treadle. The heads 82, 83 and 98, 99 of the four screws for adjusting the guide or presser have on them sleeve portions 109 (Fig. 5) which project over bosses 110 on the swing frame 67 and slide member 91 and the bosses have on each of them a row of marks over which the sleeve portions move when adjustments are being made. The relationship of the ends of the sleeve portions and the marks indicate the position heightwise and angularly of the guide or presser.

When the treadle is in its raised position the screw 93 controlling the angular position of the guide or presser 66 is in engagement with the cam 95 and if this screw is adjusted the angular position of the guide or presser is adjusted. When the cams 95, 96 are rotated by depression of the treadle the lower cam 96 comes into engagement with the left-hand end of the adjusting screw 94 and controls the angular position of the guide or presser and if when the treadle is depressed the screw 94 is adjusted the angular position of the guide or presser is adjusted. The two cams 95, 96 are identical but differently placed about the axis of the shaft 97 and when the treadle, which rotates them, is in either its raised or lowered

position a high part of one or other of the cams 95, 96 is in engagement with the end of one of the screws 93, 94. When a low part of either of the cams is opposite the end of its screw the cam is well out of contact with the end of the screw. When the treadle is in its raised position the guide or presser may be adjusted bodily heightwise and angularly by the upper pair of adjusting screws 80, 93 and when the treadle is depressed the guide or presser may be adjusted heightwise and angularly by the lower two screws 81, 94. The screw 94 which controls the angle of the guide or presser when the treadle is depressed may be so adjusted that the angle of the guide in relation to the part of the knife edge adjacent the guide is either increased or decreased as desired when the guide is lowered i. e., if the screw 94 is adjusted so that when the treadle is raised its end is further away from the shaft 97 than the end of the screw 93, as shown in Fig. 5, the member 91 will, when the treadle is depressed be moved to the left in Fig. 5 and the guide 66 will be raised. If the screw 94 is adjusted when the treadle is raised, so that its end is nearer the shaft 97 than the end of the screw 93, the member 91 will be moved to the right in Fig. 5 when the treadle is depressed and the guide 66 will be lowered. By this means an operator is enabled to skive one portion of a work piece to a desired thickness of edge and angle and by merely depressing a treadle skive another portion of the same work piece to a different edge thickness and angle which angle may be greater or smaller than the angle of the previous skive as desired.

By appropriately setting the adjusting screws the guide or presser may receive either its downward movement only (if the screws 93, 94 are adjusted the same distance away from the shaft 97) or its angular movement only if the screws 80, 81 are both adjusted to lock the shaft 76 when the treadle is depressed.

The frame of the machine is arranged to give a maximum of clearance for the skived off pieces of material. For this purpose the frame is of a boxlike nature having its front wall between the support for the feed roll and the support for guide or presser slide cut away except for the bearing 33. This opening in the front wall of the frame leads to a large recess open at the top and bottom and having side walls sloping downwardly and inwardly in which the knife 23 and grinding wheels 36, 37 are situated. This opening and recess provide clearance for the skived off material to fall down away from the knife, the parts of the knife and grinding wheel carriers and the bearing 33 on to which the skivings may fall being rounded to facilitate the dropping away of the skivings.

The feed roll 17, as in the machine of the patent, is supported for bodily and angular movement; and the presser 66, which is held rigidly stationary in a predetermined position during any given skiving operation, determines the character of the scarf which will be produced. When it is desired to produce scarfs of two different predetermined characters upon two different margins of a piece of work, the proper adjusting screws are manipulated, first with the treadle in raised position and then with the treadle depressed, so that when the treadle is in raised position the presser will normally be in position to produce one scarf and when the treadle is depressed, the presser will be moved into position to produce the other scarf.

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

1. A skiving machine having, in combination, a rotary knife, a yielding feed roll, an angularly adjustable presser which is unyielding during the skiving operation and determines by its position the character of the scarf produced, adjustable stop members limiting its angular adjustment to two predetermined angular positions, and treadle-controlled means for moving the presser quickly from one to the other of the two angular positions which have been predetermined by the positions into which the stop members have been adjusted.

2. A skiving machine having, in combination, a rotary knife, a yielding feed roll, an adjustable presser which is unyielding during the skiving operation and determines by its position the character of the scarf produced, and a single readily manipulated means for adjusting the presser both heightwise of the edge of the knife and angularly from one predetermined position to another to vary quickly the thickness of the edge and the angle of bevel of the scarf produced.

3. A skiving machine having, in combination, a rotary knife, a bodily and angularly yielding feed roll, a presser carrier movable up and down and normally held in a predetermined initial position, a presser pivoted to the carrier and normally held in a predetermined initial angular position, and a single means manipulation of which moves the carrier and swings the presser to predetermined final positions.

4. A skiving machine having, in combination, a rotary knife, a bodily and angularly yielding feed roll, a presser carrier movable up and down and normally held in a predetermined initial position, a presser pivoted to the carrier and normally held in a predetermined initial angular position, a single means manipulation of which moves the carrier and swings the presser to predetermined final positions, and means for preliminarily adjusting the carrier and the presser so that they will occupy different initial and final positions.

5. A skiving machine having, in combination, a rotary knife, a bodily and angularly yielding feed roll, a presser carrier movable up and down, a presser pivoted to the carrier, and a single means manipulation of which moves the carrier and swings the presser about its pivot.

6. A skiving machine having, in combination, a rotary knife, a bodily and angularly yielding feed roll, a slide movable up and down and normally held in a predetermined initial position, a presser pivoted to the slide and normally held in a predetermined initial angular position, and a single means manipulation of which moves the carrier and swings the presser to predetermined final positions.

7. A skiving machine having, in combination, a rotary knife, a bodily and angularly yielding feed roll, a slide movable up and down and normally held in a predetermined initial position, a presser pivoted to the slide and normally held in a predetermined initial angular position, a single means manipulation of which moves the carrier and swings the presser to predetermined final positions, and adjusting screws effective in initial

and in final position to change the predetermined initial and final positions of the presser.

8. A skiving machine having, in combination, a rotary knife, a rotary feed roll, a presser, a single means manipulation of which changes the height and angular inclination of the presser, and a bracket pivoted to the frame of the machine upon which the feed roll and presser are mounted in such manner that the bracket may be swung about its pivot to move the feed roll and the presser away from the knife while still permitting adjustment of the presser by the single means.

9. A skiving machine having, in combination, a rotary knife, a rotary feed roll, a rotary grinder, a sleeve member rotatably mounted in the frame of the machine, driving mechanism for the knife shaft feed roll and grinder housed in said sleeve member, knife supporting means fast to said sleeve member, and grinder supporting means rotatably mounted on said sleeve member.

10. A skiving machine having, in combination, a rotary knife, a yielding feed roll, an adjustable presser which is unyielding during the skiving operation and determines by its position the character of the scarf produced, a single readily manipulated means for adjusting the presser heightwise of the knife and angularly with respect thereto to place it at different angular inclinations to the edge of the knife, and means for controlling the angular adjustment in such manner that adjustment of the presser heightwise toward the knife may be accompanied by either an increase or a decrease of the angular inclination of the presser as may be desired.

11. A skiving machine having, in combination, a rotary knife, a yielding feed roll, an adjustable presser which is unyielding during the skiving operation and determines by its position the character of the scarf produced, a single readily manipulated means for adjusting the presser heightwise of the knife and angularly with respect thereto to place it at different angular inclinations to the edge of the knife, and means for controlling the two adjustments, heightwise and angular, in such manner that a selected one of them may be suppressed so that manipulation of the readily manipulated means may be caused to adjust the presser heightwise only or angularly only as may be desired.

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