

June 4, 1929.

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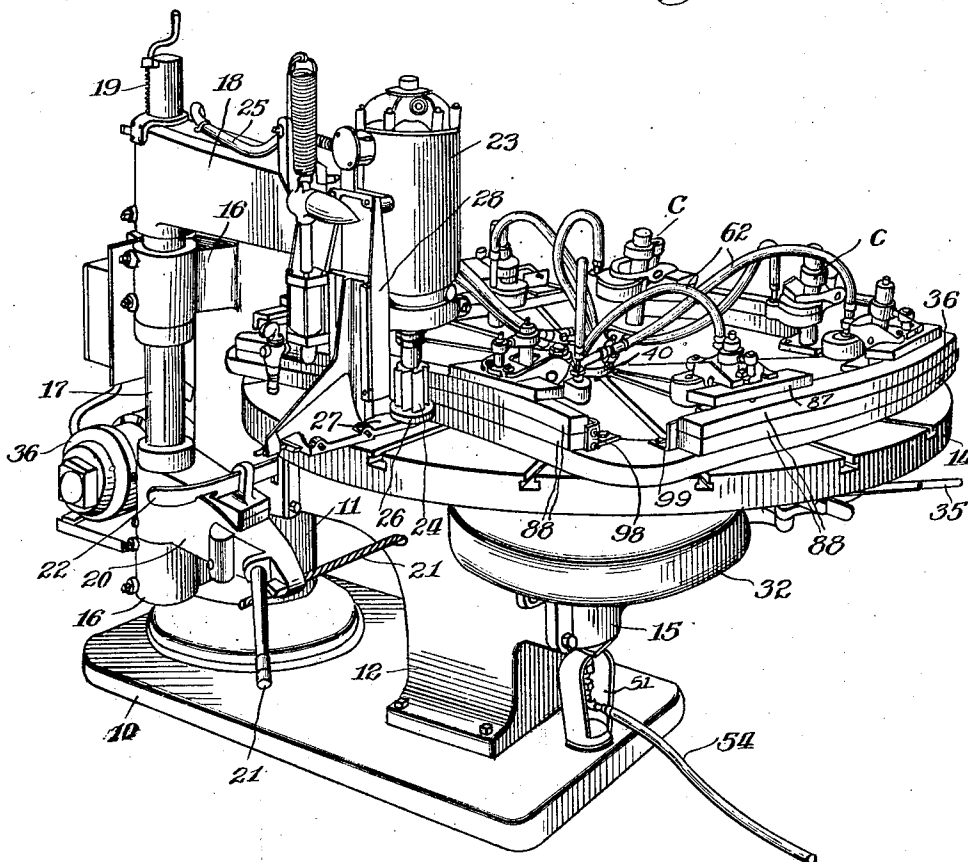
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WOOD SHAPER

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3 Sheets-Sheet 1

Fig. 1



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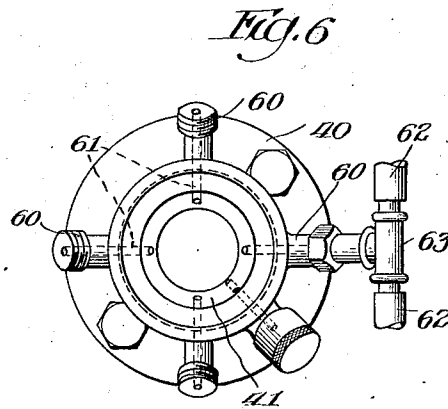
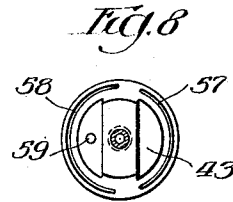
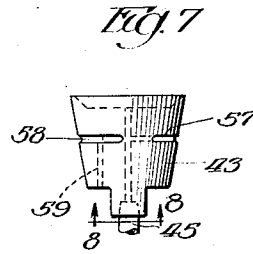
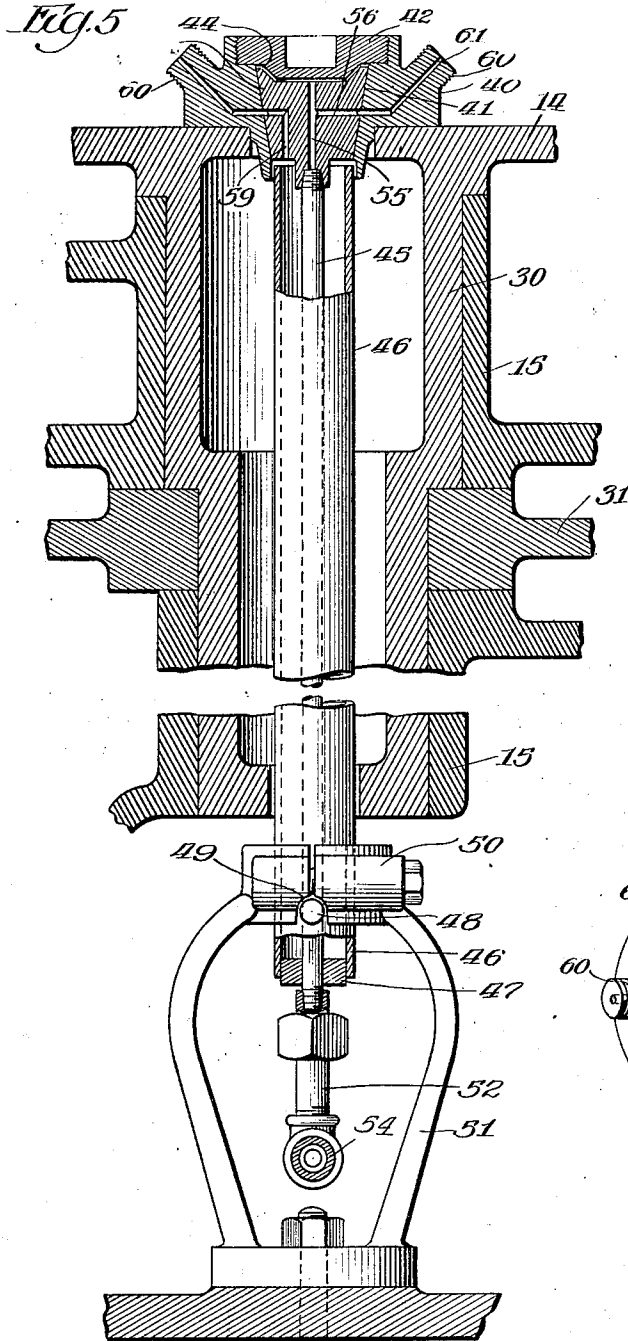
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WOOD SHAPER

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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WOOD SHAPER.

Application filed January 16, 1928. Serial No. 247,071.

This invention relates to improvements in wood shaping machines and the like, and more particularly to improved means for automatically clamping the work when the pieces are carried into cooperative relation with the cutter. This application for patent relates to wood working machines like that disclosed in my Patent No. 1,685,613, Sept. 25, 1928, except that a somewhat later design of machine is shown having a somewhat simplified air valve and a form of clamp which is quickly adjustable in the vertical position.

The main objects of this invention are to provide means whereby the pieces of work may be shaped in a continuous and automatic manner as is required in large quantity production; to provide an automatic shaper wherein the pieces may be supplied and removed continuously without the necessity of stopping any of the cutting operations; to provide a machine which can be easily set up or adjusted for different sizes and shapes of work; and to provide an improved work clamp and clamp operating device.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:—

Figure 1 is a perspective view of the wood shaping machine, shown in operating condition.

Fig. 2 is a plan view of one of the pneumatic clamps of the machine shown in Fig. 1.

Fig. 3 is a side elevation of the work clamp with parts broken away and parts shown in section.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view through the axis of the work table, showing the pressure distributing valve and connections thereto.

Fig. 6 is a plan view of the valve housing with the cover and valve head removed.

Fig. 7 is a side elevation of the valve head.

Fig. 8 is a bottom plan view of Fig. 7.

The wood shaping machine is supported on a base 10 to which is bolted the rear column 11 and the knee 12. The machine is provided with a horizontal, circular work support table 14 which is rotatably mounted in suitable bearings 15 provided in the knee 12; and at one side of the column 11 is supported on laterally extending brackets 16 the vertical cutter arm shaft 17, which may be loosened

for turning, or locked in position, if so desired.

On the shaft 17 is keyed the cutter arm 18, which may be adjusted vertically by means of the adjusting screw 19. Near the lower end of the shaft 17 is keyed the control arm 20. This arm is provided with a handle 21 for manual adjustment, and the arm is drawn inwardly towards the table by means of a weight which is suspended within the knee casting 12 by means of the cable 21, a latch 22 being provided for holding the lever 20 locked in the outward position.

On the outer end of the cutter arm 18 is mounted a fluid turbine 23, to the shaft of which is directly attached the rotary cutter 24. The turbine is supplied with fluid pressure through the flexible supply pipe 25, and is driven at a rate of approximately 7200 R. P. M., with the cutter turning against the direction in which the wood is fed, with the result that the cutter operates smoothly in the wood regardless of the direction of the grain. On the lower end of the turbine shaft, below the end of the cutter 24 is loosely mounted the guide roll 26 which is provided with a steady-rest bearing in the plate 27, the plate being mounted for both horizontal and vertical adjustment in the slideway member 28 which is secured to the cutter arm 18.

The work table 14 is provided with a hollow hub 30 which is journaled in the bearings 15 of the knee member; and the table is driven by means of a worm gear 31 which is keyed to the hub 30 and housed in the hollow portion 32 of the knee. The worm gear is rotated by means of a worm mounted on the right side of the machine, which is thrown into or out of engagement with the worm gear by means of the control levers 35. The worm is mounted on a shaft which is connected, through a suitable speed changing and controlling transmission, to the motor which is mounted on the rear of the column 11, as is more clearly shown and described in the application referred to above.

The model 36, for guiding the cutter by engagement with the guidewheel 26, is clamped to the surface of the table. The periphery of the model may include the outlines of a plurality of different shaped pieces, arranged in a continuous circular manner

about the center of the table; and the pieces of work are clamped directly on the model in proper relation with the corresponding guide portions.

5 At the center of the table is bolted the housing 40 of the pressure distributing valve. The housing has a conical bore 41 which is closed at the larger or upper end by means of the cover member 42 which is threaded into
10 the housing 40. The valve head 43 fits freely in the bore, and is pressed downwardly to prevent leakage by means of the pressure which is communicated to the chamber or clearance space 44 at the top end of the valve member
15 43. At the lower end of the valve member 43 is rigidly attached the pipe 45 which extends through a tubular housing member 46 which projects below the lower end of the bearing
20 15. The pipe 45 is rigidly connected to the tube 46, at the lower end, by means of the collar 47; and the tube 46 is held from rotating by means of the pin 48 which is fixed in the tube 46 and engages in a suitable notch 49
25 which is provided in the lower edge of the hub 50 of the fixed bracket 51. The bracket is bolted to the base 10, and the hub, at the upper end, is split so that the rotative position of the head may be adjusted and then fixed by clamping the tube 46. Suitable pipe fittings
30 52 are attached to the lower end of the pipe 45 for making a connection with the flexible hose line 54. By this construction all movable joints are eliminated in the connections to the air passage 55 in the center of the valve head 43.
35 43.

The passage 55 extends directly through the center of the valve head, and communicates through a passage 56 to the circumferential segmental groove 57, at one side of the
40 valve head. Directly on the opposite side of the valve head is provided a second groove 58 which is connected to the atmosphere by the passage 59 which opens at the outer or lower end of the head 43. Suitable threaded bosses
45 60 are provided around the body member 40 in which are provided the communicating passages 61 which open into the bore 41 in alignment with the grooves 57 and 58. When relative rotation is caused between the valve body
50 40 and the valve head 43, the outlet passages 61 are each registered successively, first with the fluid pressure through the groove or port 57, and then exhausted through the port 58.

In the arrangement shown, two clamps C
55 are provided on each side of the square formed by the model which are connected in pairs by means of the flexible tubes 62 and the pipe-T 63 to the outlet bosses 60. Since the head is held from rotating while the table is turning, it is obvious that the clamps will be automatically operated as the table rotates, the clamps being closed when they are passing the cutter 24.

The construction of the clamps C is as follows: The post 65 is provided with a base 66

which is rigidly secured to the surface of the work table 14. A frame 67 is slidably mounted on the post, and adjusted vertically thereon by means of the adjusting screw 68 which is engaged by the threaded end of the pin 69
70 which is held in the hub of the frame 67 by means of the cap screw 70. The adjusting screw 68 is held from longitudinal movement by means of a suitable yoke 71 which engages in the circumferential groove 72 in the end of
75 said screw, and is secured to the post 65.

The frame 67 has, formed therein, the air cylinder 73 in which is slidably positioned the piston 74. The stem 75 of the piston 74 projects through the cover 76 of the cylinder
80 73, and the piston 74 is pressed downwardly by means of the spring 77 which is disposed between the top of the piston and the cover 76. The tubes 62 connect to the bosses 78, which are formed at one side of the cylinder 73 (Fig. 85
2), and are provided with suitable passages 79 for communicating the pressure in the tubes 62 to the recesses or clearance space 80 in the bottom of the cylinder 73. Thus when
90 pressure is supplied to the tubes 62, the pistons 74 are forced upwardly; and the pistons are returned by the spring 77 as soon as the pressure has been exhausted.

In each frame 67 is pivotally mounted a work clamp member 81. The member 81 is
95 yoke-shaped and provided with pintles 82 which engage in conforming recesses in the lugs 83 which are integrally formed in the frame 67 at either side of the post 65. In the rear end of the clamp 81 is threaded a post 84
100 which is held against the upper end of the piston stem 75, by means of the spring 181 which is tensioned between an adjusting bolt 182, mounted in the clamp yoke 81, and the lug 183 which is formed on the frame 67. The
105 front side of the clamp 81 is bifurcated and provided with suitable slots 85 for receiving the bolts 86 which serve to clamp the clamp blocks 87 in place. When the air cylinder is exhausted, the clamp member is rotated about
110 the pintles 82 counter-clockwise, as viewed in Fig. 3, by means of the spring 182, to raise the forward end of the clamp for releasing the pieces of work 88.

For yieldably retaining the work in position until the clamps are operated, there is
115 provided a spring pressed plunger 90. This plunger is slidably mounted in a tube 91 which is fixed in a head 92; and at one side of the head 92 is provided a stem 93 which is secured in the collar 94 which is slidably adjustable on the vertical post 65. The plunger
120 90 is provided with a stem 95 which projects through the end of the head 92, the stem being provided with a stop collar 96. The
125 plunger is pressed downwardly by means of the heavy spring 97 which bears against the upper end of the plunger 90 and seats in the member 92.

In operation, the work table 14 is rotated 130

continuously and the guide wheel 26 rides against the profiled edge of the model 36, guiding the cutter in proper relation with the work. The pieces of work are forced under the yieldable plungers 90 against suitable gaging members 98—99 which are bolted to the model 36, or to the table 14.

At the front side of the table where the operator stands, the clamps 81 are in their open position and the blocks 87 are raised so that the pieces of work can be slipped under them. As the work is carried toward the cutter, the clamps are automatically closed by the rotation of the valve body 40 about the stationary valve head 43, causing the passage 61 which is connected to the clamp operating cylinder to register with the supply port 57. After the clamp has moved beyond the cutter, the opening of the passage 61 registers with the exhaust port 58. The pressure in the clamp cylinder is relieved and the work is released but held in place by the spring pressed detent until removed by the attendant.

While but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In a woodworking machine, a base, a work table rotatably mounted on the base, a plurality of air-operated clamps mounted in circular arrangement on said table, a valve housing mounted on the center of the table and having passages leading to each of said clamps, and a stationary valve in said housing, an exhaust port and a pressure supply port, said ports cooperating successively with said passages to operate the clamps.

2. In a woodworking machine having a cutter, a work support, and means for causing relative movement between the cutter and support, a pneumatic work clamp mounted on the support, and a valve operated by the relative movement between the cutter and support for opening and closing the clamp.

3. In a woodworking machine having a cutter, a work support, and means for causing relative movement between the same; a pneumatic work clamp mounted on the support, a valve controlled by the relative movement between the cutter and support for opening

and closing the clamp, and a spring pressed detent for yieldably holding the work in relation with the clamp.

4. In combination, a base, a work support rotatably mounted on the base, a pneumatic work clamp mounted on the support, a valve for operating the clamp, said valve having two cooperating control members, one member being connected to the base and the other member being mounted on the support to move therewith.

5. In combination a base, a work support rotatably mounted on the base, a pneumatic work clamp mounted on the support, a valve for operating the clamp, said valve having a housing concentrically mounted on the support and a valve head rotatably mounted in the housing and held against rotation.

6. In combination, a base, a work support rotatably mounted on the base, a pneumatic work clamp mounted on the support, a valve for operating the clamp, said valve including a housing having a tapered bore closed at the larger end and a tapered valve head mounted in the bore, the housing being concentrically mounted on the support and the valve head being held from rotating.

7. In a wood shaper having a work table, a post mounted on the table, a frame slidably mounted on the post, an arm pivotally mounted on the frame, means mounted on the frame for operating the arm to clamp pieces of work on the table, and means comprising a screw journaled in the post for positively adjusting the height of the frame from the surface of the table, so that pieces of different thicknesses may be clamped to the table by substantially the same amount of movement of the clamp arm.

8. In a wood shaper having a work table, a post mounted on the table, a frame having an air cylinder formed therein, the frame being slidably mounted on the post, a work clamp arm pivotally mounted on the frame, a piston slidable in the cylinder and connected to the arm for operating the same, and means for adjusting the vertical height of the frame so that pieces of work of different thicknesses may be clamped to the table by substantially the same movement of the arm.

Signed at Chicago this 10th day of January, 1927.

OSCAR ONSRUD.