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Lassy et al.

[11] **3,740,048**

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[54] **INSTANT TWO-WAY LOCK FOR WORK HOLDERS**

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[52] **U.S. Cl.** **269/59,** 269/72, 269/76, 269/309, 188/67

[51] **Int. Cl.** **B23q 3/02**

[58] **Field of Search** 269/59, 72, 74, 76, 269/60, 81, 289, 309; 29/1.5; 188/67; 248/184, 346; 408/91, 109

[56] **References Cited**

UNITED STATES PATENTS

3,152,799 10/1964 Daniels 269/74

2,898,068 8/1959 Warren ..... 269/72 X

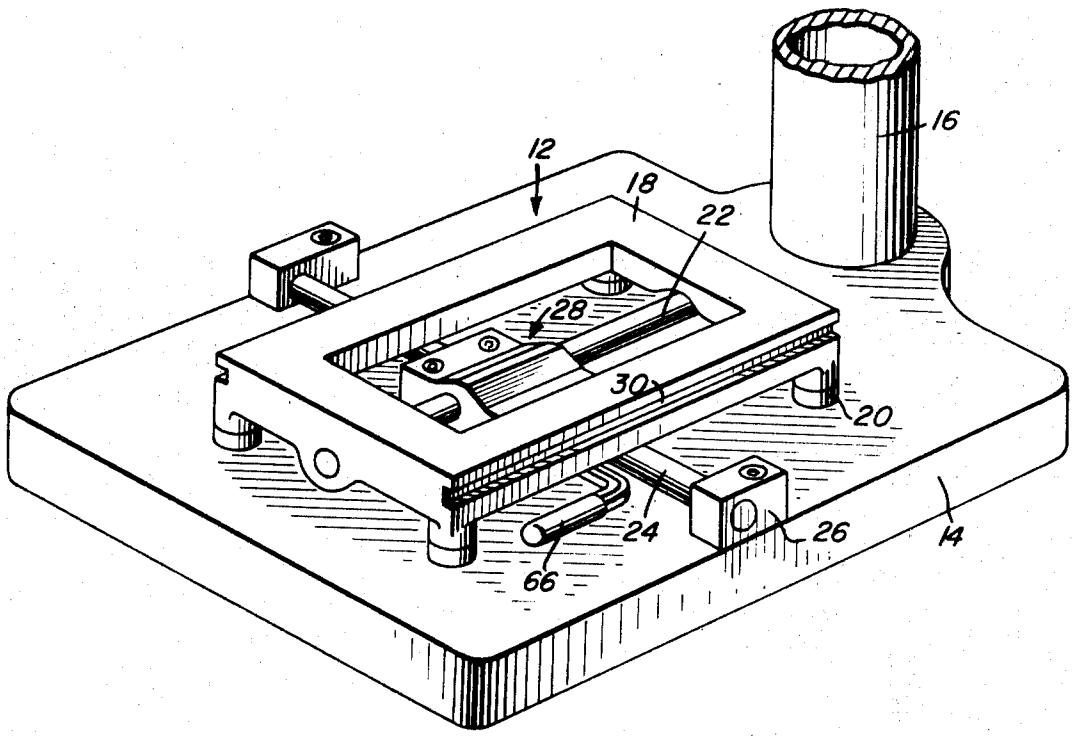
Primary Examiner—Robert L. Spruill

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[57] **ABSTRACT**

A locking assembly for instantly immobilizing the motion of a slide fixture at fixed selected positions to facilitate repetitive drilling, drilling through relatively thin material with a large drill in which procedure it is imperative to lock the fixture securely and instantly and in any other precedure or technique where it is desirable to lock a slide fixture capable of two-way motion instantly and securely in position so that the work carried by the fixture will be immobilized quickly and securely by actuating a single locking handle or actuator.

13 Claims, 11 Drawing Figures



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SHEET 1 OF 3

Fig. 1

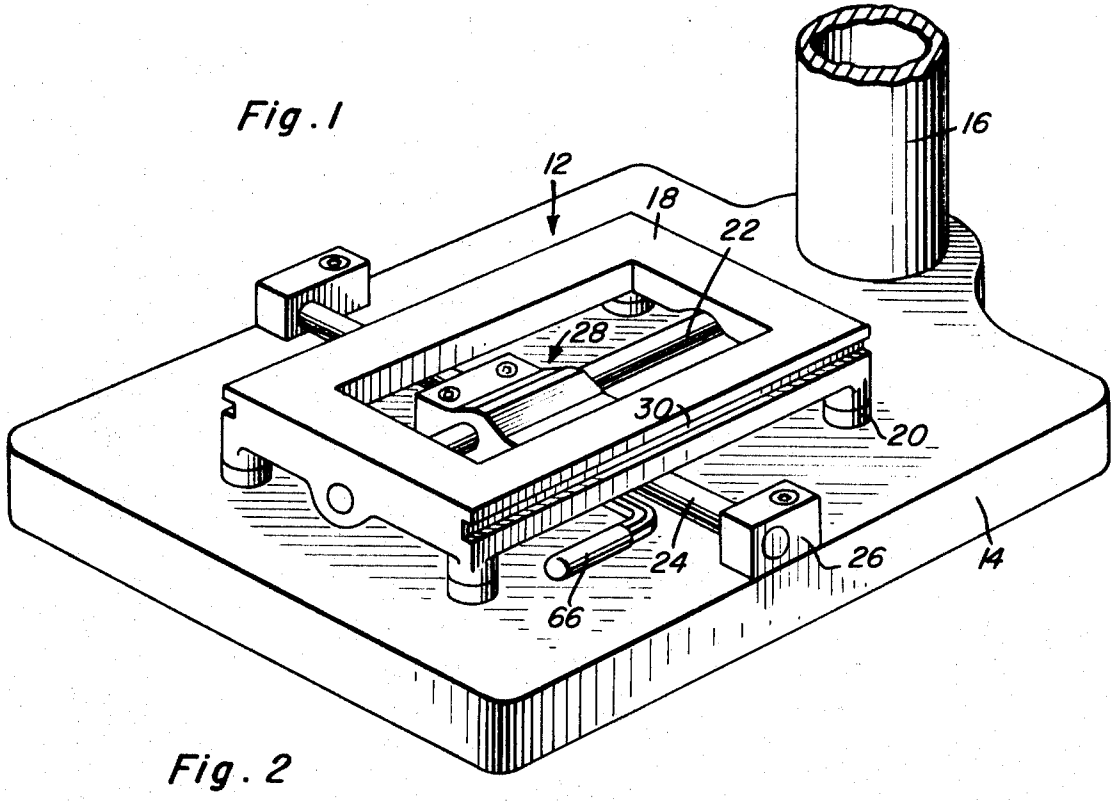


Fig. 2

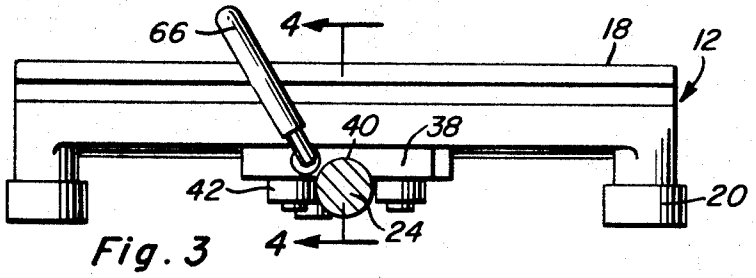
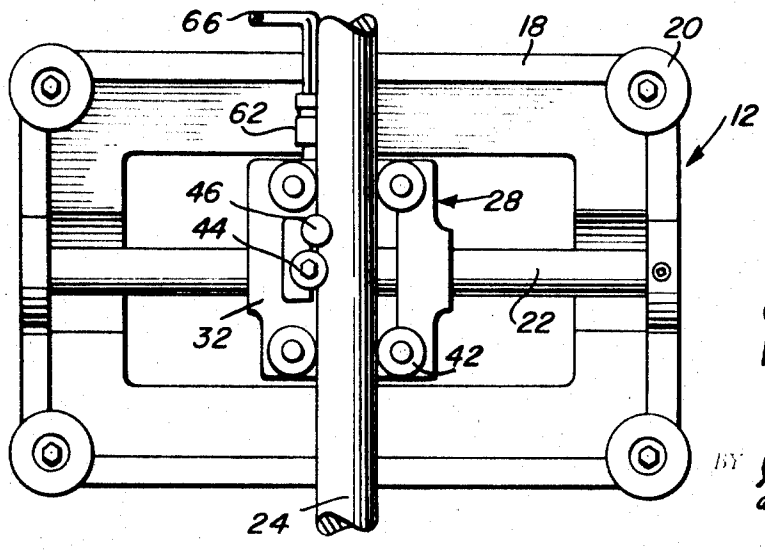


Fig. 3



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Fig. 4

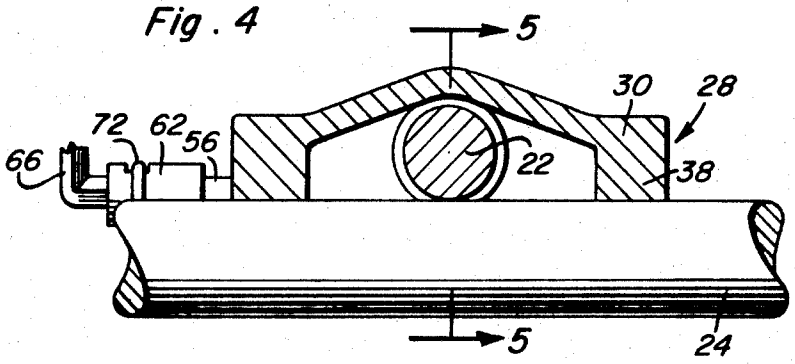


Fig. 5

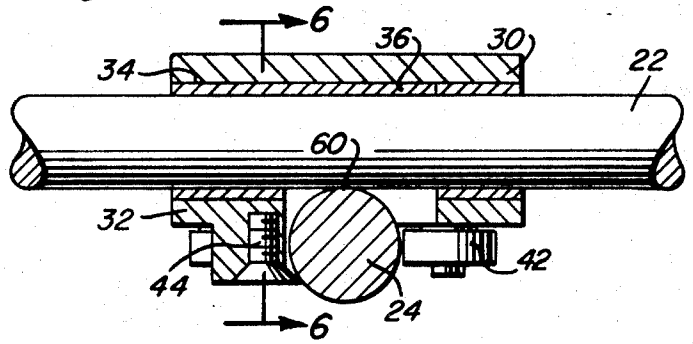


Fig. 6

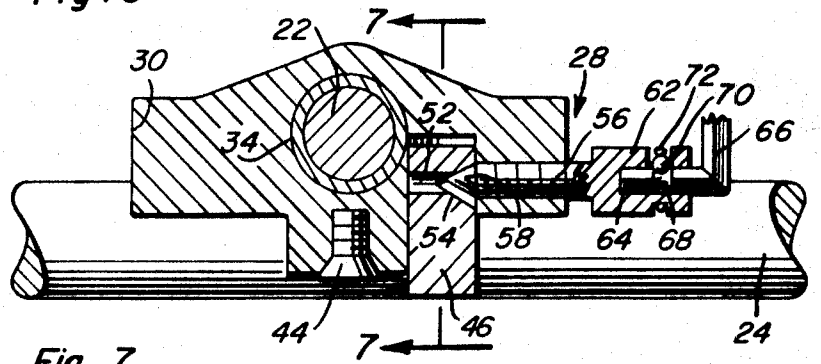
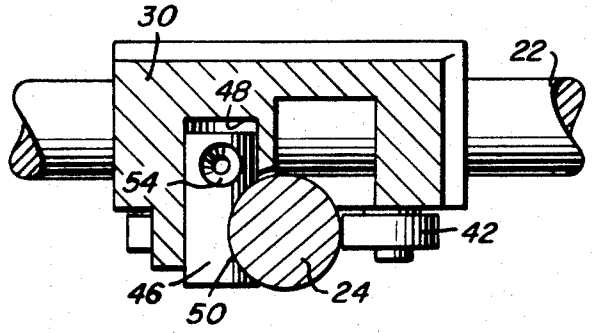


Fig. 7



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Fig. 8

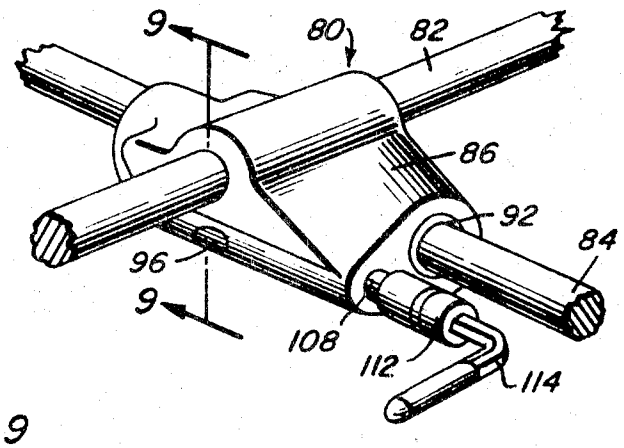


Fig. 9

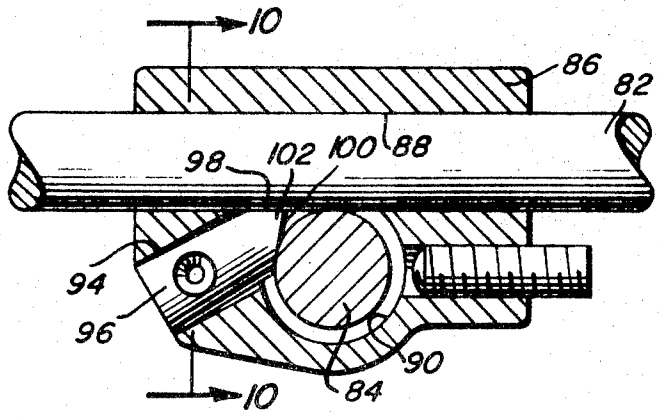


Fig. 10

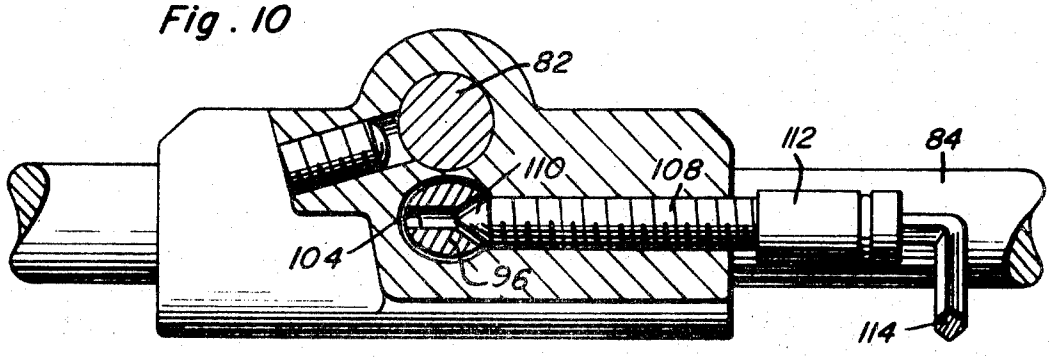
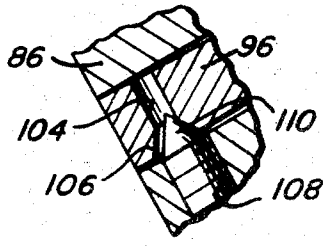


Fig. 11



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INSTANT TWO-WAY LOCK FOR WORK HOLDERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention generally relates to slide fixtures or work holders capable of movement in two linear directions and more particularly to a locking assembly therefor whereby manipulation of the single actuator will instantly lock the slide fixture or work holder securely in position in a positive manner.

2. Description of the Prior Art

Slide fixtures having two-way motion, that is, motion in two linear directions perpendicular to each other have been employed for supporting work or work holders during various machine operations such as holding work in position for drilling a hole therein by employing a drill press. Such devices also are employed in numerous other machine operations. One type of slide fixture in use is disclosed in prior U.S. Pat. No. 2,779,219, issued Jan. 29, 1957. Another type of slide fixture in use is disclosed in prior U.S. Pat. No. 2,946,247, issued July 26, 1960.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a locking assembly for a slide fixture having two-way motion in which the locking assembly is instantly actuated by a single handle or actuator for instantly and securely locking the slide fixture and the work or work holder mounted thereon in a secure, fixed and selected position.

Another object of this invention is to provide an instantly actuated lock mechanism in the form of a clamp assembly which clampingly secures the perpendicularly arranged slide rods in clamping engagement with each other.

A further object of this invention is to provide an instantly actuated lock mechanism of the wedge type in which a single wedge has two inclined surfaces simultaneously engaging the perpendicularly arranged slide rods for securely locking the carriage instantly in relation to both slide rods.

Still another object of the invention is to provide an instant lock for a slide fixture or other work holder, work table or the like having two-way motion to enable work to be positively, securely and instantly fixed in selected positions to facilitate various machine operations such as repetitive drilling or drilling through relatively thin material to eliminate the possibility of the drill causing the thin material and the slide fixture supporting the thin material to move as the drill "breaks through" which movement of the thin material causes deformation of the hole formed by the drill.

Yet another significant object of this invention is to provide an instant lock for a slide fixture or other work holding device having two-way motion to instantly and securely lock the work in fixed selected positions by manipulating a single lock actuator which structure is relatively simple in construction, positive and secure in operation, dependable and long lasting and relatively inexpensive to manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation is more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a slide fixture incorporating the locking assembly of the present invention therein to instantly and securely lock the two-way motion of the fixture.

FIG. **2** is a side elevational view of the slide fixture illustrating the structure and relationship of the actuating handle to the slide fixture.

FIG. **3** is a bottom plan view of the slide fixture illustrating details of the structure.

FIG. **4** is a transverse, sectional view taken substantially upon a plane passing along section line **4—4** of FIG. **2** illustrating the relationship of the slide rods.

FIG. **5** is a detail sectional view taken substantially along a plane passing along section line **5—5** of FIG. **4** illustrating further structural details of the slide rods and the associated guiding and retaining structure.

FIG. **6** is a detailed sectional view taken substantially upon a plane passing along section line **6—6** of FIG. **5** illustrating the construction of the locking assembly.

FIG. **7** is a detailed sectional view taken substantially upon a plane passing along section line **7—7** of FIG. **6** illustrating further structural details of the locking device.

FIG. **8** is a perspective view of another embodiment of the locking device employing a wedge-type lock.

FIG. **9** is a vertical sectional view taken substantially upon a plane passing along section line **9—9** of FIG. **8** illustrating further structural details of this embodiment of the locking device.

FIG. **10** is a detailed sectional view taken substantially upon a plane passing along section line **10—10** of FIG. **9** illustrating further structural details of this embodiment of the locking device.

FIG. **11** is a detailed sectional view of the wedge type lock and the actuating screw.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now specifically to the drawings, FIG. **1** illustrates a slide fixture generally designated by the numeral **12** having capabilities of movement in two perpendicular linear directions. The construction of the slide fixture itself forms no particular part of the present invention with it being understood that any suitable work holder such as a vise or the like may be mounted on the slide fixture or any other suitable type of work supporting device or the work itself may be mounted on the slide fixture in any suitable manner. As illustrated, the slide fixture **12** is mounted on the work table **14** of a drill press with the usual vertical standard **16** of the drill press being illustrated for orientation purposes. It is pointed out that the apparatus of the present invention may be employed in various machine operations and in various orientations for securely holding work and instantly locking and releasing the work to facilitate various machine operations.

The slide fixture **12** includes a generally rectangular plate **18** having depending corner supports **20** for engagement with the upper surface of the work table **14** but which do not restrict movement of the slide fixture in relation to the table **14.** The particular construction of the plate **18** and the depending supports **20** is not restricted and various work holders may be incorporated into the slide fixture or mounted on the plate **18** in any suitable manner. Extending longitudinally of the slide

fixture is a slide rod **22** that is fixed to the plate **18** in any suitable manner. Extending perpendicular to the slide rod **22** is a slide rod **24** that is fixedly attached to the work table **14** by mounting blocks **26.** Slidably interconnecting the slide rods **22** and **24** is a slide block generally designated by the numeral **28** which slidably receives each of the slide rods **22** and **24** and maintains accurately the perpendicularity of the slide rod **22** with respect to the slide rod **24.**

With the slide block **28** being freely slidable with respect to the slide rods **22** and **24,** the slide rod **24** fixedly secured to the work table and the slide rod **22** fixedly secured to the slide fixture **12,** the slide fixture **12** is free to move in linear perpendicular directions or in any radial direction that is a composite of the two linear directions which enables a work piece to be positioned in a desired relationship to a drill or other tool during a machine operation.

The slide block **28** includes a generally hollow body or block **30** having depending side edges **32** provided with a passageway **34** therethrough receiving the slide rod **22.** Suitable bearing sleeves or other suitable bearings may be provided for the rod **22** as indicated by numeral **36.** The block **30** is also provided with depending edges **38** having a generally semi-circular notch **40** in the bottom edge thereof receiving the rod **24.** Supported from the underside of the block **30** are four rollers **42** that rotate about vertical axes and the rollers are generally disposed at the corners of the block and are adapted to engage opposite sides of the shaft **24** to guide movement of the block **30** thereon. For retaining the block **30** assembled on the shaft **24,** one depending edge or wall **32** is provided with a screw threaded retainer **44** which has an outwardly tapering head that projects under the lower curved portion of the rod **24** as illustrated in FIG. **5** thus retaining the shaft **24** assembled in relation to the slide block **28.**

For locking the slide block **28** simultaneously to the slide rod **24** and the slide rod **22,** a vertically disposed lock rod **46** is slidably disposed in a vertical socket **48** communicating with the bottom of the depending side edge **32** as illustrated in FIG. **7.** The lock rod **46** is provided with a semi-circular recess **50** in one wall thereof that is in free sliding engagement with a substantial portion of the periphery of the slide rod **24** so that it will freely slide in relation to the slide rod **24** but will not rotate about its own longitudinal axis in relation thereto. The socket or recess **48** forms a backing for the lock rod **46** so that any vertical movement of the lock rod **46** will cause vertical pressure to be exerted on the slide rod **24.**

To cause upward movement of the lock rod **46,** the lock rod is provided with a transverse bore **52** terminating in an enlarged conical recess **54** on one side thereof as illustrated in FIG. **6.** Threaded into the block **30** in perpendicular intersecting relation to the socket **48** and the lock rod **46** is a threaded screw **56** in the form of a lock actuator having a conical tip **58** thereon which engages the recess **54** as illustrated in FIG. **6.** The recess **54** has the center line thereof passing through the apex disposed below the center line of the screw **56** passing through the apex of the conical tip **58.** Thus, as the screw **56** is threaded inwardly, the conical tip **58** thereon will engage the upper surface of the conical recess **54** and thus cam the locking member **46** upwardly as the screw **56** is rotated so that it moves inwardly. This upward movement of the locking rod **46** will cause upward movement of the slide rod **24** and correspondingly exert a downward force on the block **30** and the slide rod **22** therein thus frictionally locking the slide rod **22** and slide rod **24** in locking engagement with each other at point **60** in FIG. **5** thereby simultaneously locking the slide fixture **12** from movement in either linear direction thereby instantly and securely locking the slide fixture in a selected fixed position.

For rotating the screw **56,** the outer end thereof is provided with an enlarged head **62** having a polygonal socket **64** therein receiving the laterally extending end of an L-shaped handle **66** of polygonal cross-sectional configuration corresponding to the shape of the socket **64** so that the handle may be used for rotating the screw **56** with the handle being insertable into the socket at different angular positions to facilitate manipulation of the handle **66.** The portion of the handle **66** extending into the socket **64** is provided with a peripheral groove **68** receiving a ball detent **70** radially movable in the head **62** of the screw and urged into engagement with the groove by a spring ring **72** thus enabling the wrench handle **66** to be detached and reinserted at different angular positions.

The angularity adjustment enables the handle **66** to be positioned in an out-of-the-way position yet readily accessible to enable the device to be locked and unlocked by a clamping action which requires only a partial revolution of the screw **56.**

Referring now specifically to FIGS. **8-11,** the wedge-type embodiment of the invention is generally designated by the numeral **80** and includes slide rods **82** and **84** which correspond generally with the slide rods **22** and **24** in the embodiment illustrated in FIGS. **1-7.** In this construction, a slide block or body **86** is provided that may be in the form of a casting or the like having a bore **88** extending therethrough slidably receiving the slide rod **82** so that the slide block **86** may freely slide thereon. In perpendicular relation to the bore **88** and disposed below the bore **88,** there is provided a transverse bore **90** extending through the slide block **86.** Suitable bearings, sleeve bushings or the like **92** are provided in the bore **90** for slidable engagement with the rod **84** thus enabling the slide block to slide in relation to the slide rods **82** and **84** with the slide fixture carried by the slide rod **82** being capable of linear movement in two perpendicular directions or in a radial direction that is the component of the two linear directions.

Extending inwardly from the outer surface of the slide block **86** is a bore **94** which communicates with both the bore **90** and the bore **88** as illustrated in FIG. **9.** Movably disposed in the bore **94** is a locking rod in the form of a double wedge member **96** having wedge surfaces **98** and **100** engaging the bottom surface of the slide rod **82** and the side surface of the slide rod **84** with the apex **102** defined by the juncture of the two angularly disposed wedge surfaces **98** and **100** being directed toward the space or area between the intersecting slide rods **82** and **84.** Thus, when the wedge member **96** is moved inwardly, the wedge surface **98** will lockingly engage with the slide rod **82** and the wedge surface **100** will lockingly engage with the slide rod **84** thereby simultaneously and instantly locking the slide block **86** with respect to the slide rods **82** and **84** and thus locking the slide fixture in secure position.

As illustrated in FIG. **9,** the wedge member **96** tapers slightly toward the end thereof having the wedge sur-

faces **98** and **100** thereon thus enabling some degree of movement of the wedge member **96** in a lateral manner to enable the wedge surfaces **98** and **100** to maintain engagement with the slide rods.

The wedge member **96** is provided with a transverse passage **104** therein terminating at one end in a conical recess **106** that faces the inner end of a screw threaded locking member **108** having a conical tip **110** thereon for engagement with the conical recess **106** with the conical tip **110** being smaller than the conical recess **106** but correspondingly shaped and having the longitudinal axis thereof offset toward the wedge surfaces **98** and **100** so as the screw threaded member **108** is screw threaded inwardly, the tip end **110** will engage the inner edge of the recess **106** and thus cam the wedge member **96** inwardly to force the wedge surfaces **98** and **100** into locking engagement with the slide rods **82** and **84.** The other end of the screw threaded member **108** is provided with an enlarged head **112** having a socket therein releasably receiving an L-shaped wrench or handle **114** in substantially the same manner as the structure illustrated in FIGS. **1-7** so that the screw threaded member **108** may be easily manipulated by moving the handle **114** a portion of a revolution which is sufficient to move the wedge member **96** into locking position with respect to the slide rods **82** and **84.**

In both forms of the invention, the locking device instantly immobilizes motion of the slide fixture in fixed selected position which facilitates various machine operations such as repetitive drilling, or when drilling holes through relatively thin material with a large drill or when it is necessary to lock the fixture and work piece securely and instantly. This device may be employed with various types of work holding vises, work supporting table and the like and in both instances, when the actuating screw is turned inwardly, it actuates the clamp member or wedge member and in the clamping type illustrated in FIGS. **1–7,** the slide rod or bar **22** and the slide rod or bar **24** are clamped against each other thus automatically locking the mounting plate in fixed position. When the screw is backed off, the clamping member is automatically released thus again making the mounting plate easily moved. The wedge-type illustrated in FIGS. **8–11** is similarly actuated so that as the screw is moved inward, the conical point moves the wedge member inwardly so that the wedge surfaces simultaneously wedge against both slide bars thus locking them immovable in relation to the slide block. The slight taper of the wedge member provides a free floating action so wedges can automatically bear against both of the slide rods or bars **82** and **84.**

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. An instant locking device for immobilizing a work piece securely in fixed selected position comprising support means engaging the work piece, means supporting the support means from a support to enable the work piece to be moved freely in two perpendicular linear directions, and locking means having a single actuator for simultaneously and securely locking the support means immobilized, said means supporting the support means including a first slide rod connected to the support means, a second slide rod connected to a support and disposed in perpendicular relation to the first slide rod, and a slide block slidably engaged with both of said slide rods, said locking means being incorporated into said slide block.

2. The structure defined in claim **1** wherein said locking means includes a movable locking member movable into a position to immobilize the slide block with respect to the slide rods, and means actuating the locking member.

3. The structure as defined in claim **2** wherein said means actuating the locking member including a screw threaded member having handle means projecting outwardly of the slide block for manipulation, and cam means interconnecting the screw threaded member and locking member for longitudinally reciprocating the locking member into locking position when the screw threaded member is rotated a partial revolution in one direction and releasing the locking member when the screw threaded member is rotated a partial revolution in the opposite direction.

4. The structure as defined in claim **3** wherein said cam means includes a conical recess in the locking member and a correspondingly shaped conical tip on the screw threaded member with the conical tip on the screw threaded member being smaller than the conical recess in the locking member but correspondingly shaped, the longitudinal axis of the screw threaded member and conical tip thereon being offset in relation to the center of the conical recess in the direction of longitudinal movement of the locking member for moving the locking member into locking position in response to rotation of the screw threaded member.

5. The structure as defined in claim **3** wherein said locking member includes a notch in one side thereof receiving said second slide rod to laterally deflect that rod into locking engagement with said first slide rod at the point of tangential adjacency.

6. The structure as defined in claim **3** wherein said locking member includes a pair of angularly disposed wedge surfaces on the inner end of the locking member for frictional locking engagement with both of said slide rods by entering into the space between the slide rods at the point of crossing thereof.

7. The structure as defined in claim **2** wherein said locking member includes a notch in one side thereof receiving said second slide rod to laterally deflect that rod into locking engagement with said first slide rod at the point of tangential adjacency.

8. The structure as defined in claim **7** wherein said means actuating the locking member including a screw-threaded member having handle means projecting outwardly of the slide block for manipulation, and cam means interconnecting the screw-threaded member and locking member for longitudinally reciprocating the locking member into locking position when the screw-threaded member is rotated in one direction and releasing the locking member when the screw-threaded member is rotated in the opposite direction.

9. The structure as defined in claim **2** wherein said locking member includes a pair of angularly disposed wedge surfaces on the inner end of the locking member for locking engagement with both of said slide rods.

10. The structure as defined in claim **9** wherein said means actuating the locking member includes a screw-

threaded member having handle means projecting outwardly of the slide block for manipulation, and cam means interconnecting the screw-threaded member and locking member for longitudinally reciprocating the locking member into locking position when the screw-threaded member is rotated in one direction and releasing the locking member when the screw-threaded member is rotated in the opposite direction for engaging the wedge surfaces with both of said slide rods at the point of tangential adjacency with wedge surfaces being oppositely facing to move between the adjacent rods.

11. The structure as defined in claim **2** wherein said means actuating the locking member includes a single handle member, and movable means interconnecting said handle member and the locking member to reciprocate the locking member in response to single movement of the handle member.

12. The structure as defined in claim **11** wherein said movable means and locking member include corresponding conical recess and projection means disposed in offset relation to move the locking member when brought into engagement and the recess and projection means are moved toward alignment.

13. A locking device for locking an assembly of a slide block movably associated with a pair of perpendicular slide rods for movement in perpendicular linear directions comprising single lock means carried by said slide block for simultaneously immobilizing said block and slide rods in relation to each other, said lock means including a single actuator means for actuating the lock means with a single actuation.

* * * * *