Aug. 17, 1937. W. W. BRADBURY 2,090,024

WOOD HEEL TURNING MACHINE

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Fig.5.

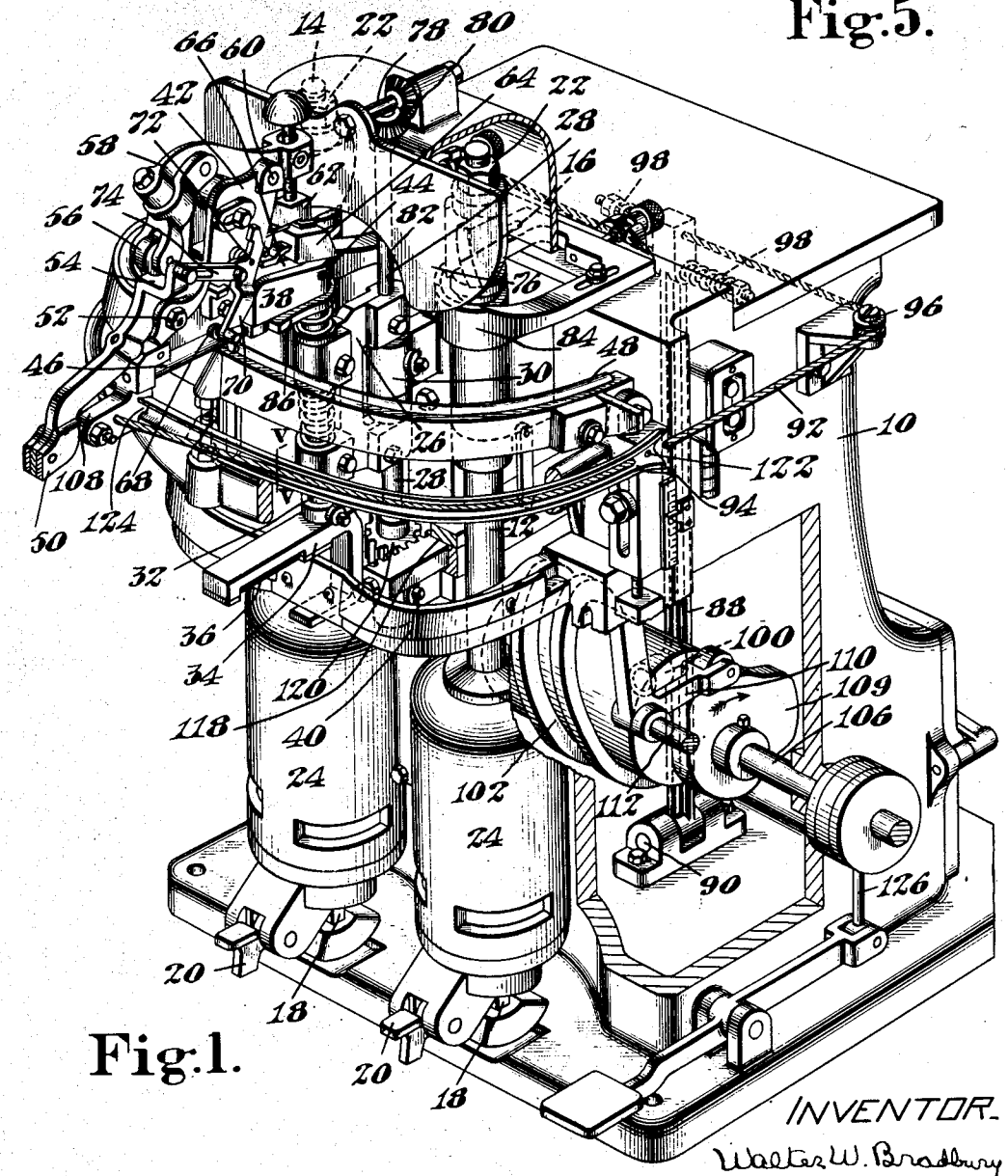


Fig.1.

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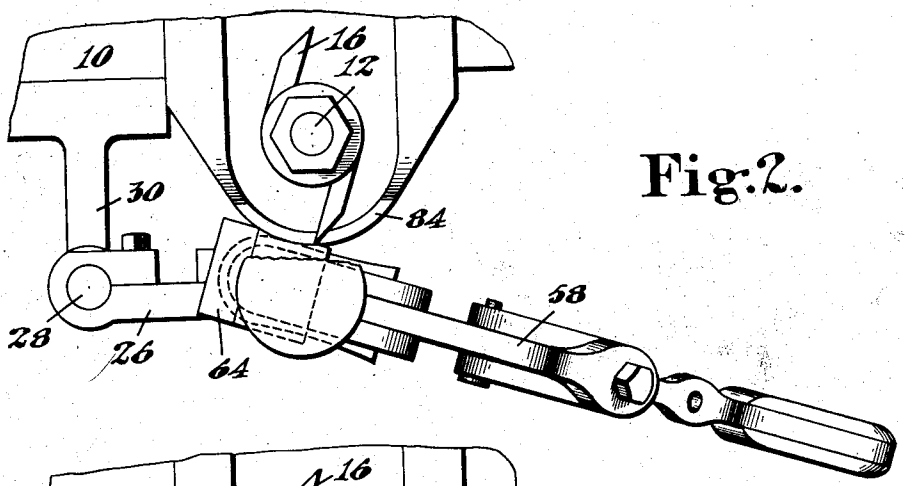


Fig.2.

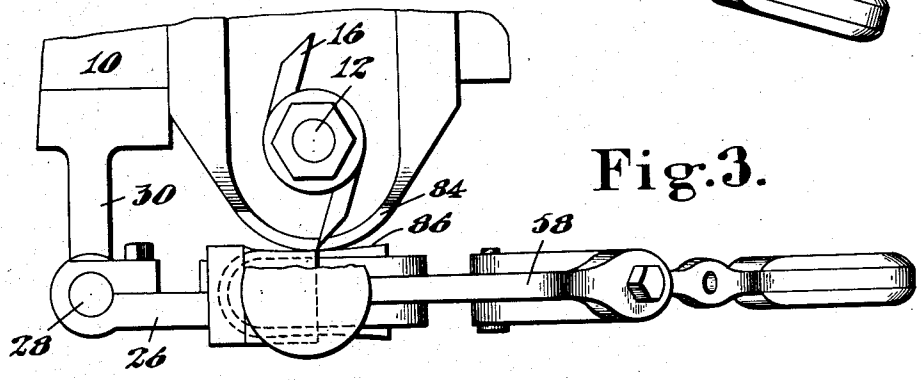


Fig.3.

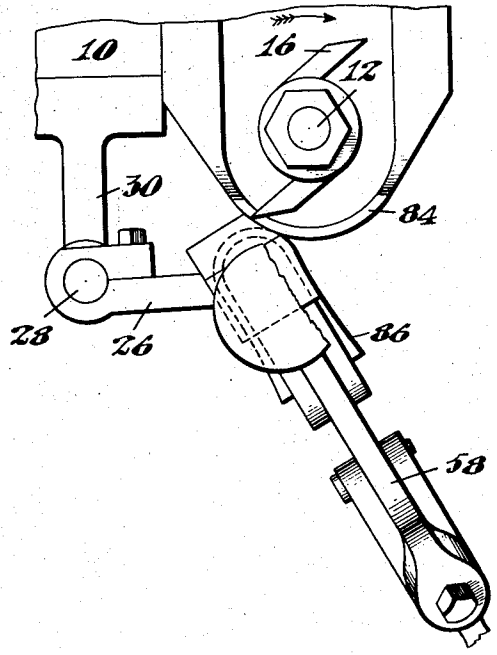


Fig.4.

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WOOD HEEL TURNING MACHINE

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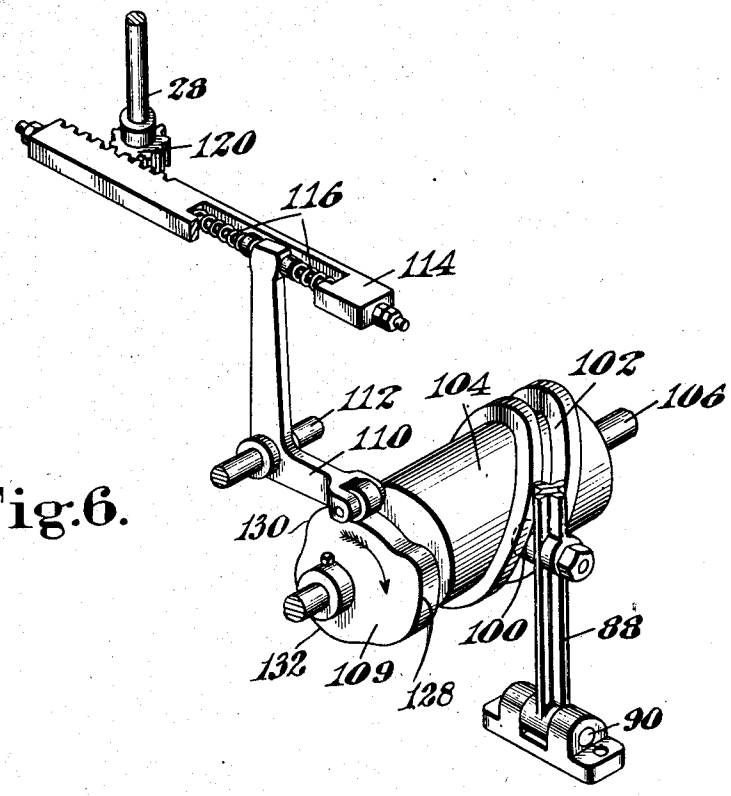


Fig.6.

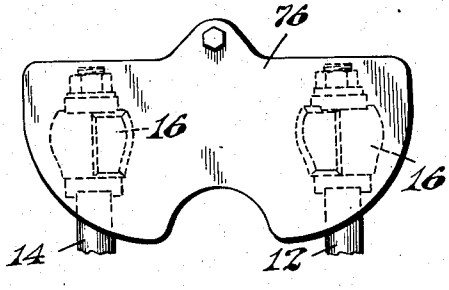


Fig.7.

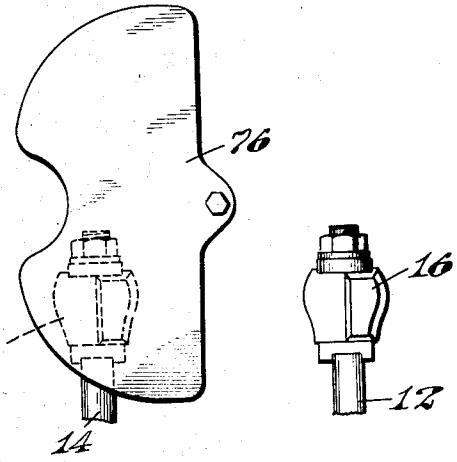


Fig.8.

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UNITED STATES PATENT OFFICE

2,090,024

WOOD HEEL TURNING MACHINE

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Application February 2, 1932, Serial No. 590,386

15 Claims. (Cl. 12—87)

This invention relates to wood heel turning machines and is illustrated as embodied in a machine of the type disclosed in United States Letters Patent No. 1,488,534, granted April 1, 1924, on the application of Folsom, Vinton and Whitney.

Machines of this type are provided with two rotary cutters at fixed locations, and a rotating jack which is swung and rotated over a cam track to present a heel blank to the cutters in turn to form the side and rear surfaces of the head or "block" as it is termed in the trade. The jack is swung by an operator whose unremitting attention is necessary.

A principal object of the present invention is to provide for automatic operation of wood heel turning machines such for example, as machines of the type referred to, thus enabling a single operator to operate more than one machine. Accordingly, I have provided, in the illustrated machine, a power-operated mechanism for rotating a heel-blank-carrying jack. Conveniently, and as illustrated, this mechanism may comprise a lever connected to the jack by a flexible cable. A guide is preferably provided for this cable and, as illustrated, the guide is maintained in proper operative relation to the jack as the jack moves over the cam track mentioned.

An important feature of the invention resides in provision for timing of the movements of a jack relative to a cutter which may be a cutter of a machine of the type referred to. The movements of the jack relative to a cutter of a machine of that type are of two kinds, first, the jack is swung as a whole to the cutter which is next to operate on the heel blank; and second, the jack is rotated with the heel blank past the cutter to make the cut. Since the cut begins at the breast it is advisable, in order to avoid chipping the blank there, to begin the cut a little back of the breast, then to turn the blank backward to finish the cut to the breast, and then to turn it forward to cut from the breast to the back, thus passing through the point where the cut was begun. In the illustrated embodiment of the present invention the power jack-operating mechanism is so organized that the jack is moved to its operative position in front of a cutter a little before it has rotated to the position in which the breast edge is being trimmed.

The invention also comprises improved means for guarding the cutters arranged to swing away from a cutter as the jack is swung toward that cutter.

These and other features of the invention comprising certain combinations and arrangements of parts will be apparent from the following description of a preferred embodiment of the invention shown in the drawings, in which

Fig. 1 is a perspective view of the machine;

Figs. 2, 3 and 4 are details showing different positions of the jack;

Fig. 5 is a cross-section of the cable and guide;

Fig. 6 is a detail of the operating mechanism; and

Figs. 7 and 8 are details of the guard.

Except as hereinafter indicated, the illustrated machine structure is substantially as shown in the United States Letters Patent No. 1,488,534, above mentioned.

The main frame **10** has mounted therein two cutter spindles **12**, **14** carrying cutters **16**. The lower ends of the spindles are squared at **18**, to coact with square holes in levers **20**, which can be thrown by the operator to lock the spindles when it is desired to manipulate the cutter-holding clamp nuts **22**. The spindles are driven by motors **24**.

A swinging gate member or "tomahawk" **26** is fixedly mounted on a shaft **28** which turns in bearings **30** on the frame **10**. The end of the gate member **26** carries a rotatable and vertically slidable shaft **32** which has an arm **34**, with a roller bearing **36**, at its lower end and a head **38** at its upper end. The roller **36** runs on a lower cam track **40** to control the height of the head **38** as the shaft **32** turns.

A jack frame **42** is pivoted to the head **38** at **44** and has a roller **46** running on an upper cam track **48** to tilt the jack frame as it turns around the axis of the shaft **32**. The jack has a handle **50**, pivoted at **52** on the frame **42**, with a cam surface **54** cooperating with a roller **56** on a clamping lever **58** (described in United States Letters Patent No. 1,707,985, granted April 9, 1929, upon an application of N. W. Kinney), pivoted at **60** on the jack frame and having an adjustable, pivoted clamp jaw **62** (described in United States Letters Patent No. 1,661,320, granted March 6, 1928, upon an application of W. W. Bradbury), arranged to clamp a heel blank **64** firmly down on lower clamp jaw **66** mounted on the jack frame **42**. A side gage **68** is mounted on a lever **70** pivoted at **72** on the jack frame and is operated by a link **74** connected to the swinging handle **50**. When the jack is open the gage **68** is swung up beside the heel blank **64** to gage it laterally and when the handle **50** is thrown down to clamp the blank, the gage is swung back to the position shown in Fig. 1. (This structure

is fully described and claimed in United States Letters Patent No. 1,715,660, granted June 4, 1929, upon an application of R. F. Knight.)

The shaft **28**, as it swings with the gate member **26**, operates a guard **76**. The illustrated guard is pivotally mounted on a shaft **78** at the top of the machine and is geared to the shaft **28** at **80**. Thus the swing of the gate member operates the shaft to throw the guard **76** away from the cutter toward which the gate swings, see Fig. 8. The placing of the gearing at the top of the machine enables the guard to be cut away on its bottom edge, at **82**, and thus avoids any interference between the guard and finished blanks as they fall from the jack when in its central position.

Each cutter spindle is surrounded by an adjustable collar **84** which cooperates with a pattern **86** mounted on the head **38**, as will be seen.

All of the structure so far described, with the exception of the improved guard **76**, is well known. The machine as so far described is operated by hand as fully described in the Folsom, Vinton and Whitney Patent No. 1,488,534 referred to. The heel blank is mounted in the jack as shown in Fig. 1, with the jack in its central position. The jack and gate **26** are then swung over to one side as shown in Fig. 3, with the form **86** against the collar **84**, and then the jack is turned around the axis of the spindle **32** to cut from the breast of the blank around to the back. The gate is then swung around about 180° to the other side so that the form will rest against the other collar **84**, and the jack is thrown with it to the reverse of the position of Fig. 3, and the cut is made on the other side of the blank from breast to back by turning the jack as before. Then the gate and jack are drawn out to the central position of Fig. 1 again and the finished blank removed.

It is customary in hand operation to throw the gate to its extreme position in operative relation to a cutter before allowing the jack to reach its extreme position, so that the cut begins at a point substantially behind the heel breast, as shown in Fig. 2. This avoids the catching of the breast corner by the cutter and tearing out splinters thereby spoiling the blank. From the Fig. 2 position the jack is turned to the Fig. 3 position, thus cutting forward to the breast, and then is turned toward the Fig. 4 position to cut from the breast to the back.

The mechanism of the illustrated machine for operating the machine automatically will now be described.

A lever **88** is pivoted at **90** on the frame **10**, to swing from side to side. A cable **92** has its ends mounted in the upper end of this lever and passes on rollers **96** around the front of the machine and through a split tube **94**. The ends of the cable pass through springs **98**, after passing through the lever, and are arranged to slide in the lever. These springs give the lever a certain lost motion at times. The lever **88** has a cam roll **100** running in a barrel cam slot **102** in a barrel **104** on a shaft **106** mounted in the machine frame. The cam slot is shaped to swing the lever from a central position (Figs. 1 and 6) to the right, then to a corresponding position to the left, and then back to the central position. The cable is fastened to the jack frame at **108**, and this movement of the lever **88** will swing the jack from the Fig. 1 position to the Fig. 3 position, then to the reverse of the Fig. 3 position and back to the Fig. 1 position.

In Figs. 1 and 6 the mechanism is shown in its central loading position. The shaft **106** rotates as shown by the arrows. The first 90° of rotation (approximately) will carry the upper right hand (Fig. 6) portion of the slot **102** to the roll **100**, throwing the lever **88** to the right (Fig. 6), and pulling the jack to the right (Fig. 1). The next 90° of rotation of the shaft **106** throws the jack back to central position again, on its way to the other cutter. The next 90° brings the lower left hand portion (Fig. 6) of the slot **102** to the roll **100** and the lever **88** swings to the extreme left (Fig. 6) and the jack to the extreme left (Fig. 1). The fourth 90° brings the jack to central position again, and the machine stops there.

In order to control the gate member **26** and the guard **76**, a cam **109** on the shaft **106** operates a bell crank lever **110** on a shaft **112** mounted in the machine frame to push back and forth a slide bar **114**, with which it has resilient lost motion connections at **116** in both directions. This bar **114** slides in a guide **118** in the machine frame, and has a rack and pinion connection at **120** with the shaft **28**. The cam **109** is so shaped as to swing the gate **26** from the Fig. 1 position to the Fig. 3 position, and hold it there while the jack turns to make the cut, and then to throw the gate **26** over to the reverse of the Fig. 3 position, hold it there while the other cut is being made, and then to swing the gate back to central position again. The cam **109** (Fig. 6) has a high portion **128**, an intermediate portion **130**, and a low portion **132**. The portions **128** and **132** are formed as long dwells, and are about 180° apart, and the portion **130** is about half way between them. The portion **130**, which is operative in the Fig. 6 position, holds the shaft **28** and gate **26** in central position (Fig. 1). The first 90° of rotation of the shaft **106** brings the low portion **132** into action on the arm **110**. This enables the arm **114** to move backward in the machine, or to the right (Fig. 6). (The cam **109** being shown as an edge cam, some convenient means of pulling the bar **114** to the right, in Fig. 6, as a spring, will be used.) This movement of the bar **114** will turn the shaft **28** counterclockwise, as seen from above, will turn the gate to the right (Fig. 1), and will turn the guard **76** clockwise (Fig. 8). The next 180° of rotation of the shaft **106** throws the high portion **128** into action on the arm **110**, and throws the gate and guard about 180° to their other extreme positions. The last 90° of rotation of the shaft **106** brings the parts back to the positions of Figs. 1 and 6. The cams are so designed as to bring the gate **26** to its extreme position just before the jack reaches its extreme position, as shown in Fig. 2, so that the cutting will begin at a point back of the breast, as above described. In other words the low portion **132** leads the upper right hand (Fig. 6) portion of the slot **102**, and the high portion **128** similarly leads the lower left hand portion of the slot **102**.

As is usual in machines of this type, the cam track **48** is pivoted at its ends to permit angular adjustment to control the style of the heel as explained in United States Letters Patent No. 1,247,335, granted November 20, 1917, on the application of H. W. Russ. Inasmuch as the vertical position of the jack roller **46** is determined at all times by the camtrack **48**, it is necessary to provide a suitable connection at **108** which will permit proper action of the cable **92** under various conditions of track adjustment. Accordingly, in the illustrated machine the split tube **94** is pivoted at its ends at **122** on the machine frame and a tongue **124** is provided on the lug at **108** to engage in the groove of the split tube **94**. Thus

the tube follows the jack in all its positions, irrespective of the adjustment of the track 48.

In using this machine, the operator inserts a heel blank in the jack while the machine is in the position of Figs. 1 and 6 and trips the clutch. The guard swings down from the right hand (Fig. 1) cutter, and the gate and jack swing toward the right hand cutter, but the gate brings the form 86 against the collar 84, and the cutting begins, a little before the jack completes its turn to the right. The jack completes its turn to the right and returns to the left while the dwell 132 is in action, and then the jack and gate swing to the left side of the machine and the guard reverses its position, enabling an exactly similar cutting operation to take place on the left side of the machine. The lost motion springs 116 and 98 take up the drive movement when the extreme positions have been reached by the moving parts. The last quarter cycle returns the parts to the positions of Figs. 1 and 6.

A suitable one-revolution clutch and treadle mechanism 126 will conveniently be provided on the machine.

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

1. In a heel turning machine, a cutter, a jack arranged to hold a heel blank and to move it past the cutter, a cam track mounted in fixed relation to the cutter and arranged to tilt the jack as the jack moves the heel blank past the cutter to form the side and rear surfaces of the finished heel on the blank, and power-operated means for moving the jack past the cutter.

2. In a heel turning machine, a cutter, a jack arranged to hold a heel blank and to move it past the cutter, two cam tracl . mounted in fixed relation to the cutter, one arranged to tilt the jack relatively to the cutter and the other arranged to lift the jack relatively to the cutter as the jack turns the heel blank past the cutter to form the side and rear surfaces of the finished heel on the blank, and automatic means for turning the jack past the cutter about an axis extending generally vertically of the heel.

3. In a heel turning machine, two cutters mounted at fixed locations, a jack carrying member arranged to place its jack in operative relation to the cutters alternately, a cam track having a fixed location during the operation of forming the side and back surfaces of a heel for controlling the operative movement of the jack relatively to the cutter when the jack is moved to carry a heel blank therein past the cutter, automatic mechanism for operatively moving the jack relatively to the cutters to shape the side and back of a heel blank, and automatic mechanism for moving the jack from one cutter to the other.

4. In a heel turning machine, a cutter, a jack arranged to hold a heel blank and to turn it past the cutter to form progressively a finished heel surface running from the breast to the back of the blank, and automatic means for turning the jack arranged to bring a heel blank therein into operative contact with the cutter first at a point on the side of the blank, then to turn the blank to carry the point of cut to the breast of the blank, and then to reverse the direction of turn to carry the point of cut from the breast to the back of the heel blank.

5. In a heel turning machine, a cutter, a jack carrying member arranged to carry a jack therein into and out of operative relation to the cutter, the jack being rotatable on the carrying member to carry the point of cut on a heel blank in the jack along the periphery of the heel blank, and automatic mechanism for swinging the jack back and forth and for operating the jack carrying member, constructed and arranged to bring the jack into operative position prior to the time when the jack reaches the extremity of its rotation, and to hold the jack in operative position while the jack moves to the said extremity of rotation and then turns in the opposite direction to carry the point of cut on the blank from the breast to the back thereof.

6. In a heel turning machine, a cutter, a jack carrying member arranged to carry a jack therein into and out of operative relation to the cutter, the jack being rotatable on the carrying member to carry the point of cut on a heel blank in the jack along the periphery of the heel blank, and automatic mechanism for swinging the jack back and forth and for operating the jack carrying member, constructed and arranged to bring the jack operating member to the extremity of its swing just before bringing the jack holding member to the extremity of its rotation.

7. In a heel turning machine, two cutters arranged to trim the respective sides of a heel blank from the breast to the back, a jack arranged to oscillate from one cutter to the other, and back again, power means comprising a cable operating to oscillate the jack between the cutters, and power means operating to turn the jack, while in operative relation to a cutter, to trim a heel blank in the jack from breast to back.

8. In a heel turning machine, two cutters arranged to trim opposite sides of a heel blank, a jack arranged to rotate a heel blank held therein against a cutter when in operative relation thereto, a jack carrier arranged to carry the jack from one cutter to the other, a power-operated member arranged to turn the jack in successive opposite rotations of substantially 180°, power-operated mechanism arranged to move the jack carrier in successive opposite movements from one cutter to the other, the power-operated member and mechanism being so timed as to bring the jack carrier to an extremity of its movement adjacent one cutter before the jack reaches the extremity of its rotation, and to hold the jack carrier at said extremity while the jack makes substantially half of its return movement, and then to bring the jack carrier to its other extreme position adjacent the other cutter, before the jack has completed the return movement, and to hold the jack carrier at said other extreme position while the jack completes the said return movement and performs substantially 90° of the following direct movement.

9. In a heel turning machine, two cutters arranged to trim opposite sides of a heel blank, a jack arranged to rotate a heel blank held therein against a cutter when in operative relation thereto, a jack carrier arranged to carry the jack from one cutter to the other, and power-operated mechanism arranged to oscillate the jack carrier in successive opposite movements from one cutter to the other, the movements in one direction being uninterrupted, said power-operated mechanism comprising a cable connected to both sides of the jack carrier, and a member arranged to pull on the cable in opposite directions, alternately, the power-operated mechanism being constructed and arranged to cause the jack carrying member to dwell while the jack carried thereon

is in operative relation to a cutter, while the jack turns sufficiently to carry the point of cut on a blank in the jack from the breast around to the back thereof.

10. In a wood heel turning machine, a cutter shaped to form the lateral and rear surfaces of a heel blank, a jack adapted to be swung to a position in front of the cutter in order to turn a heel blank in the jack past the cutter, and a power-operated cable attached to the jack whereby the jack is so turned.

11. In a wood heel turning machine, a cutter shaped to form the lateral and rear surfaces of a heel blank, a jack adapted to be swung to a position in front of the cutter in order to turn a heel blank in the jack past the cutter, a power-operated cable attached to the jack whereby the jack is so turned, and a lever for operating the cable.

12. In a wood heel turning machine, a cutter shaped to form the lateral and rear surfaces of a heel blank, a jack adapted to be swung to a position in front of the cutter in order to turn a heel blank in the jack past the cutter, a power-operated cable attached to the jack whereby the jack is so turned, and a movable guide for the cable arranged adjacent to the path of the jack.

13. In a wood heel turning machine, a cutter shaped to form the lateral and rear surfaces of a heel blank, a jack adapted to be swung to a position in front of the cutter in order to turn a heel blank in the jack past the cutter, a power-operated cable attached to the jack whereby the jack is so turned, a movable guide for the cable arranged adjacent to the path of the jack, and a connection between the jack and the guide whereby operative relation between the jack and the guide is maintained at all times.

14. In a wood heel turning machine, a cutter shaped to form the lateral and rear surfaces of a heel blank, a jack adapted to be swung to a position in front of the cutter in order to turn a heel blank in the jack past the cutter, a power-operated cable attached to the jack whereby the jack is so turned, a movable guide for the cable arranged adjacent to the path of the jack, and a tongue on the jack engaging the guide whereby operative relation between the jack and the guide is maintained at all times.

15. In a wood heel turning machine, a cutter shaped to form the lateral and rear surfaces of a heel blank, a jack adapted to be swung to a position in front of the cutter in order to turn a heel blank in the jack past the cutter, a pivotally adjustable cam track for guiding the jack, a power-operated cable attached to the jack whereby the jack is turned, a movable guide for the cable arranged adjacent to the path of the jack, and means for maintaining the guide and the jack in operative relation irrespective of the adjustment of the track.

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