Sept. 5, 1950 L. M. LARSON 2,521,231

VISE AND JIG

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Fig. 1.

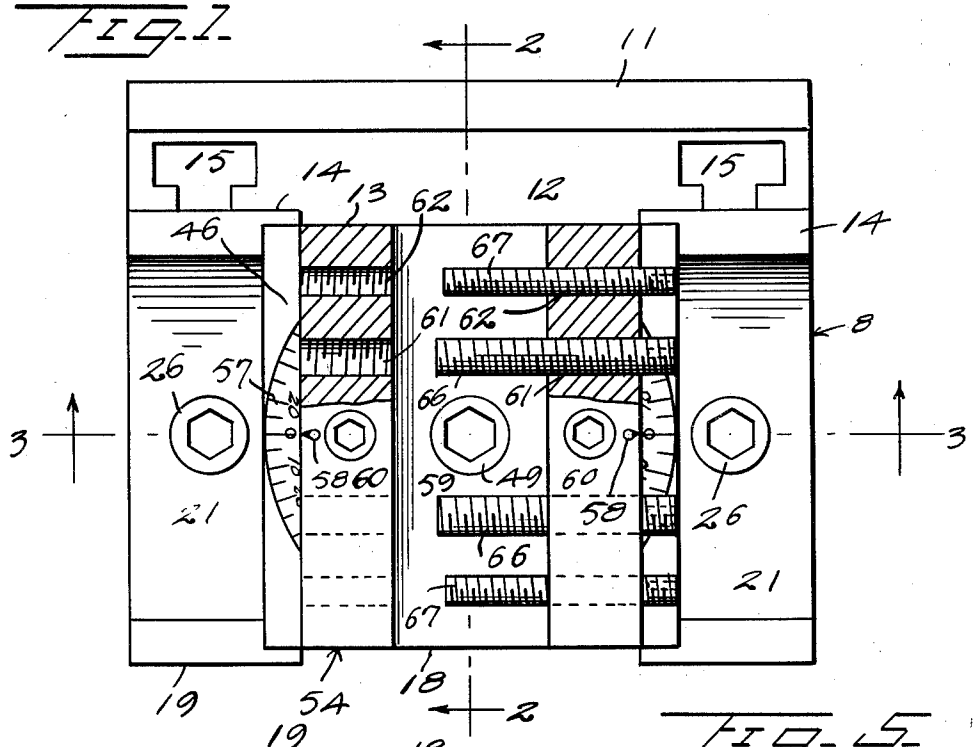
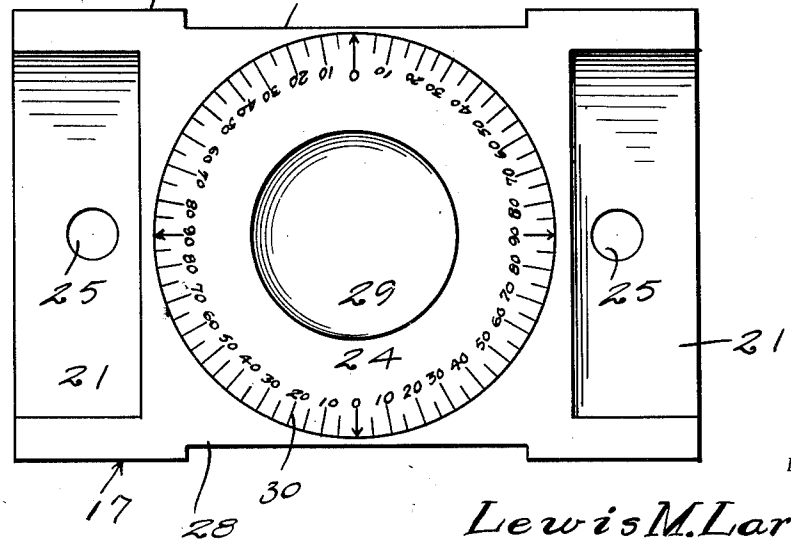


Fig. 5.



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Fig. 2

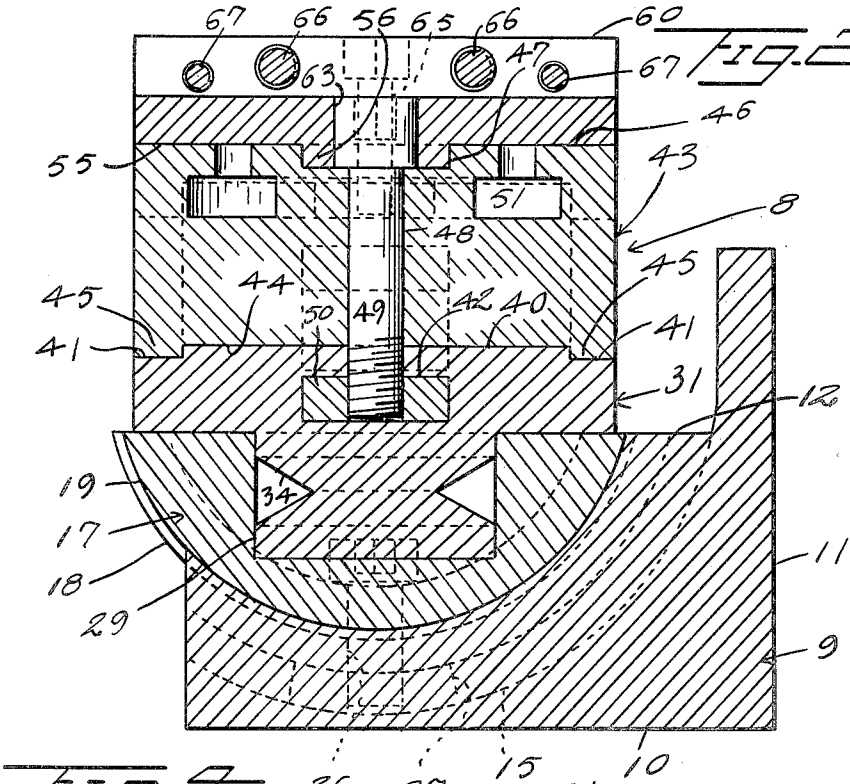
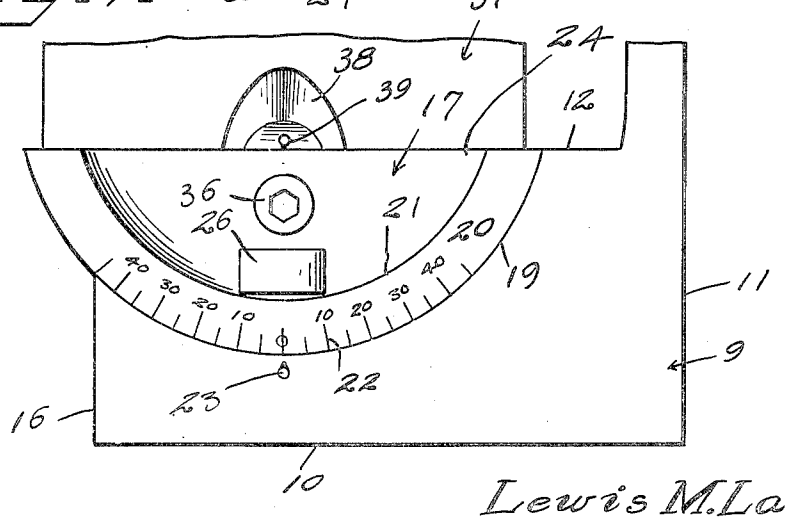


Fig. 4



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Fig. 3.

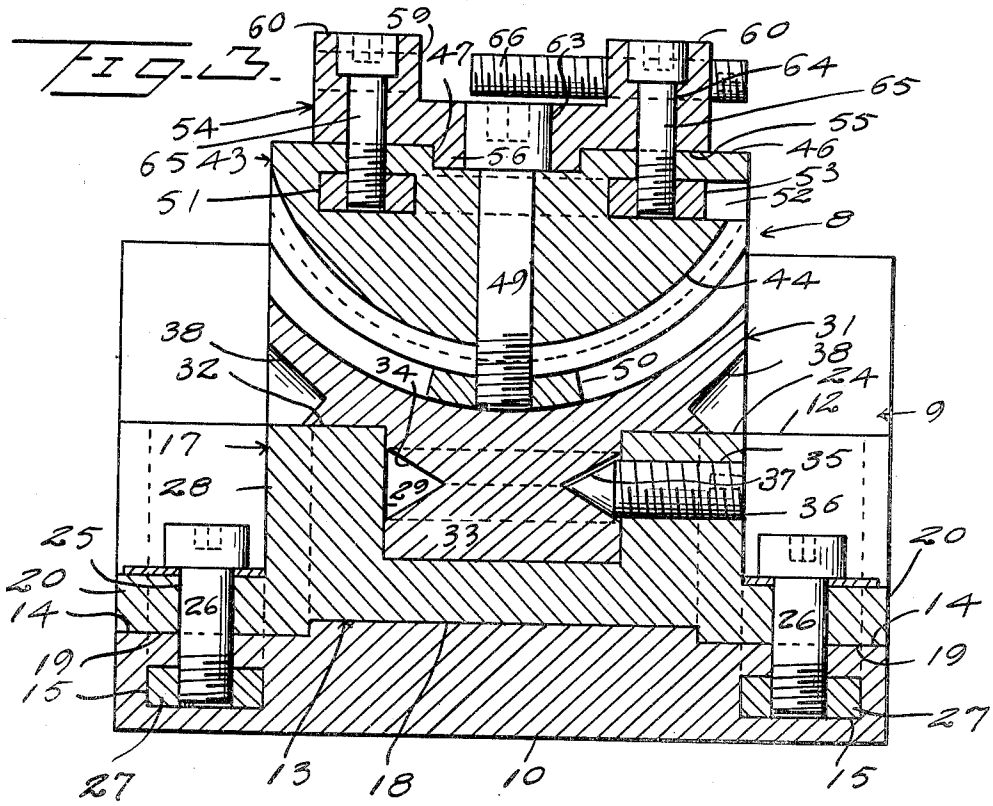


Fig. 6.

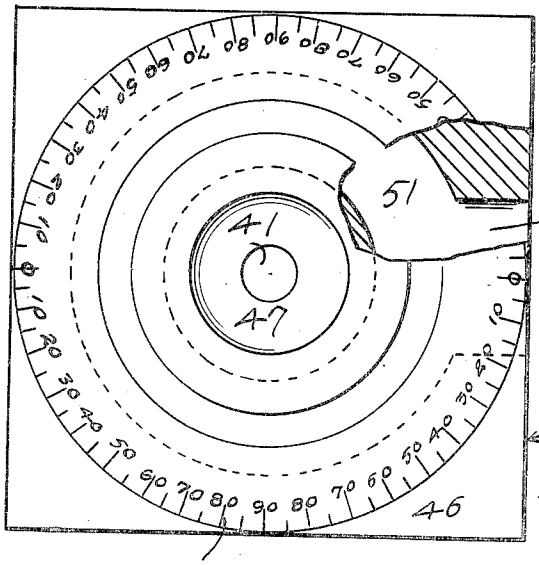
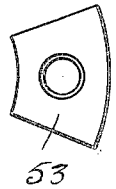


Fig. 7.



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UNITED STATES PATENT OFFICE

2,521,231

VISE AND JIG

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Application November 22, 1946, Serial No. 711,633

2 Claims. (Cl. 51—220)

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This invention relates to a novel construction of combined vise and jig and constitutes an improvement on my prior co-pending application entitled "Combination Vise and Jig," filed May 22, 1946, and bearing Serial No. 671,476.

The present invention, like my prior application, relates to a vise and jig adapted to be supported on the magnetic block of a grinding machine, and which is capable of use for holding tools being ground for accurately positioning the tool, relatively to the grinding wheel, so that the tool may be ground to a desired angle on the side, to a required siderake off of the side angle to fit a required backrake on an angular end of the tool; all of which may be accomplished through the provision of the vise and jig which is capable of universal adjustment for positioning the tool holding portion thereof at any required angle with respect to the grinding wheel.

Among the objects and advantages of the present application, in addition to those as set forth in my prior application, are to provide a combination vise and jig including means for adjustably locking the detachably connected and adjustable parts thereof by means of a plurality of locks which will exert an upward instead of a downward pull on the connected parts.

Another and particularly important object and advantage of the present invention is to provide a combination vise and jig which will eliminate all angle parallels by the provision of a plurality of superposed rockers mounted for oscillating movement relatively to one another and at various angles with respect to each other and to the other parts of the instrument or device and having a swivel connection interposed therebetween to enable a tool or work element to be held at any desired angle with respect to a grinding wheel to thus enable the accomplishment of cuts on complicated compounds and with as great an amount of accuracy as could be obtained with the use of a set of angle parallels.

Other important objects and advantages of the invention are to provide a combined vise and jig capable of being more readily assembled and disassembled and having a plurality of sets of graduations for accurately adjusting various parts of the device and which are so constructed and arranged that they may be readily read by the operator for accurately positioning the adjustable parts of the device.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a preferred embodiment thereof, and wherein:

Figure 1 is a top plan view, partly in horizontal section, of the improved vise and jig.

Figure 2 is a vertical sectional view taken substantially along a plane as indicated by the line 2—2 of Figure 1;

Figure 3 is a vertical sectional view taken substantially along a plane as indicated by the line 3—3 of Figure 1;

Figure 4 is a fragmentary side elevational view of the lower portion of the device;

Figure 5 is a top plan view of the lower rocker;

Figure 6 is a top plan view, partly in section of the upper rocker; and

Figure 7 is a plan view of one of the retaining nuts utilized for rotatably connecting the tool holder to the upper rocker.

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Referring more specifically to the drawings, the combined vise and jig in its entirety and comprising the invention is designated generally 8 and includes a base section designated generally 9 and having supporting surfaces 10 and 11, disposed at right angles to one another, and on either of which surfaces the base 9 is adapted to rest. The base 9 is formed of any suitable metal capable of being attracted by a magnetized block, not shown, and is adapted to rest with either of its surfaces 10 and 11 on the supporting surface of such a block and to be magnetically attached thereto for detachably retaining the vise and jig 8 in a predetermined position.

The base 9 is provided with a substantially flat upper surface 12 which is disposed substantially parallel to the surface 10 and adjacent the surface 11 and which is relatively narrow in a direction lengthwise of the base 9. The remainder of the upper surface of the base 9, from the surface 12 to the end thereof, remote to the surface 11, is concave and arcuate in a direction lengthwise of the base 9. Said concaved upper surface portion 13 includes an intermediate portion and side edge portions 14 which are stepped downwardly slightly with respect to the intermediate portion. The side edge portions 14 are each provided with a longitudinally disposed groove 15 which is substantially T-shaped in cross section. Corresponding ends of the grooves 15 open upwardly of the surface 12 and the opposite ends of said grooves 15 open outwardly of the end 16 of the base 9. The lower rocker designated generally 17 is pivotally supported on the base 9 and is provided with an under surface having an intermediate portion 18 shaped to fit flush against the intermediate surface 13 and downwardly stepped side edge portions 19 which fit flush against the surfaces 14. The surfaces 18 and 19 of the rocker 17 are adapted to slidably engage the base surface 13 for pivotal movement of said rocker 17 relatively to the base 9. The side edge portions of the rocker 17, designated 20, are arcuate in side elevation and with the upper and lower surfaces 21 and 19, respectively thereof, conforming to the curvature of the sur-

faces 14. As best seen in Figure 4, the outer edges or sides of the portions 20 are provided with degree calibrations and graduations, designated generally 22, which extend in either direction from the intermediate portions of said sides and the sides of the base 9, directly beneath the graduations and calibrations 22 are provided with index markers 23 adapted to function in conjunction with the graduations and calibrations 22 for indicating the angle at which the upper surface 24 of the rocker 17 is disposed with respect to the plane of the base 9. As best seen in Figure 3, the rocker portions 20 are provided with openings 25 intermediate of their ends through each of which extends a bolt 26 having a threaded shank end extending through the narrow portion of the groove 15 and into the enlarged bed portion thereof to engage a nut 27, which is slidably disposed in the associated groove bed for detachably and slidably connecting the rocker 17 to the base 9.

The intermediate portion 28 of the rocker 17 has its upper surface 24 disposed at the same level as the upper surface of the end of the rocker portions 20 and said upper surface 24 is provided with a cylindrical well 29 which is disposed centrally thereof. As clearly illustrated in Figure 5, the side walls of the rocker portion 28 are inset with respect to the side edges of said rocker to form the arcuate upper surfaces 21 of the rocker portions 20. As best seen in Figure 5, the upper surface 24, concentrically around the well 29, is provided with degree graduations and calibrations 30 extending from 0 to 90 degrees in both directions and from both the front and rear ends of the rocker 17.

A sub-base, designated generally 31, and of a length and width substantially equal to the rocker portion 28, is provided with an under surface 32 which is adapted to rest flush on the surface 24 and has a central, depending projection 33 adapted to turnably fit the well 29 and in sufficiently close engagement therewith to prevent any lateral movement of the sub-base 31 relatively to the rocker 17. The depending projection 33 is provided with an annular groove 34 which is substantially V-shaped in cross section and the rocker portion 28 is provided in one side thereof with a transversely disposed threaded bore 35 which opens into the well 29, in communication with a portion of the groove 34 and which is adapted to detachably receive a screw 36 having a conical inner end 37 tapered to fit the groove 34 and providing means for detachably and swivelly retaining the projection 33 in the well 29. As seen in Figure 3, the conical end 37 engages the bottom of groove 34 but is spaced from the top and bed thereof, to urge projection 33 downwardly and against the opposite side of the well 29 to prevent chattering or vibration between the sub-base and bottom rocker. Side walls of the sub-base 31, at opposite sides thereof, are provided with recesses 38, as best seen in Figures 3 and 4, which open into the under surface 32 and by which portions of the graduations and calibrations 30 are exposed. Portions of the walls of said indentations 38 are provided with index markers 39, disposed directly above the graduations and calibrations 30 and for use in conjunction therewith for accurately positioning the sub-base 31 relatively to the lower rocker 17.

As best seen in Figures 2 and 3, the sub-base 31 is provided with an arcuate and concave upper surface 40 which is bowed longitudinally from one end to the opposite end thereof and which is provided with downwardly stepped side edge portions 41. The central portion of the concave upper surface 40 is provided with a longitudinal groove 42 which extends from end to end thereof and which is substantially T-shaped in cross section.

An upper rocker, designated generally 43, is provided with an arcuate convex under side 44 which is adapted to fit flush against and slidably engage the surface 40 and which is provided with downwardly stepped side edge portions 45 which rest flush on the surface portions 41. The upper rocker 43 is provided with a substantially flat upper surface 46 having a central cylindrical depression 47 and provided with a perpendicular bore 48, the upper end of which opens centrally into the depression 47 and the lower end of which opens outwardly of the under side 44 and centrally thereof. A bolt 49 extends through the bore 48 and has a threaded lower end which extends substantially perpendicularly through the groove 42 for detachably engaging a nut 50 which is slidably disposed in the enlarged, bed portion of the groove 42, for detachably and slidably connecting the upper rocker 43 to the sub-base 31 and so that said upper rocker can slide and pivot by the reciprocal engagement of the surfaces 40 and 44.

The upper surface 46 of the upper rocker 43 is provided with an annular groove 51 which is substantially T-shaped in cross section, as seen in Figure 3, and which is provided in a portion of the enlarged bed thereof with an outwardly extending passage 52 which opens outwardly of an end wall of the upper rocker 43 and by means of which a pair of nuts 53 may be inserted into or removed from the enlarged bed portion of the groove 51. As best seen in Figure 7, the nuts 53 are each arcuate in top plan having concave inner edges and convex outer edges to conform to the curvatures of the side walls of the enlarged bed portion of the groove 51 and so that said nuts 53 may slide freely therearound.

A tool holder, designated generally 54 and comprising the uppermost part of the vise and jig 8 is swivelly mounted on the upper surface 46 of the top rocker 43 and is provided with a substantially flat under side 55 for engaging the surface 46 and having a depending projection 56 to swivelly engage the depression 47 and which fits sufficiently snug therein to prevent lateral movement of the holder 54 relatively to the top rocker 43. As best seen in Figure 1, the tool holder 54 is of a length substantially equal to the length or width of the top part of the upper rocker 43, but is of a width somewhat less than the width or length of said rocker 43, so that portions of the upper surface 46 of the upper rocker 43 will be exposed on either side of the tool holder 54. As best seen in Figure 6, the upper surface 46 of the upper rocker 43 is provided with calibrations and graduations in degrees, designated generally 57 and corresponding to the graduations 30 and it will be readily apparent, as seen in Figure 1, that portions of the graduations and calibrations 57 will be exposed at either side of the tool holder 54 for indicating the angular disposition of the tool holder relatively to the upper rocker surface 46. The side walls of the tool holder 54 may be provided with index pointers, not shown, for use in conjunction with the calibrations and graduations 57 or such index markers 58 may be provided on the tool holder 54 as illustrated in Figure 1.

The top surface of the tool holder 54 is provided

with a longitudinally disposed central channel 59 forming substantially parallel side walls 60 each of which is provided with a plurality of transversely disposed internally threaded bores 61 and 62 which extend therethrough, for a purpose hereinafter to be described. As seen in Figures 1, 2 and 3, the central portion of the tool holder 54 is provided with a central bore 63 which opens outwardly of the bottom of the projection 56 and into the channel 59 and which is sized to swivelly receive the head of the bolt 49, the flat upper surface of which is disposed flush with the bed of the groove 59. The walls 60, intermediate their ends, are provided with corresponding perpendicular bores or openings 64 having enlarged upper portions. Each of the bores 64 is adapted to register with the upper restricted portion of the groove 51 and to receive a bolt 65 which extends therethrough into the groove 51 and which has a threaded lower end to threadedly engage one of the nuts 53 so that the two bolts 65 are connected to the nuts 53 for detachably securing the tool holder 54 for swivelling movement on the upper surface of the upper rocker 43. The heads of the bolts 65 seat in the enlarged upper ends of the bores 64 and terminate flush with the upper surfaces of the walls 60.

The threaded bores 61 and 62 of either of the walls 60 are adapted to contain set-screws 66 and 67, respectively, which extend into the channel 59 and which are adapted to be utilized for clamping a tool to be ground, not shown, in the channel 59 and against the inner face of the other wall 60.

From the foregoing it will be readily apparent that the vise and jig may, when positioned on its base surface 10, be employed as a vise for holding a tool, not shown, engaged by the set-screws 66 and 67 in the channel 59 and against the inner surface of one of the walls 60. The tool end to be engaged by a grinder, not shown, disposed above the device 8, may be positioned at any angle desired by adjusting the bottom rocker 17 relatively to the base 9; the sub-base 31 relatively to the rocker 17; the upper rocker 43 relatively to the sub-base 31, and the tool holder 54 relatively to the upper rocker 43, all by means of the pivotal and swivel connections between the parts, as clearly illustrated in the drawings and as previously described. The graduations and calibrations 22 enable accurate positioning of the bottom rocker relatively to the base, the graduations and calibrations 30 providing accurate adjustment of the sub-base relatively to the bottom rocker, the graduations, not shown, but corresponding to the calibrations and graduations 22 providing for accurate adjustment of the top rocker 43 relatively to the sub-base 41, and the calibrations and graduations 57 enabling accurate adjustment of the tool holder relatively to the top rocker to enable an end of the tool to be positioned at any desired angle relatively to a grinder so that through the universal adjustment of the tool with respect to the grinder, it is possible to cut the tool at any angle or angles desired and without the use of a set of angle parallels and so that any desired side angle, side rake-off of the side angle and backrake on the angular end of the tool may be effectively accomplished without the use of additional implements.

Likewise, the device 8 may be positioned on its base 11 for use as a jig and for positioning the

tool in substantially a perpendicular plane, while at the same time angularly adjusting the end of the tool to be ground in the same manner and for the same purpose as previously described.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit and scope of the invention as hereinafter defined by the appended claims.

I claim:

1. A tool holder comprising a base, a bottom rocker pivotally mounted on the base and angularly adjustable relatively thereto, a supplemental base swivelly connected to and supported on the bottom rocker, a top rocker pivotally mounted on the supplemental base and angularly adjustable relatively thereto, a tool holder section swivelly connected to and supported on the top rocker, said rockers pivoting about axes disposed in parallel planes and said supplemental base and tool holder section rotating about axes disposed at right angles to the planes of the pivotal axes of the bottom rocker and top rocker, respectively, for mounting the tool holder section for universal movement relatively to the base, nut and bolt fastenings connecting the base and bottom rocker and urging said parts toward one another and into snug abutting engagement, said supplemental base having an annular groove of V-shaped cross section, a screw fastening threadedly engaging the bottom rocker having a conical end engaging one wall of said annular groove and cooperating therewith for connecting the bottom rocker and supplemental base and urging said parts into snug fitting engagement, the longitudinal axis of said screw fastening being disposed at a right angle to the longitudinal axes of the bolts of said nut and bolt fastenings, a nut and bolt fastening connecting the supplemental base and top rocker and urging said parts into snug fitting engagement, and nut and bolt fastenings connecting the top rocker and tool holder section and urging said parts into snug fitting engagement.

2. A tool holder as in claim 1, said top rocker having an upper surface provided with an annular groove of inverted T-shape cross section, said top rocker having a side wall and being provided with a lateral passage communicating with the enlarged bed of said inverted T-shaped groove and opening outwardly of the side wall, the nuts of said last mentioned nut and bolt fastenings slidably engaging in the bed of said inverted T-shaped groove and being movable into and out of engagement therewith only through said lateral passage.

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