Sept. 5, 1950 L. M. LARSON 2,521,230

COMBINATION VISE AND JIG

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FIG. 1.

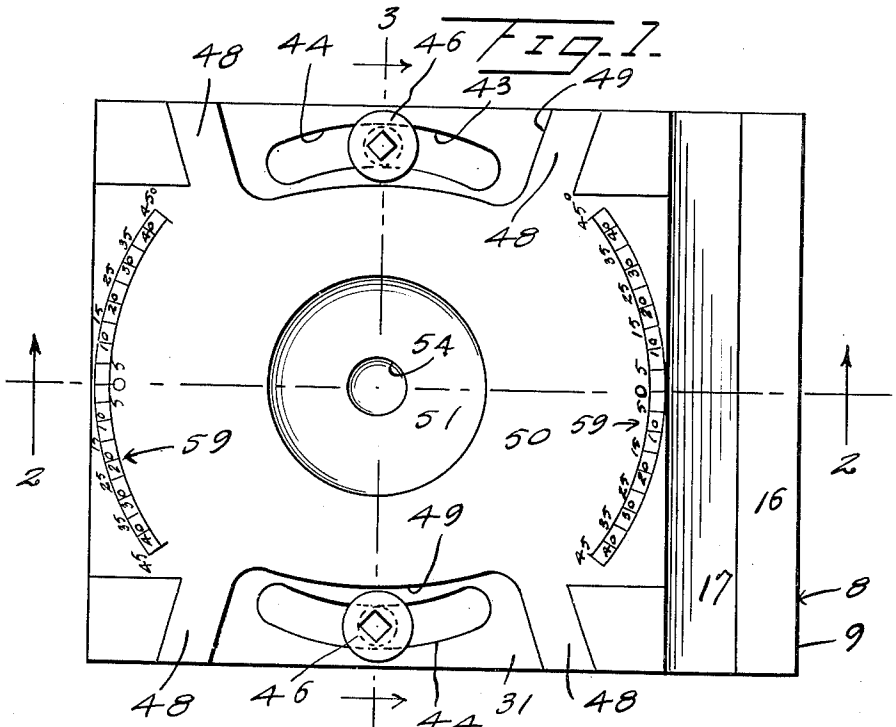
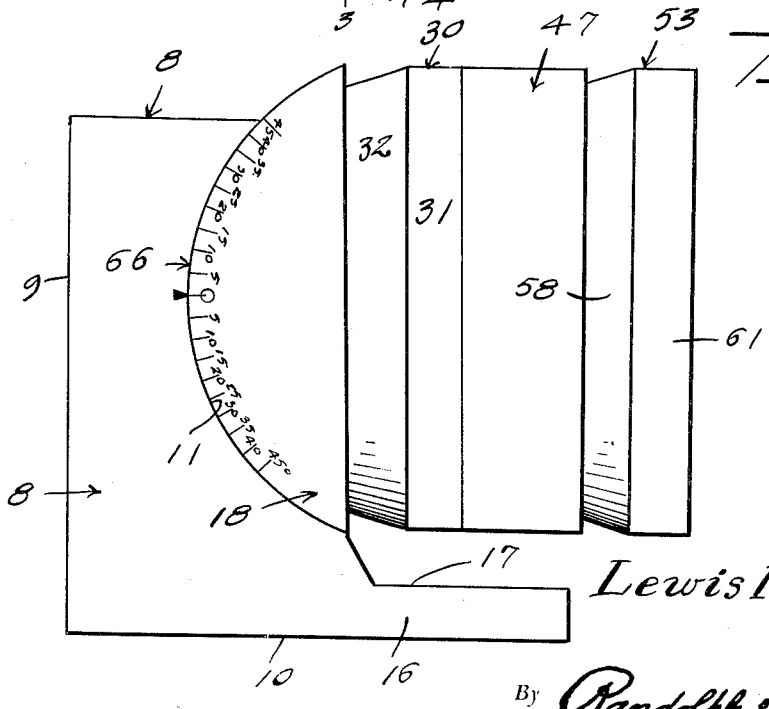


FIG. 4.



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FIG. 2.

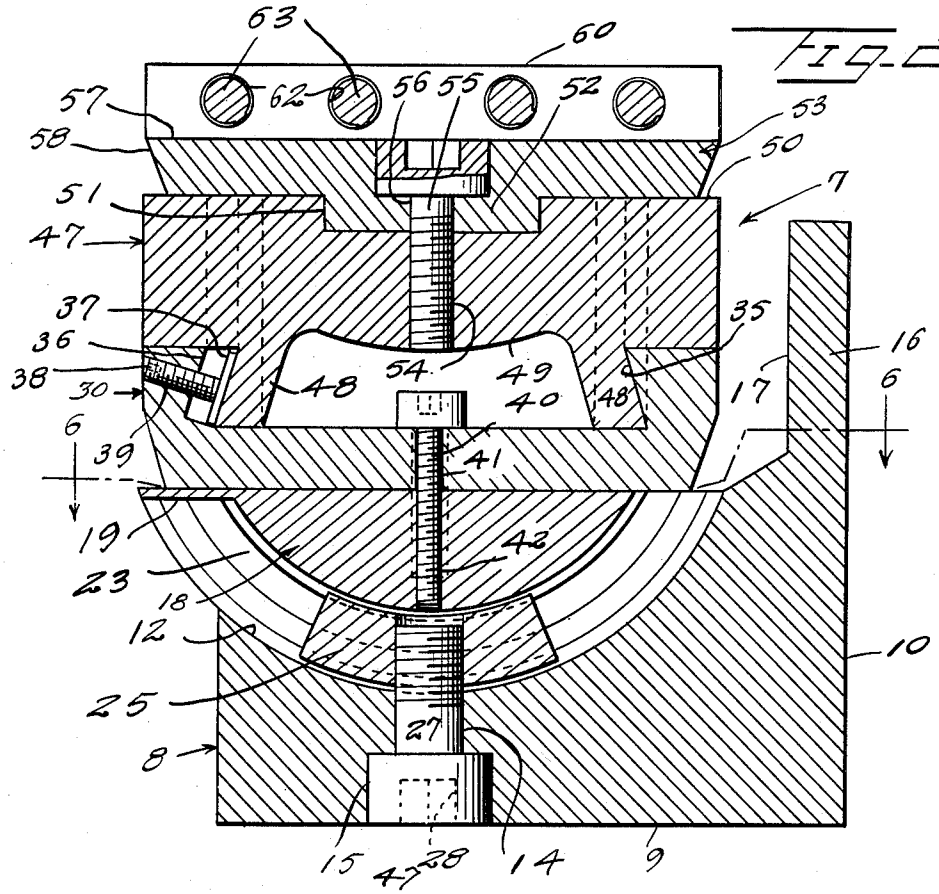
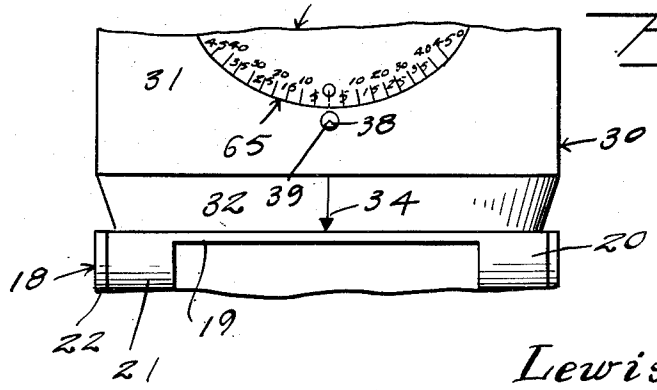


FIG. 5.



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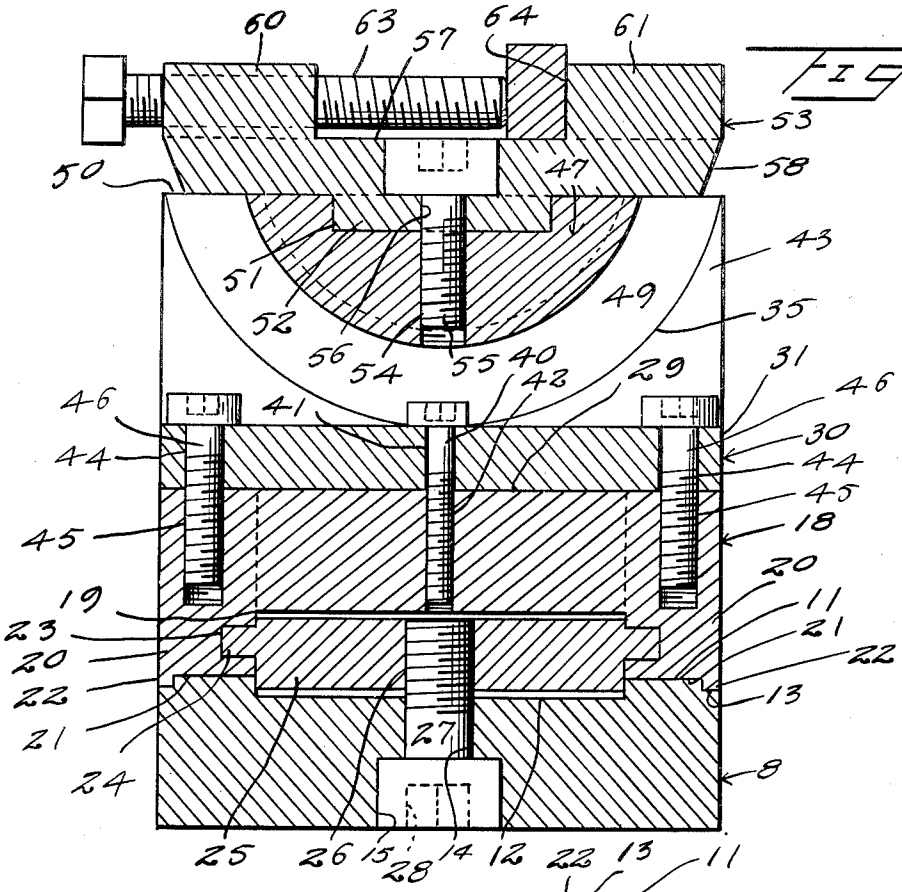


FIG. 3.

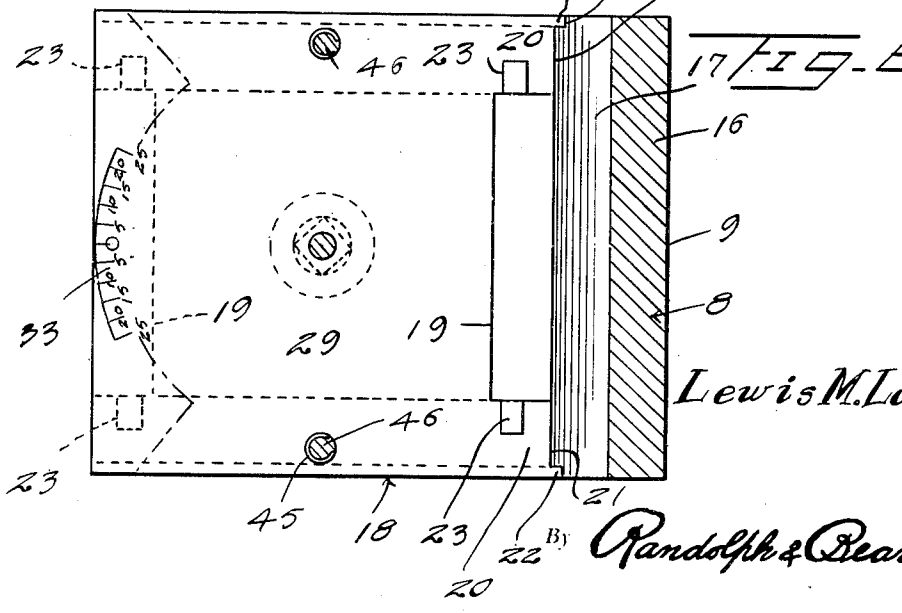


FIG. 6.

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COMBINATION VISE AND JIG

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Application May 22, 1946, Serial No. 671,476

4 Claims. (Cl. 51—220)

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This invention relates to a novel construction of combination 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.

A primary object of the invention is to provide a universally adjustable combination vise and jig capable of being readily set for accurately holding a tool for engagement with a grinding wheel for grinding a plurality of edges of an end of the tool to any required specification.

Another aim of the invention is to provide a combination vise of the aforedescribed characteristics having two bases, angularly disposed with respect to one another, and either of which is adapted to engage the upper surface of a magnetic block for supporting the device either as a vise or jig, so that when the device is positioned as a jig, a tool may be correctly held therein for cutting clearances on the angle on an end of the tool.

A further object of the invention is to provide a device which will eliminate the need for using a comparator by utilizing a plurality of sets of graduations, forming a part of the device and by means of which a combination vise and jig may be accurately set with the work holder portion thereof at any required angle with respect to both the vertical and horizontal.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, which illustrate a preferred embodiment thereof, and wherein:

Figure 1 is a top plan view of the combination vise and jig with the tool holder section thereof removed;

Figures 2 and 3 are vertical sectional views of the complete combination vise and jig taken substantially along planes as indicated by the lines 2—2 and 3—3, respectively, of Figure 1;

Figure 4 is a side elevational view showing the device positioned to function as a jig;

Figure 5 is a fragmentary end view in elevation looking toward the left hand end of Figure 1, and

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Figure 6 is a horizontal sectional view taken substantially along a plane as indicated by the line 6—6 of Figure 2.

Referring more specifically to the drawings, 7 designates a combination vise and jig in its entirety and which includes a base section, designated generally 8 having surfaces 9 and 10, disposed at right angles to one another and on either of which the base 8 is adapted to rest. The base 8 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 9 or 10 on a magnetized supporting block of a grinding machine, not shown. The base 8 is provided with an arcuately shaped upper surface 11 which is disposed above the surface 9, and which, as best seen in Figure 3, is provided with a circumferentially extending recess 12 and circumferentially extending recesses 13, which latter recesses are disposed at the sides of the base section 8. The base section 8 is provided with a bore 14 which opens into the recess or channel 12 and which is provided with a countersunk or enlarged outer end 15 which opens into the surface 9. The upwardly extended portion 16 at one side of the base section 8 is recessed as seen at 17 for a purpose which will hereinafter become apparent.

A lower rocker, designated generally 18, is mounted on the upper arcuate surface of the base section 8, as best seen in Figure 3. The rocker 18 is provided with a downwardly opening arcuate channel 19 which is disposed above the recess or channel 12 and which is formed by the depending side portions 20 of the rocker 18. The side portions 20 are provided with arcuate surfaces 21 which engage the surfaces 11 and depending flanges 22 which engage the recesses 13. The depending portions 20 are provided with opposed, inwardly opening arcuate grooves 23 which slidably receive laterally projecting lugs 24 of a retaining block 25 which is disposed in the space formed by the channels 12 and 19 and which is provided with a central threaded bore 26 which is connected to the threaded shank of a bolt 27 which extends through the bore 14 and which has a head countersunk in the bore portion 15. The head of the bolt 27 is provided with a suitable tool receiving recess, as seen in dotted lines at 28 in Figure 3, for applying and removing the bolt 27. It will be readily apparent that the bolt 27 in conjunction with the block 25 retains the lower rocker 18 in its position on the base 8 and permits rocking movement thereof, relatively to the base 8 in a direction toward and away from

the base portion 16. As seen in Figure 6, the upper surface of the lower rocker 18, designated 29, is substantially flat to turnably support a secondary base section 30, the bottom surface of which rests thereon. The base section 30 has a substantially cylindrical side wall 31 which is provided with a tapered lower portion 32 for exposing a part of the upper surface 29 of the bottom rocker 18. As best seen in Figure 6, a portion of the surface 29 which is thus exposed, is provided with degree markings and calibrations, designated generally 33 which extend from a zero midpoint to a twenty-five degree reading on either side thereof and the tapered portion 32, as seen in Figure 5, is provided with an arrow head or pointer 34 to function in conjunction with the calibrations 33. The upper portion of the secondary base section 30 is provided with an upwardly opening arcuate groove 35 which opens outwardly at its ends of opposed portions of the cylindrical wall 31 and which is provided with upwardly and inwardly inclined side walls, as best seen in Figure 2. One of the side walls of the groove 35 is recessed throughout its length, as seen at 36 and a part of said recessed wall 36 contains a retaining block or plate 37 which is connected to a screw 38, which is turn threadedly engages a bore 39 which opens outwardly of the cylindrical wall 31. As best seen in Figure 3, a bolt 40 extends through a central bore 41 in the supplemental base 30 and into a threaded bore 42 in the lower rocker 18. The head of the bolt 40 is disposed in the arcuate groove 35. The supplemental base 30 is provided with a diametrical channel 43 which joins with the arcuate groove 35 and which is of the same width as the widest portion of the groove 35. The supplemental base 30 is provided with arcuate recesses 44 which extend therethrough and which open into the ends of the channel 43. The rocker 18 is provided with upwardly opening, internally threaded recesses 45 which register with portions of the elongated, arcuate slots 44 for receiving bolts 46 which extend through the slots 44 and which have heads at their upper ends disposed in the ends of the channel 43. The slots 44, as best seen in Figure 1, are of a sufficient length to allow turning of the base 30 approximately through an arc of twenty-five degrees in either direction from an intermediate position, as seen in Figure 1. The bolt heads of the bolts 40 and 46 may be provided with recesses for receiving a suitable turning tool.

An upper rocker 47 is provided with a depending tongue 48 which fits into the arcuate groove 35 and which has downwardly and outwardly flared side walls which form a dovetail connection with the upwardly restricted groove 35, as seen in Figure 2. The plate 37 is advanced inwardly by turning the screw 38 for engaging one of the flared side walls of the tongue 48 to slidably retain said tongue in engagement with the groove 35. It will be readily apparent, from a consideration of Figure 2, that the plate 37 may be retracted to permit the tongue 48 to be removed perpendicularly from the groove 35. The tongue 48 is provided with a downwardly opening recess 49 which extends from end to end thereof and which accommodates the heads of the bolts 40 and 46. As best seen in Figure 2, the upper rocker 47 is disposed substantially at a right angle to the lower rocker 18 and may be turned through an arc of substantially twenty-five degrees in either direction from this position by means of the slots 44, as previously described.

The rocker 47 is provided with a substantially flat upper surface 50 having a circular recess 51 in the center thereof to receive a circular depending projection 52 which is swivelly mounted therein and which depends from the underside of a tool holder 53, the bottom surface of which rests on and turnably engages the surface 50. The rocker 47 is provided with a central threaded bore 54 to receive the threaded shank of a bolt 55 which extends through and is turnable in a bore 56 of the projection 52. The bore 56 is provided with an enlarged upper end in which the recessed head of the bolt 55 is countersunk and which opens into the tool receiving top surface 57 of the tool holder 53. The tool holder 53 is provided with a downwardly converging annular side wall 58 for exposing two diametrically opposed indicia bearing portions 59 which are inscribed on the upper surface 50 of the upper rocker 47 and each of which includes graduation markings extending from a zero midpoint forty-five degrees in either direction and which cooperate with pointers, not shown, inscribed on the wall 58.

The upper surface 57 of the tool holder 53 is provided with two upstanding elongated flanges 60 and 61 which are laterally spaced to one another. The flange 60 is provided with a plurality of transversely disposed threaded bores 62 for selectively receiving clamping screws 63 which cooperate with the inner face 64 of the flange 61 for clamping a tool, to be ground, not shown, on the surface 57.

In addition to the degree graduations 33 and 59, previously described, both sides of the upper rocker 47 are provided with similar degree markings 65 along the arcuate lower edge thereof and which extend from a zero midpoint to forty-five degrees in each direction and which cooperate with a suitable pointer, not shown, on opposite sides of the supplemental base 30.

From the foregoing it will be readily apparent that when the combination device 7 is positioned on its base 9, it may be employed as a vise for holding a tool, not shown, engaged between the screw 63 and the flange face 64. The tool end to be ground by a grinder, disposed above the vise 7, not shown, may be positioned at any angle desired by tilting the lower and upper rockers 18 and 47 and by swivelling the upper rocker 47 and base 30 relatively to the rocker 18 and by swivelling the tool holder 53, relatively to the rocker 47. The lower rocker 18 is also provided with degree graduations 66, corresponding to the graduations 65, for indicating the extent of tilting of the rocker 18 relatively to the base 8 for swinging an end of the tool toward or away from the grinding wheel. The base 30 may be turned to any desired angle with respect to the rocker 18, as indicated by the graduations 33 for positioning an end of the tool at any required angle to the grinding wheel and the rocker 47 may be angularly adjusted with respect to the supplemental base 30 to any angle, as indicated by the graduations 65 for canting the tool with respect to the grinding wheel. Further angular adjustment of the tool can be obtained by turning the tool holder 53 swivelly on the upper rocker 47. It will thus be readily apparent that a universal adjustment of the point of the tool to be ground may be obtained, while the tool is held in the vise 7 and with respect to a grinding wheel.

Similarly, by positioning the vise 7 on its base 10, said device will function as a jig and with the tool disposed in substantially a perpendicular position with respect to the magnetic supporting block, not shown, which is located beneath the grinding wheel. All of the adjustments, previously described, may be employed with the device 7 in its position of Figure 4, for adjusting the end of the tool into any position with respect to the grinding wheel to grind an end of the tool to an angle of any desired degree on the side of the tool and with a siderake of any required degree and with an end angle as required having a backrake of any required angular degree.

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. In a combination vise and jig, a base having two supporting surfaces disposed at right angles to one another and each adapted to rest on a suitable supporting surface for supporting the device, a pair of rockers, one of the rockers, constituting a lower rocker, being mounted on the base for angular adjustment relatively thereto, a supplemental base interposed between said rockers and swivelly supported by the lower rocker for turnably positioning the upper rocker relatively to the lower rocker, and a tool engaging head supported by said upper rocker.

2. A device as in claim 1, said supplemental base being provided with a dovetailed groove, said upper rocker being provided with a depending dovetail tongue for engaging said groove, and a retractable retaining member carried by the supplemental base for engaging and detachably retaining said tongue in engagement with the groove.

3. A tool holder comprising a base, a tool holder section disposed above the base, a sub-base interposed between the tool holder section and base, a bottom rocker interposed between the base and sub-base pivotally supported on and connected to the base for angular adjustment relatively thereto and on which said sub-base is swivelly mounted and to which the sub-base is connected, and a top rocker interposed between the sub-base and tool holder section pivotally mounted on and connected to the sub-base for angular adjustment relatively thereto and on which the tool holder section is mounted and swivelly connected, said top rocker and bottom rocker combining with the sub-base to mount the tool holder section for universal adjustment relatively to the base, said base being provided with two supporting surfaces disposed at right angles to one another and adapted to alternately engage a supporting member for positioning the tool holder to function either as a vise or as a jig.

4. 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 thereon relatively thereto, and a tool engaging head swivelly connected to and supported on the top rocker, said rockers pivoting about axes disposed in parallel planes and said supplemental base and tool engaging head 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 engaging head for universal movement relatively to the base.

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