

Serial Number 09/246,195
Filing Date 11 January 1999
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LARGE PANEL SURFACE PLANER

STATEMENT OF GOVERNMENT INTEREST

BACKGROUND OF THE INVENTION

(1) Field of the Invention

The invention is related to planing and surface finishing and in particular to manually operated guides for planing large panels.

(2) Description of the Prior Art

Large panels are typically surfaced using large and expensive milling machines. The alternative is hand planing and sanding to provide a flat surface. The hand finishing method requires both high skill and extended time for satisfactory results. In the case of smaller panels, the hand finishing method is reasonably acceptable. However, for larger panels, the accuracy of hand finishing is reduced and the time is greatly extended. Various jig guides and fixtures have been developed to assist in manual finishing of flat panels. These devices include various tables,

1 clamping devices and router attachments. For example, U.S. Patent
2 No. 5,203,389 to Goodwin, provides a guide, which supports a
3 router above a workpiece. However, a large workpiece cannot be
4 planed if it exceeds the fixed size of the frame. Additionally,
5 the frame cannot be greatly enlarged due to the construction of
6 the slide mechanism. Other examples include U.S. Patent No.
7 5,375,951 to Veale, which provides a complex custom device to
8 serve as a bed for milling machine and U.S. Patent No. 5,682,934
9 to Rybski, which is intended for shaping and cutting rather than
10 planing. None of these devices are adapted to work with large
11 panels. Additionally, many of the devices rest on the short
12 lengths of the workpiece. A device resting on the short length of
13 a workpiece can usually help to provide a smooth surface.
14 However, due to surface irregularities, such a device cannot
15 accurately provide a flat planar surface such as those produced by
16 a milling machine. What is needed is a portable device, which can
17 be attached to a workpiece, but stand clear so that a cutting tool
18 may follow a planar path over the workpiece.

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SUMMARY OF THE INVENTION

21 Accordingly, it is an object of the present invention to
22 provide a surface-planing device suitable for large panels.

23 It is another object of the invention to provide a surface-
24 planing device which can provide both a smooth surface and a flat,
25 planar surface on a large panel.

1 It is yet another object of the invention to provide a
2 surface planing device which can be attached to a workpiece while
3 remaining clear of any surface irregularities.

4 It is a further object of the invention to provide a surface
5 planing device having manually-operated tool guides adapted for
6 use with common cutting tools.

7 The invention is a large panel surface planer comprising a
8 flat platform used as a mounting base and having a pair of channel
9 rails clamped thereon using c-clamps at each end of each channel
10 rail. The workpiece is secured to the flat platform using one or
11 more pairs of back-to-back clamps which clamp both the workpiece
12 and the flat platform. A pair of rectangular guide bars are
13 clamped to and aligned orthogonally with the channel rails using a
14 c-clamp at each end of each guide bar. A tool stop is also
15 clamped at the channel rail-guide bar intersection providing both
16 a tool stop and a spacer for alignment of the spacing between the
17 guide bars. A cutting tool, such as a router, is then manually
18 moved across the surface of the workpiece using the guide bar to
19 hold the tool in position (both height and lateral position).
20 After planing a particular set position, it is necessary to
21 manually reposition the guide bar for the next cut and to continue
22 sequentially until the entire workpiece has been planed.

1 will be planed, is held in place on the flat platform 12 by a
2 second means for attaching, the back-to-back
3 clamps 18. Above the workpiece 100, rectangular guide bars 20 are
4 positioned on top of and forming right angles with the channel
5 rails 14 which are used as guide supports for the guide bars 20.
6 The guide bars 20 are separated at each end by spacer/end stops 22
7 and held in place against the channel rails 14 by the third means
8 for attaching, additional c-clamps 16. A cutting tool 102 is
9 shown positioned on top of the guide bars 20 ready for planing.

10 Referring to FIG. 2, the planer can be seen from a top view.

11 This view shows the channel rails 14 with the orthogonally
12 positioned guide bars 20 mounted over workpiece 100 on the flat
13 platform 12. The assembly is held in place by c-clamps 16 at the
14 flat platform edges 12C and at the channel rail/guide bar
15 intersections. The workpiece is held by back-to-back
16 clamps 18. The cutting tool 102, illustrated as an electric
17 router, is positioned between the guide bars 20 and is moveable
18 laterally as depicted by arrows 24. The lateral movement of the
19 cutting tool 102 is restricted by the spacer/end stops 22, the end
20 stops striking the router base plate.

21 FIG. 3 shows the positioning of workpiece 100 over flat
22 platform 12 and beneath guide bars 20. The cutting tool 102 is
23 supported by guide bars 20. The entire assembly is clamped
24 together, including the flat platform, by c-clamps 16, except the
25 workpiece 100 which is held by back-to-back clamps 18.

1 FIG. 4 shows the end view of the flat platform 12 with the
2 channel rails 14 secured by c-clamps 16. The rectangular guide
3 bars 20, separated by spacer/end stop 22 are likewise clamped to
4 the channel rails 14 by additional c-clamps 16.

5 FIG. 5 shows a typical cutting tool 102 which is used in the
6 large panel surface planer. This tool has a bushing 104 mounted
7 by screws 108 located around the cutter 110. The bushing 104
8 engages the guide bars 20 and provides a straight, even path for
9 manual movement of the cutting tool 102. The base plate 106 rides
10 along the top of the guide bars 20 and maintains the proper
11 elevation of the cutting tool 102.

12 The set up and operation of the invention is relatively fast
13 and accurate compared to prior methods of manual planing. The
14 workpiece 100 and channel rails 14 are clamped to the flat
15 platform 12. Then guide bars 20 are clamped to the channel rails
16 14 and the cutting tool 102 is run back and forth across the
17 workpiece 100. The channel rails 14 are then repositioned and
18 another cut is completed. This process is repeated until the
19 entire workpiece has been planed. After planing one side, the
20 workpiece 100 is turned over to plane the opposite side.

21 The features and advantages of the invention are numerous.
22 The large panel surface planer is assembled using commonly
23 available components such as c-clamps, back-to-back clamps,
24 channel rails and rectangular tubing. By repositioning the clamps
25 and channel rails, different sized panels can be accommodated.

1 Additionally, surface irregularities on the workpiece do not
2 interfere with the production of a smooth and plane surface
3 because the guide bars do not rest on the workpiece surface.
4 Although the present invention has been described relative to a
5 specific embodiment thereof, it is not so limited. The specific
6 shape of the guide bars may be modified so long as the lateral
7 rigidity is maintained. For example, the guide bar can be changed
8 from rectangular to an I-beam or T-shape. Likewise, the channel
9 rails may have other shapes provided rigidity is maintained.
10 Also, a variety of clamps or clamping devices can be used.
11 Clamping pliers can replace c-clamps. Thus, it will be understood
12 that many additional changes in the details, materials, steps and
13 arrangement of parts, which have been herein described and
14 illustrated in order to explain the nature of the invention, may
15 be made by those skilled in the art within the principle and scope
16 of the invention.

1 Attorney Docket No. 78686

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LARGE PANEL SURFACE PLANER

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ABSTRACT OF THE DISCLOSURE

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7 A large panel surface planer is provided. The planer has
8 a flat platform used as a mounting base. A pair of channel
9 rails are clamped to the mounting base using c-clamps at the
10 ends of each channel rail. A workpiece is secured to the flat
11 platform using one or more pairs of back-to-back clamps which
12 clamp both the workpiece and the flat platform. A pair of
13 rectangular guide bars are clamped to and aligned orthogonally
14 with the channel rails using a c-clamp at each end of each guide
15 bar. A tool stop is also clamped at the channel rail-guide bar
16 intersection providing both a tool stop and a spacer for
17 alignment of the spacing between the guide bars. A cutting
18 tool, such as a router, is then manually moved across the
19 surface of the workpiece using the guide bar to hold the tool in
20 position (both height and lateral position). After planing a
21 particular set position, it is necessary to manually reposition
22 the guide bar for the next cut and to continue sequentially
23 until the entire workpiece has been planned.

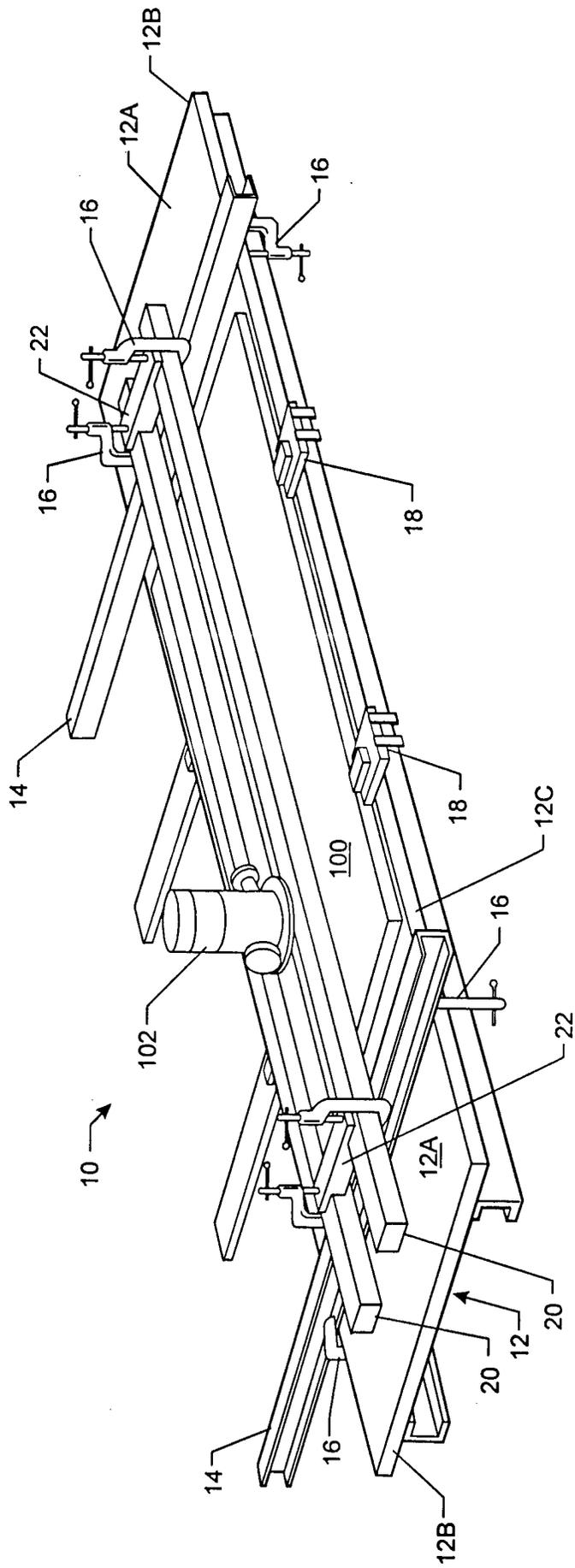


FIG. 1

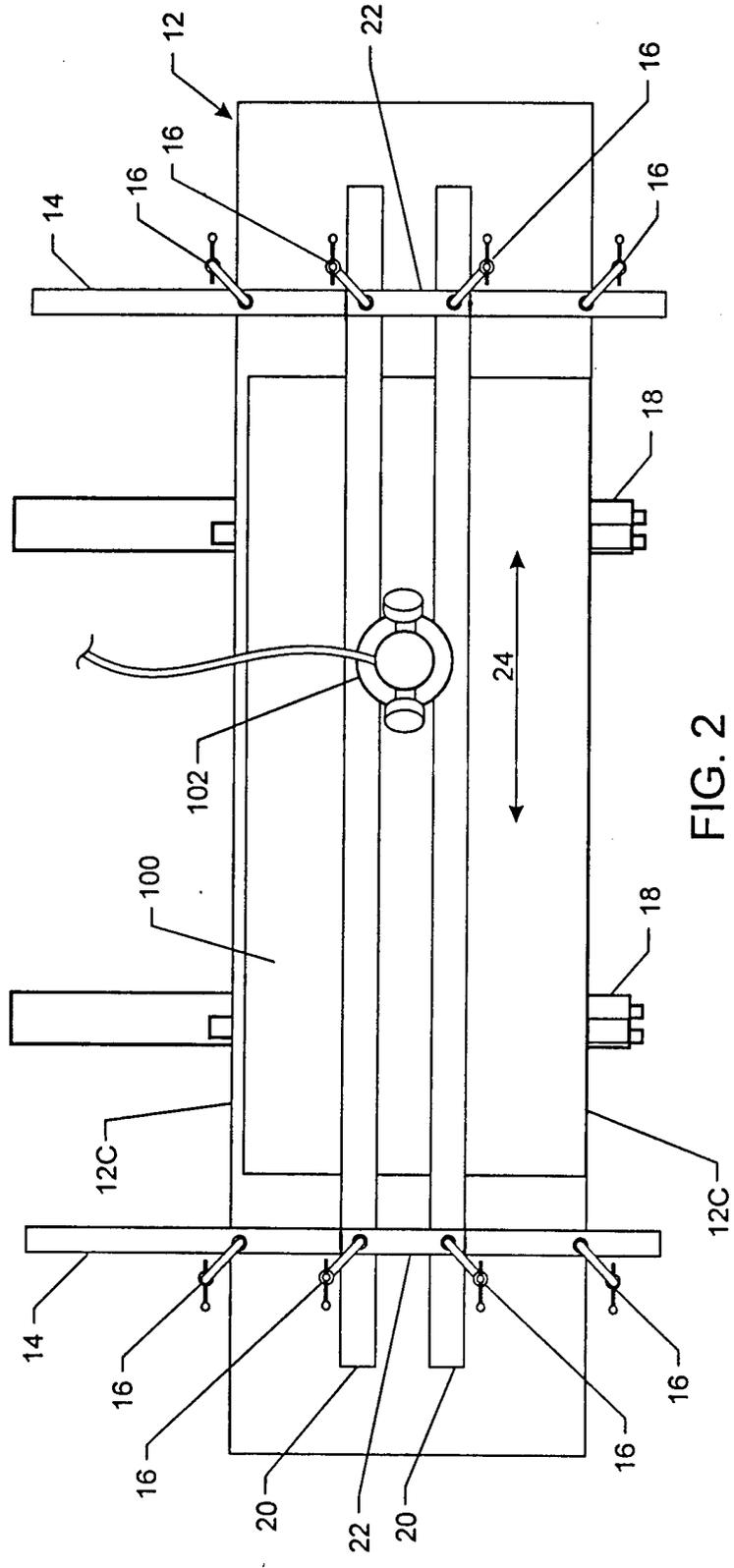


FIG. 2

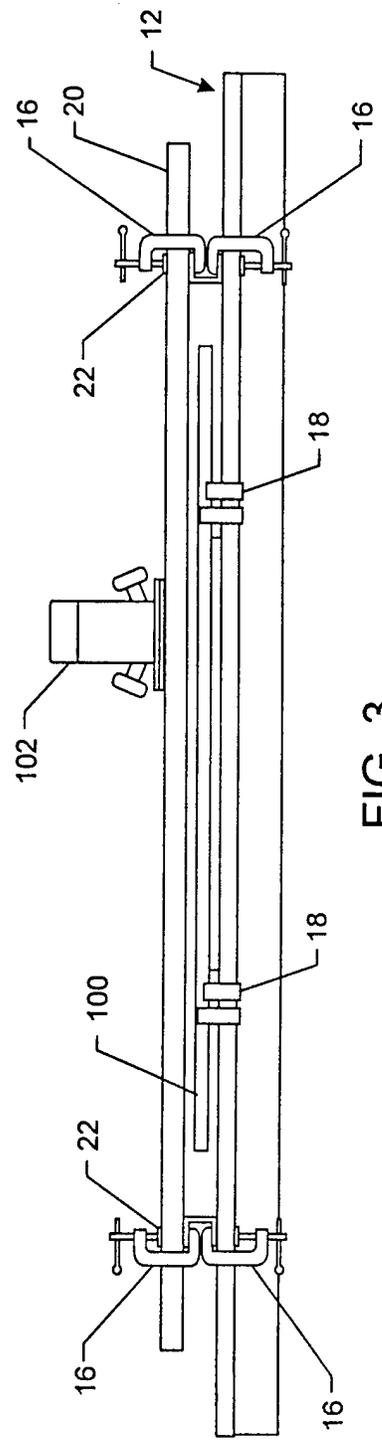


FIG. 3

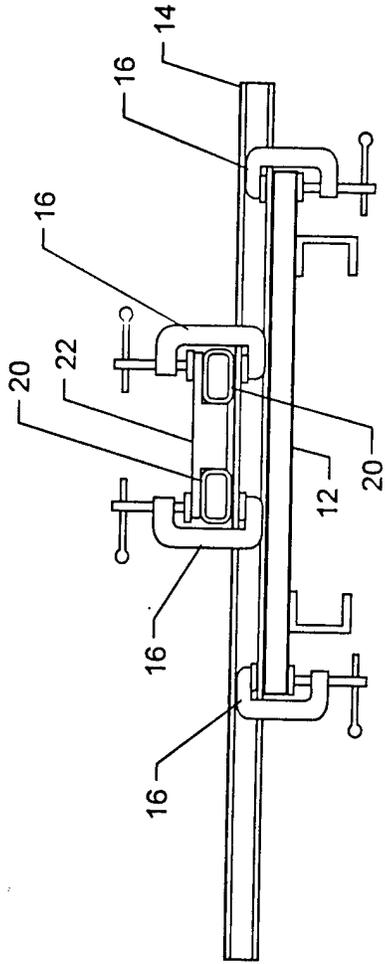


FIG. 4

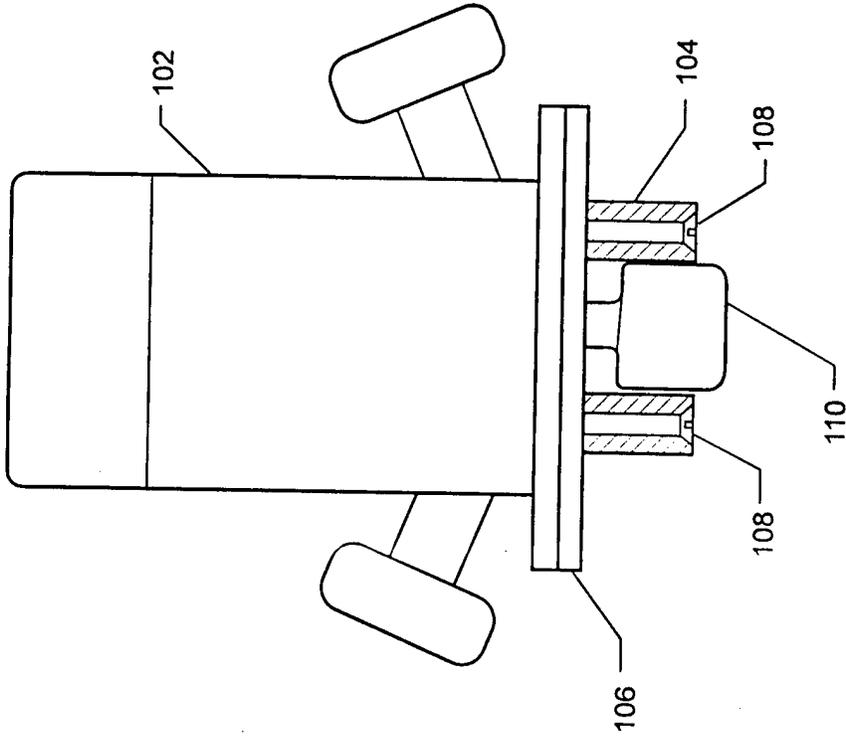


FIG. 5