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Woods

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[54] **MITER GAGE**

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[73] Assignee: **Shopsmith, Inc.**, Dayton, Ohio

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[51] **Int. Cl.**[4] **B27B 5/29**

[52] **U.S. Cl.** **83/425**; 83/437; 83/477.2; 83/581; 403/395

[58] **Field of Search** 403/395, 398, 399; 83/431, 437, 477, 477.1, 477.2, 581, 425

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,208,358	7/1940	Chandler	403/395 X
2,529,173	11/1950	Moyer et al.	403/395 X
2,759,503	8/1956	Goldschmidt	269/165 X
4,395,053	7/1983	Kalfas	403/395 X

Primary Examiner—Frank T. Yost

Attorney, Agent, or Firm—Biebel, French & Nauman

[57] **ABSTRACT**

A miter gage having an adjustable workpiece clamp. The miter gage is of the type having a bar shaped to slidably engage a guideway of a tool work table, a protractor mounted on the bar and a grip mounted on the protractor. The clamping device includes a lock guide having a base adapted to be attached to the grip, a longitudinally-extending, vertical opening and a pair of opposing side walls; a U-shaped lock clamp having a sidewardly-opening channel receiving the lock guide and including a vertical bore positioned in registry with the lock guide opening, a lock rod extending vertically through the bore and opening and a lock knob having a stud which is threaded through the side of the lock clamp to bear against an adjacent sidewall of the lock guide. Displacement of the threaded stud relative to the lock clamp urges the lock guide sidewardly out of the channel and causes the lock rod to be urged against the lock guide, thereby preventing its relative movement. By selectively loosening or tightening the threaded stud against the sidewall of the lock guide, the lock rod may be alternately locked in position or released for vertical movement to an appropriate height above the associated work table to accommodate a particular workpiece.

5 Claims, 6 Drawing Figures

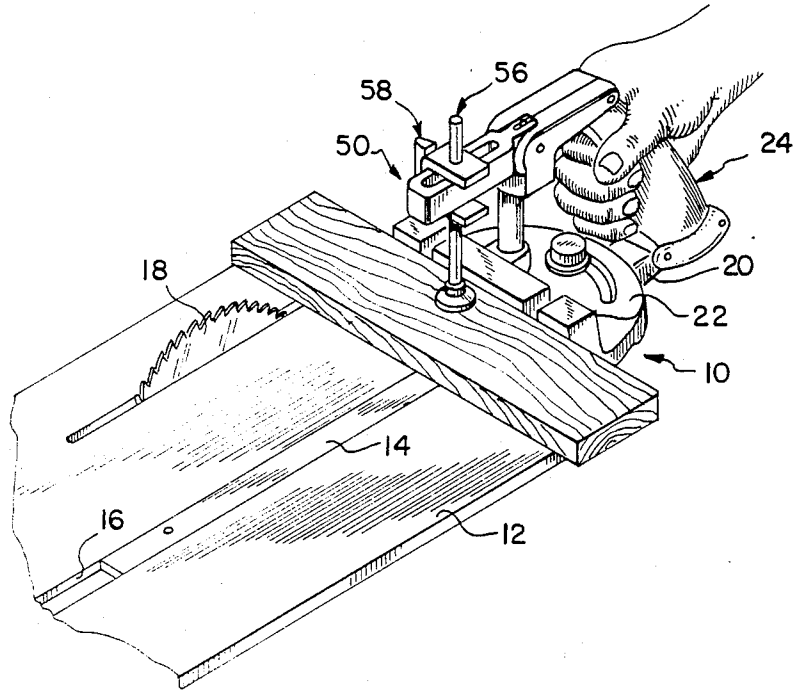

FIG-1

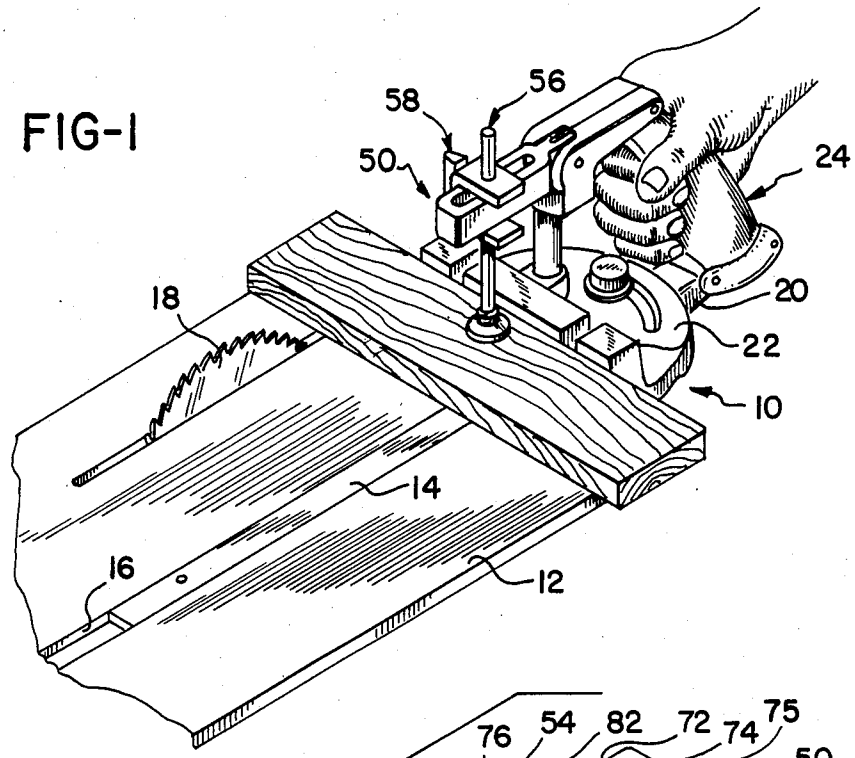
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FIG-2

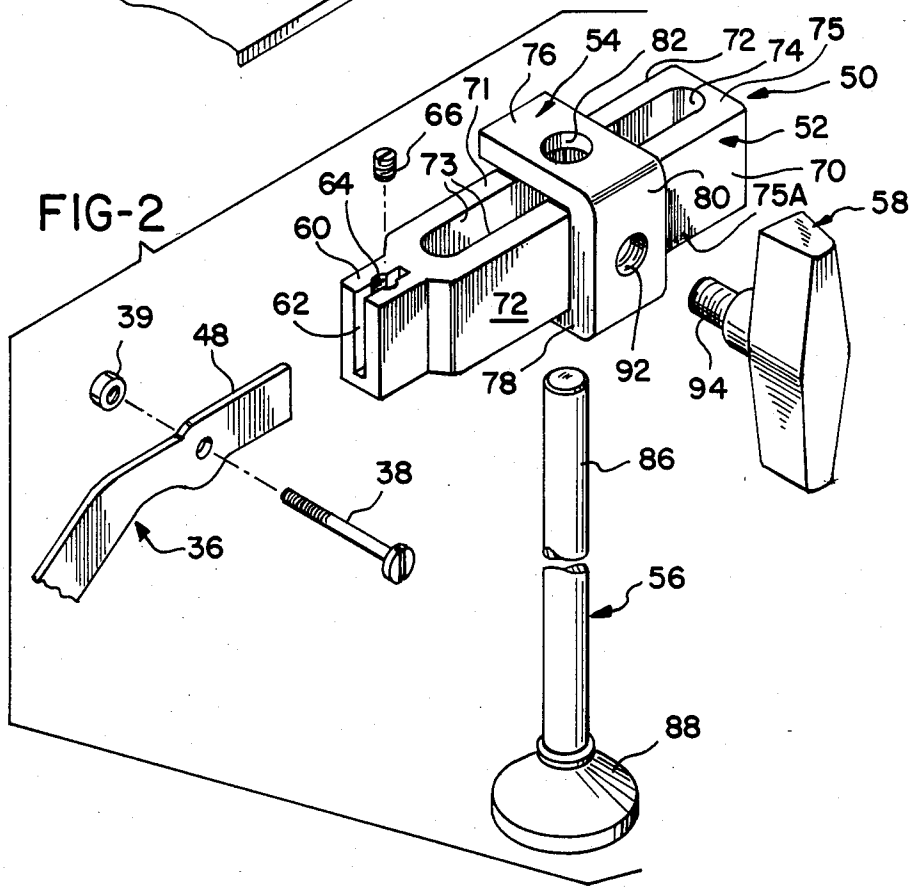
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FIG-3

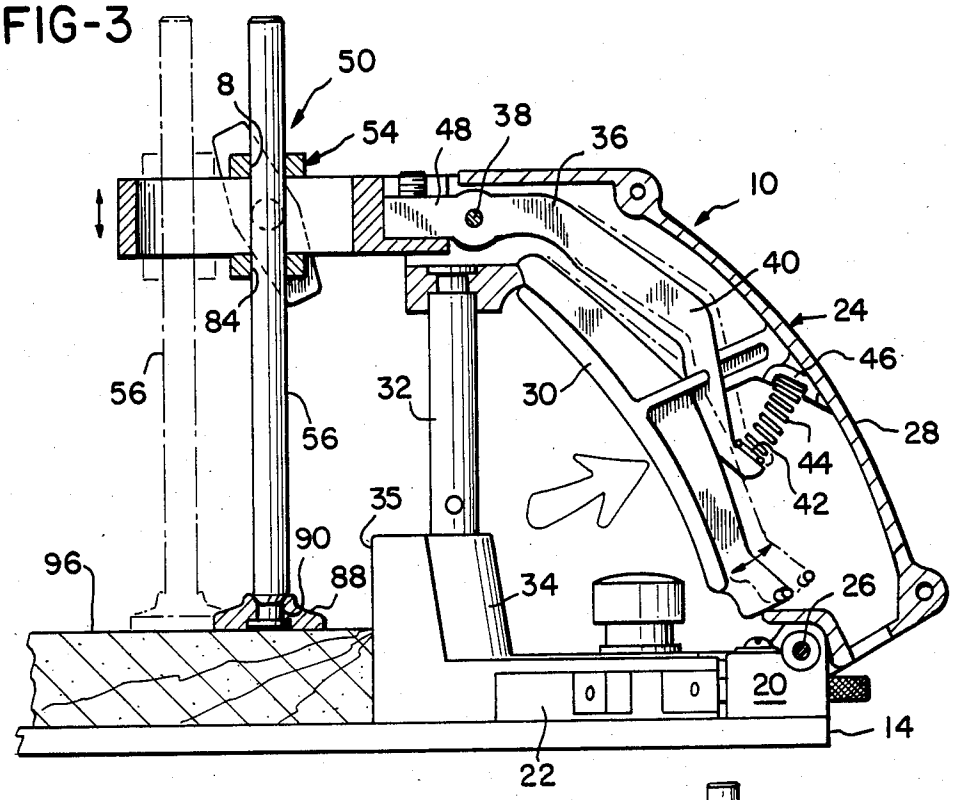
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FIG-4

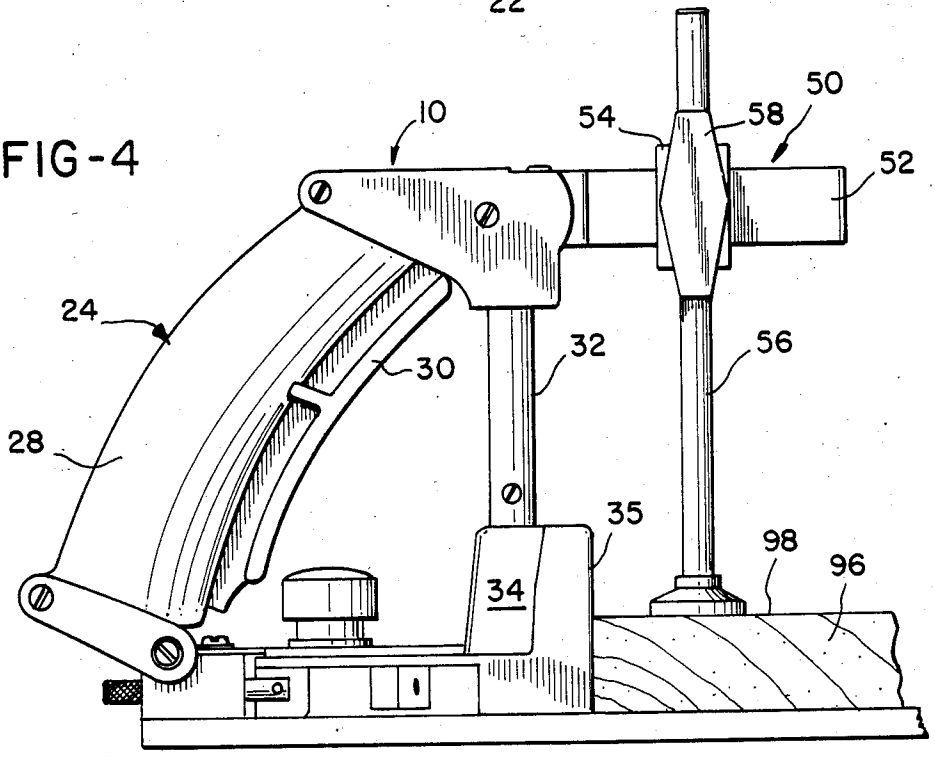
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FIG-5

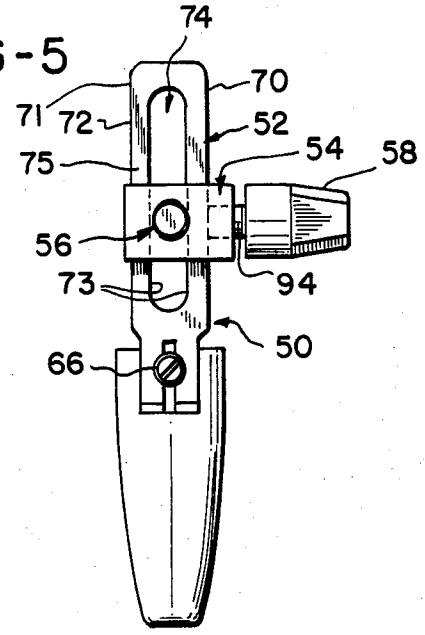
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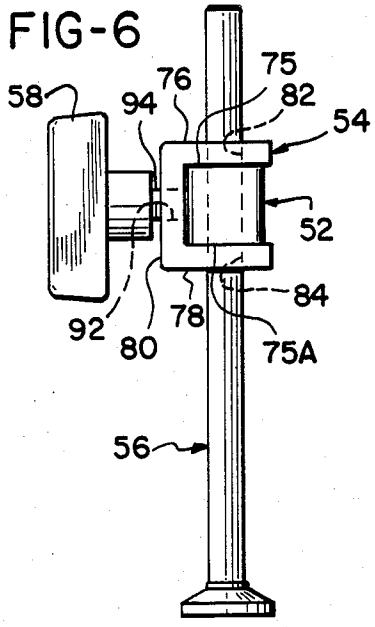
FIG-6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MITER GAGE

BACKGROUND OF THE INVENTION

The present invention relates to miter gages of the type adapted for use with power tool work tables and, more particularly, miter gages for use with power saw tables for holding a workpiece at a predetermined orientation for feeding into the saw blade extending through the saw table.

A miter gage is a device commonly used in combination with a table saw or band saw and is used to hold a workpiece during a crosscut operation. Such a miter gage typically includes an elongate bar which is shaped to slidably engage a groove formed in the tabletop of the saw table and extends in a direction parallel to the cutting plane of the tool mounted beneath the saw table. A protractor is mounted on the bar such that it pivots about a vertical axis and includes a flat face for engaging a workpiece.

To perform a crosscutting operation with such a miter gage, the workpiece is held against the face of the protractor and the miter gage is slid along the groove past the tool, which may be a rotating circular saw blade for a crosscutting operation, and the workpiece is cut by the tool. To perform a miter cut, the protractor portion of the miter gage is pivoted such that the workpiece-engaging face is disposed at the desired skewed or nonperpendicular angle to the plane of rotation of the tool. Consequently, a workpiece held against the face of the protractor and fed into the rotating saw blade is cut to have a beveled or angled end.

The better quality miter gages also include a work holding assembly which forms a part of the miter gage. For example, the Goldschmidt U.S. Pat. No. 2,759,503 shows a miter gage having a clamp in the form of a vertically adjustable lock rod which is supported by a lock guide extending outwardly from a grip mounted on the protractor. The lock rod comprises a threaded shaft having a disk-shaped shoe mounted on its lower end. The lock guide includes an elongate opening sized to receive an upper end of the lock rod and the elevation of the lock rod relative to the lock guide is adjusted by a pair of nuts threaded on the lock rod and positioned above and below the lock guide.

To adjust the elevation of the lock rod relative to the lock guide and thereby position the shoe at a predetermined height above the saw table, the nuts are displaced along the shaft of the lock rod away from the lock guide to allow the lock rod to be moved vertically relative to the lock guide. The lock rod may also be displaced relative to the lock guide by sliding the lock rod within the elongated opening. Once the lock rod is positioned at an appropriate elevation and location along the opening, the nuts are tightened against the upper and lower surfaces of the lock guide and thereby hold the lock rod in position relative to the lock guide.

To facilitate the rapid clamping and unclamping of the lock rod against a workpiece, the lock guide is attached to the lock lever which is pivotally attached to the grip and is linked to a trigger. By squeezing the trigger against the grip, the lock lever pivots relative to the grip and thereby moves the lock guide and lock rod slightly downwardly, thereby clamping a workpiece between the shoe and the saw table. The trigger is spring actuated such that when the grip is released from the hand of a user, the lock lever pivots the lock guide slightly upwardly so that the shoe is removed from engaging the workpiece.

While the aforementioned miter gage provides a safe and secure means for clamping a workpiece against the face of the protractor, the procedure for vertically adjusting the lock rod to accommodate workpieces of varying thicknesses is slow and relatively tedious. Four distinct operations must be performed: the upper and lower nuts must be individually moved away from the lock guide to allow the vertical movement of the lock rod, and the nuts must again be individually displaced against the lock guide to secure the lock rod once the lock rod has been positioned at the proper elevation.

Accordingly, there is a need for a miter gage having a work holding assembly in which the work holding piece may be adjusted in elevation to accommodate workpieces of differing heights in a rapid and easy manner. Furthermore, the workpiece engaging device must be relatively inexpensive to manufacture and reliable in operation.

SUMMARY OF THE INVENTION

The present invention is a miter gage having a workpiece holding assembly in which a lock rod may be clamped against or released from clamping engagement with a lock guide by the rotation of a single knob. The clamping assembly includes a lock clamp which slidably engages the lock guide and includes a vertical bore positioned in registry with the longitudinal opening of the lock guide. A lock knob includes a threaded stud which engages a threaded bore in a side portion of the lock clamp and bears against a sidewall of the lock guide. The lock rod extends through the vertical bore of the lock clamp and the opening of the lock guide.

To clamp the lock rod against the lock guide, the knob is rotated such that the threaded stud bears against the adjacent sidewall of the lock guide and urges the lock guide sidewardly away from the lock clamp. This urges the lock guide against the portion of the lock rod extending through the lock guide opening with sufficient force to prevent the vertical movement of the lock rod relative to the lock guide. To release the lock rod from its clamped engagement with the lock guide, the knob is turned in an opposite direction so that the threaded stud is displaced away from the sidewall of the lock guide, thereby releasing the portion of the lock rod extending through the opening from its engagement with the lock guide.

In a preferred embodiment, the lock clamp is in the form of a U-shaped channel having a sideward opening and comprising top and bottom members joined by a side member. The channel is shaped to receive the lock guide and the top and bottom members include the vertical bore. The side member includes the threaded bore which receives the threaded stud of the lock knob.

The lock guide is elongate in shape and includes a pair of opposing side walls which are substantially flat and provide a bearing surface to be engaged by the end of the threaded stud. With this specific design of the lock clamp and lock guide, the lock clamp may be positioned so that the side member, and hence the lock knob, is on the left or right side of the lock guide to accommodate a right-handed or left-handed user.

Accordingly, it is an object of the present invention to provide a miter gage with a work clamping assembly having a vertically positionable lock rod that can be locked at a predetermined elevation above the work table with a single adjustment; a miter gage having a

clamping assembly which is relatively simple in construction and is capable of withstanding rugged use; and a miter gage having a locking assembly which may be adapted easily for use by a right-handed or a left-handed user.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the miter gage of the present invention mounted on a tabletop and holding a workpiece, the tabletop being shown broken away;

FIG. **2** is a detail in perspective of the miter gage of FIG. **1**, showing an exploded view of the locking mechanism;

FIG. **3** is a side elevational view, partly in section, of the miter gage of FIG. **1**, showing the lock rod in a displaced position in phantom;

FIG. **4** is a side elevational view of the miter gage of FIG. **1**;

FIG. **5** is a detail top plan view of the miter gage of FIG. **1**; and

FIG. **6** is a front elevational view of the locking assembly of the miter gage of FIG. **1**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. **1**, the miter gage of the present invention, generally designated **10**, is designed to be used in combination with the tabletop **12** of a woodworking tool, such as a table saw. The miter gage **10** includes an elongate bar **14** which is shaped to slideably engage a slot **16** formed in the tabletop and extending parallel to the plane of the saw blade **18**. The bar **14** is attached to a pedestal **20** and is pivotally attached to a protractor body **22**, both of which have flat undersides for sliding acros the tabletop **12**.

A grip portion, generally designated **24**, is attached to the pedestal **20** by a screw **26** and includes a two-piece handle **28** which slideably receives a trigger **30**. The upper portion of the handle **28** receives the upper end of a cylindrical stud **32** which is threaded at a lower end into the top of a work abutment **34** of the protractor body (FIGS. **3** and **4**). Work abutment **34** includes a flat face **35** oriented substantially vertically.

An elongate lock lever **36** is pivotally attached to the handle **28** by screw **38** and nut **39** and includes a lower end **40** extending through the handle and terminating in a spring seat **42**. A coil spring **44** engages the coil seat **42** and is seated at its opposite end in a recess **46** formed in the handle **28**. The spring **44** biases the lower end **48** of the lock lever **36** outwardly against the trigger **30**.

The structural details of the bar **14**, pedestal **20**, protractor body **22**, handle **24** and stud **32** are shown and described in the Goldschmidt U.S. Pat. No. 2,759,503, the disclosure of which is incorporated by reference.

As shown in FIGS. **2** and **3**, the upper end **48** of the lock lever **36** is attached to a locking assembly, generally designated **50**. The locking assembly **50** includes a lock guide **52**, a lock clamp **54** which slideably engages the lock guide, a lock rod **56** and a lock knob **58**. The lock guide **52** includes a base **60** having a vertical slot **62** formed therein which is shaped to receive the upper end **48** of the lock lever **36**. The upper end of the slot, **62** includes a threaded bore **64** that receives a set screw **66**, so that the set screw may be threaded downwardly to clamp the upper end **48** against the bottom **68** of the slot **62**. The lock guide **52** includes a pair of opposing side walls **70**, **71**, each having a flat outer surface **72** and a flat inner surface **73**. The inner surfaces **73** together define an elongate, vertical opening **74**. The lock guide **52** also includes flat, parallel upper and lower surfaces **75**, **75A** oriented at right angles to the inner and outer surfaces **72**, **73** (see also FIGS. **5** and **6**).

The lock clamp **54** is generally U-shaped and includes a top member **76**, a bottom member **78** and a side member **80** (see also FIG. **6**). The side member **80** extends between the top and bottom members and the three members together form a sidewardly-opening channel. The top and bottom members each include a vertically-extending bore **82**, **84** (see also FIGS. **2** and **6**).

The bores **82**, **84** and opening **74** are sized to receive the cylindrical shank **86** of the lock rod **56** such that the lock rod is held perpendicular to the bar **14**. The lock rod **56** also includes a foot **86**, which is disc-shaped and is rotatably attached to a lower extention **90** of the lock rod by an interference fit.

The side member **80** includes a threaded bore **92** which receives the threaded shank **94** of the lock knob **58**. The threaded shank **94** is sized to extend through the threaded bore **92** and bears against the adjacent sidewall **70** of the lock guide **52**, as shown in FIG. **5**.

The operation of the miter gage **10** is as follows. Depending on the type of cut to be made, the protractor **22** may be pivoted to place the work abutment face **35** at a skewed angle relative to the cutting plane of the tool blade **18**. In order to lock the lock rod **56** to the lock guide **52**, the lock clamp **54** is first positioned on the lock guide so that the lock guide extends through the channel portion of the lock clamp and the bores **82**, **84** are in registry with the opening **74** of the lock guide, as shown in FIG. **2**. The shank **86** of the lock rod **56** is then inserted through the bores **82**, **84** and the opening **74**, as shown in FIGS. **3** and **4**. At this time, the lock clamp **54** is loosely secured to the lock guide **52** since the shank **86** prevents the separation of the lock clamp from the lock guide. The lock clamp **54** is free to be displaced along the lock guide **52** so that the shoe **88** and lock rod **56** is at an appropriate distance from the work abutment face **35** for the particular workpiece. The elongate shape of the opening **74** enables the lock rod **56** to be displaced with the lock clamp **54** relative to the lock guide **52**.

Once positioned along the lock guide **52**, the lock rod **56** is then displaced upwardly relative to the bar **14**, thereby raising the shoe **88** above the bar and tabletop **12** (FIG. **1**), and locked in position. It is desirable to raise the shoe **88** above the tabletop a distance in excess of the thickness of the workpiece **96** to be gripped by the miter gage **10** to facilitate placement of the workpiece against the work abutment face **35**.

To lock the lock rod to the lock guide **52**, the lock knob **58** is rotated, thereby threading the shank **94** of the lock knob into the threaded bore **92** (FIG. **6**). The end of the shank **94** bears against the sidewall **70** of the lock clamp **54** and displaces the lock clamp sidewardly relative to the lock guide **52**. This sideward displacement of the lock clamp **54** draws the shank **86** of the lock rod **56** sidewardly against the adjacent inner wall **75** of the opening **74**, and it is this frictional engagement that locks the rod to the lock guide and prevents the relative vertical movement of the lock rod.

Once the workpiece **96** has been positioned beneath the shoe **88** and against the face **35**, the knob is rotated in a reverse direction to draw the shank **94** away from

the sidewall **70** to release the lock rod **56** from its engagement with the inner wall of the opening **74**, thereby allowing the shoe to drop downwardly and rest upon the upper surface **98** of the workpiece. The knob **58** is again rotated to lock the lock rod **56** to the lock guide **52** in the manner previously described in order to secure the workpiece firmly against the work abutment body **34** and the upper surfaces of the bar **14** and tabletop **12**.

The workworking tool on which the miter gage **10** is mounted may then be actuated and the miter gage displaced along the tabletop **12** so that the workpiece **96** engages the saw blade **18** of the tool to perform a cut. When the user grips the handle **28** and squeezes the trigger **30**, as shown in FIG. **1**, the lock lever **36** pivots to urge the lock guide **52** downwardly, and hence the lock rod **56** downwardly against the workpiece **96** to hold it in place against the work abutment face **35**.

In order to accommodate the personal preference of a user, the locking mechanism **50** may be disassembled and reassembled such that the lock clamp **54** engages the lock guide **52** in the opposite sense shown in FIGS. **1–6**, so that the bore **92** and side member **80** are adjacent to sidewall **72**, rather than sidewall **70** as shown in the figures.

While the form of apparatus herein described constitutes a preferred embodiment of this invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention.

What is claimed is:

1. In a miter gage of the type having an elongate bar shaped to slidably engage a guideway of a tool work table, protractor means mounted on said bar, and grip means mounted on said protractor means, the improvement comprising:

a lock guide having a pair of opposing side walls, each having flat inner and outer surfaces and flat upper and lower surfaces, said inner surfaces defining an opening therebetween extending between said upper and lower surfaces;

a lock clamp having substantially a U-shape and including a flat top member shaped to overlie and abut said upper surface, a flat bottom member shaped to overlie and abut said lower surface, and a flat side member shaped to overlie and abut said outer surface of a selected one of said side walls, such that said lock clamp forms a channel receiving said lock guide for relative sliding movement, but is constrained from relative pivotal movement, and said top and bottom members including bores positioned in registry with said opening;

a rod oriented substantially perpendicularly to said bar and extending through said bores and opening; and

lock means for urging said lock guide sidewardly within said channel away from said side members against said rod, whereby said rod is constrained from being displaced relative to said lock guide and lock clamp.

2. The miter gage of claim **1** wherein said lock means includes a threaded bore through said side member into said channel; and a threaded stud extending through said threaded bore and engaging said outer surfaces of said selected side wall such that displacement of said stud into said threaded bore causes said stud to bear against said selected side wall and urge said lock guide sidewardly out of said channel.

3. The miter gage of claim **2** wherein said lock means includes a knob for turning said threaded stud in said threaded bore.

4. The miter gage of claim **1** wherein said opening is an elongate in shape such that said lock clamp and said rod are displaceable therealong.

5. The miter gage of claim **1** wherein said lock guide includes a base having a slot extending vertically therein and including a bottom surface and a set screw bore at an upper end thereof, and a set screw in said set screw bore; and said grip means includes a lock lever having an end positioned in said vertically-extending slot and held against said bottom surface by said set screw.

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