

April 21, 1959

R. E. NOVKOV

2,882,656

SQUARING FIXTURE

Filed July 19, 1957

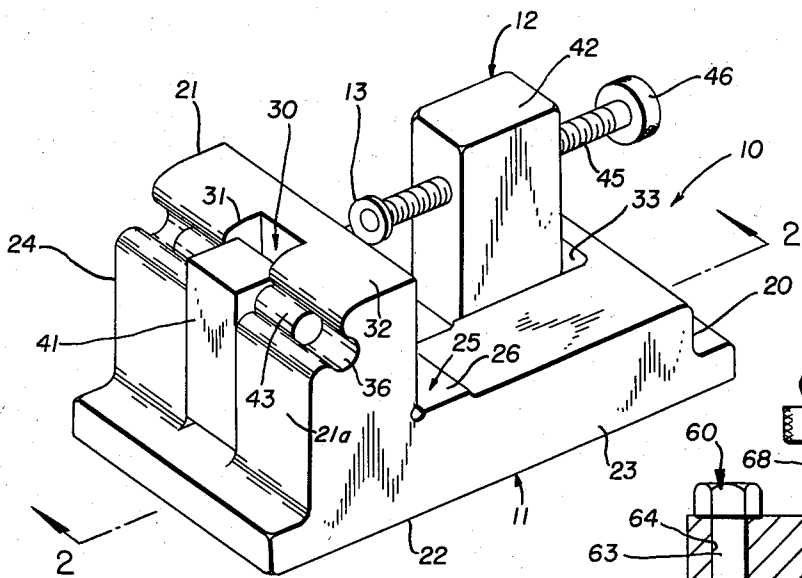


FIG. 1

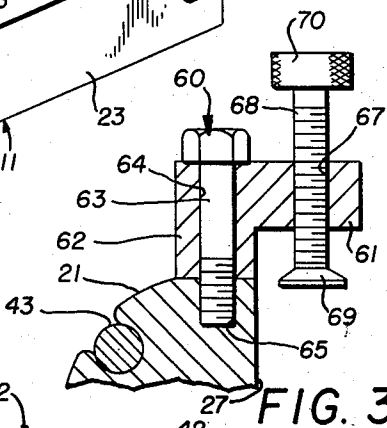


FIG. 3

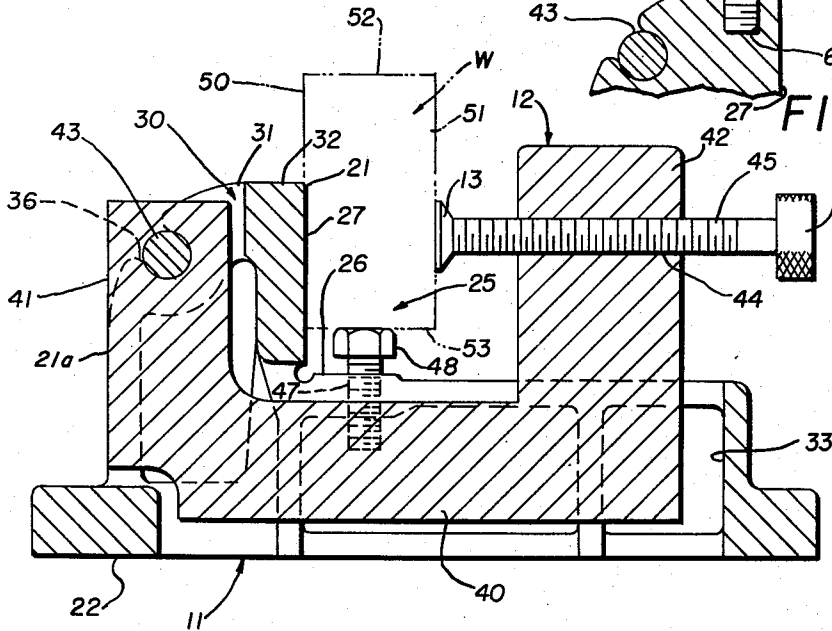


FIG. 2

INVENTOR.
RAYMOND E. NOVKOV

BY

J. William Freeman

ATTORNEY

1

2,882,656

SQUARING FIXTURE

Raymond E. Novkov, Akron, Ohio, assignor to Manchester Machine & Tool Co., Akron, Ohio, a corporation of Ohio

Application July 19, 1957, Serial No. 673,082

10 Claims. (Cl. 51—217)

This invention relates to squaring fixtures and in particular has reference to improvements in clamping types of fixtures used in association with surface grinding equipment.

In the known prior art of surface grinding it is always intended that the four or six sides of the object being ground, be ground in "squared" relationship to each other so that each surface is disposed at exactly 90° from the adjoining surface. In language of the trade this is conventionally referred to as grinding or "squaring" an object.

The prior art heretofore employed in this regard normally utilizes a conventional clamping type of arrangement wherein the fixtures employed utilize the mechanical principle of a vice. In this type of squaring fixture the work is normally gripped between two relatively movable surfaces, with the clamping pressure being applied so as to tightly hold the object in place between these surfaces during the grinding of any particular surface of the object.

It has been found in regard to the known type of prior art, that while devices of this general characteristic are initially satisfactory, that after repeated usage the same are prone to becoming inaccurate due to the fact that the movable clamping surface will normally become distorted or "sprung" by virtue of the constant force applied thereagainst during repetitive clamping. Specifically it has been found that the actual clamping operation in such type of device operates in effect to "spring" the clamping surface with the result that as more clamping pressure is applied a greater and greater distortion will occur. This is due to the fact that the clamping surfaces are acting on opposed sides of the normally unyieldable object being clamped, so that as more clamping pressure is applied, a greater distortion force exists.

It is believed obvious that such distortion or "springing" will lead to inaccurate grinding results due to the fact that upon springing of a clamping surface out of perpendicular with the supporting surface there is obviously a misalignment that will preclude perpendicular grinding of an adjoining surface.

It has been found that if the clamping force is arranged to occur so as to be uniformly directed towards opposed sides of the supporting surfaces, that such distortion and resultant misalignment will be precluded due to the fact that there is no distorting force present, since all clamping action is occurring against opposed sides of a single supporting surface. As a result this supporting surface is not subject to any forces that would cause the same to be distorted out of alignment.

It accordingly becomes the principal object of the invention to provide an improved type of squaring fixture that features clamping of an object to be squared, against a supporting surface that is not subject to distortion during clamping of the object thereagainst.

It is the still further object of this invention to provide a squaring fixture of this general classification that is

2

low cost in use while being extremely simple to operate and practice.

It is a still further object of this invention to provide a squaring fixture that is readily adaptable to receiving additional attachments for facilitating grinding or squaring of the fifth and sixth sides of a rectangular object for example.

These and other objects of the invention will become more apparent upon a reading of the following brief specification, considered and interpreted in the light of the attached drawing.

On the drawings:

Figure 1 is a perspective view of the improved squaring fixture.

Figure 2 is a view taken on the lines 2—2 of Figure 1 and showing work W being held by the squaring fixture.

Figure 3 is a partial section showing a modification of the invention.

Referring now to the drawings and in particular to Figure 1, the improved squaring fixture, generally designated by the numeral 10 is shown including a supporting member 11 and a relatively movable clamping member 12; the arrangement being such that work W may be clamped between a supporting surface of the base 11 and a swivel-type clamping foot member 13 of the clamping member 12 as will presently be described.

To this end, the supporting member 11 is shown as including a rectangular base member 20 and an upright supporting leg section 21 that extends perpendicularly of base section 20 adjacent one end thereof as is best shown in Figures 1 and 2 of the drawings. This leg section 21 is defined by opposed surfaces 27 and 21A that are interconnected by the top surface 32; the arrangement being such that the surface 27 may be a work-engaging or work-supporting surface against which the work may be positioned while the surface 21A is preferably undercut as at 36 to facilitate coaction with certain components of member 12 as will be described. The base section 20 also defines a flat under-surface 22 that is preferably perpendicular to opposed side surfaces 23 and 24 in order to facilitate mounting of any of the surfaces 22, 23 and 24 to the bed of the grinding machine in known manner. Additionally the supporting member 11 further defines a nest, indicated generally by the numeral 25, within which the work may be received, and which includes perpendicular surfaces 26 and 27 that are respectively defined by base 20 and supporting leg 21 with the surface 27 being preferably perpendicular to surfaces 22 and 26 as is best shown in Figure 2 of the drawing.

To the end of co-acting with the clamping member 12 as will presently be described, the supporting member 11 is shown provided with a central slot indicated generally by the numeral 30 in Figure 1 of the drawings. This slot 30 extends between opening 31 of surface 32 in leg 21, to end wall 33 that is provided in the base 20 as is clearly shown in Figures 1 and 2 of the drawing. Additionally, the upright supporting leg 21 is shown provided with an arcuate recess 36 that extends transversely thereof so as to preferably interconnect with the surfaces 23 and 24 as best shown in Figure 1, with this arcuate recess 36 being of course interpreted at its point of juncture with slot 30.

Also included in the surface 26 of supporting member 11 may be a tapped aperture 47 within which is received a bolt 48 with the bolt 48 being capable of utilization to raise the work above bed surface 26.

Considering next the structure of the clamping member 12, it will be seen from Figure 2 that the same is of generally U-shaped configuration, so as to define a base section 40 and opposed leg portions 41 and 42, with leg

portion 41 including a through pin 43 that projects from opposed sides thereof for reception in recess 36, while leg portion 42 is internally threaded as at 44, to facilitate reception of a screw 45 that has a swiveled foot section 13 and a turning head 46. It is of course apparent that the width or thickness of the clamping member 12 is such that the same may be conveniently loosely received within the confines of previously described slot 30. In this manner, in its free and unrestricted condition, the clamping member 12 will be movable relatively of supporting member 11 as a result of the pivotal connection between pin 43 and arcuate recess 36. This will facilitate clamping of the work W against surface 27 by the previously described clamping foot 13 with tightening thereof being achieved by turning head 46.

In use or operation of the improved squaring fixture 10 it will first be assumed that the component parts have been assembled in the position of Figure 1 and that the squaring fixture has been attached to a grinding machine with surface 22 thereof being positioned on the bed of such machine.

At this time, and assuming that a rectangular piece is to be ground square, it is merely necessary that the operator proceed to grind two opposed surfaces thereof in parallel relationship without the use of the fixture, with this operation being a standard one wherein one surface is ground and the ground surface is then placed on the bed for parallel grinding of the opposed surface. In this regard it will be assumed that the operator has ground surfaces 50 and 51 of work piece W that is shown in Figure 2 in the aforesaid manner.

When the operator next desires to grind the surface 52 for example, it is merely necessary that the ground surface 50 be clamped against the vertical supporting surface 27 with the result that the surface 50 will be perpendicular to surface 22 so that upon grinding of the surface 52 this surface will be in exact perpendicular with surfaces 51 and 50. When this surface 52 has been ground the operator may merely rotate the work 180° in the clamping fixture for grinding of the surface 53, or may merely grind this surface 53 by placing the work W on the bed of the grinding machine with surface 52 in contact therewith.

It will be seen at this point that if a thinner work piece is being ground that the adjusting bolts 48 may be moved relatively of the tapped apertures 47, 47 that are provided in the bed surface 26.

It will be seen that during the aforesaid operation, that all force is in effect transmitted against opposed sides of the upright supporting leg 21, with such force being exerted by the projecting pin 43 on the one hand, and by the clamping foot 13 on the other hand. Thus, there is no force present in the device that is operating to exert a strain that would act to move the surfaces 22 and 27 out of their perpendicular relationship with each other, since all force is being transmitted against groove 36 on the one hand and vertical supporting face 27 on the other hand.

It will be seen from the foregoing that there has been provided a new and novel type of squaring fixture that is characterized by the presence of perpendicular supporting surfaces that are not subject to distortion during the clamping operation. It has been shown how the use of a clamping mechanism that acts on both sides of the supporting surface operates to eliminate any distorting strains on the same so that the same can be repetitively used with ever present accuracy.

The modified form of the invention shown in Figure 3 of the drawings, envisions the same type of clamping fixture as has been previously described with the exception that an additional attachment in the form of a clamping block 60 is attached to the uppermost surface 32 of the upright supporting leg 21. Accordingly where indicated like numerals designate like parts.

To this end, the clamping lug 60 is shown as being of L-shaped cross-sectional configuration so as to include leg 61 and a leg 62, with leg 62 being attached to surface 32 by provision of bolt 63 that is threaded through apertures 64 and 65, that are respectively provided in leg 62 and leg portion 21 respectively. Similarly the leg portion 61 is provided with a tapped aperture 67 through which may be threaded a threaded shaft 68 that has a clamping foot 69 as well as a turning head 70.

In this manner the fifth and sixth sides of a work piece can be ground in squared or perpendicular relationship to the previously ground sides 50, 51, 52 and 53 by merely placing one ground side 53 for example against surface 26 and applying either side surface 23 or 24 of supporting member 11 against the bed of the grinding machine at which time a fifth end can be ground in perpendicular relationship to the previously ground sides. At this point the sixth end may be ground by merely setting the fifth ground surface on the grinding bed and grinding the sixth surface in parallel therewith or by using the fixture and placing the fifth ground surface thereon against the bed surface 26.

While a full and complete disclosure has been made in accordance with the dictates of the patent statutes, it is to be understood that the invention is not intended to be so limited.

Accordingly other modifications of the invention may be resorted to without departing from the spirit hereof or the scope of the appended claims.

What is claimed is:

1. A clamping fixture of the character described, comprising; a work support member including a base and an integral supporting leg section substantially disposed at right angles to said base and having opposed faces; a clamping member of U-shaped configuration having one leg portion thereof pivoted about a point on one said face of said supporting leg section whereby said clamping member may be pivoted relatively of said work support member; and a clamping element shiftably received in the remaining leg portion of said clamping member and being movable relatively of said clamping element towards said remaining face of said supporting leg section whereby an object received against said remaining face of said supporting leg section may be clamped thereon upon movement of said clamping element.

2. A clamping fixture of the character described, comprising; a work-supporting member including a base and an upright flange having opposed faces; a U-shaped clamping member having opposed leg portions and means for releasably pivoting one leg portion of said clamping member with respect to a point on one said face of said flange, whereby said remaining leg portion may be moved in an arc relatively of said remaining face.

3. A clamping fixture of the character described, comprising; a work-supporting member including a base and an upright flange having opposed faces; a U-shaped clamping member having opposed leg portions; means for releasably pivoting one leg portion of said clamping member with respect to a point on one said face of said flange, whereby said remaining leg portion may be moved in an arc relatively of said remaining face; and a shiftable clamping foot secured to said remaining leg portion of said clamping member and being shiftable towards said remaining face of said support surface.

4. A clamping fixture of the character described, comprising; a support member defined by a base and an upright flange having opposed faces and with said member including a through slot; a U-shaped clamping member defining opposed leg portions; and means for pivotally securing one end of one said leg portion about a point on one face to said upright flange when said clamping member is disposed in said slot whereby said remaining leg portion of said clamping member may be moved in

5

an arc relatively of said remaining face while being disposed in clamping relationship therewith.

5. A clamping fixture of the character described, comprising; a support member defined by a base and an upright flange having opposed faces and with said member including a through slot; a U-shaped clamping member defining opposed leg portions; and means for pivotally securing one end of one said leg portion about a point on one face of said upright flange when said clamping member is disposed in said slot whereby said remaining leg portion of said clamping member may be moved in an arc relatively of said remaining face while being disposed in clamping relationship therewith; said means including an offset in said face of said flange and a pin carried by said leg portion and being received in said offset.

6. A clamping fixture of the character described, comprising; a support member defined by a base and an upright flange having opposed faces and with said member including a through slot; a U-shaped clamping member defining opposed leg portions; and means for pivotally securing one end of one said leg portion about a point on one face of said upright flange when said clamping member is disposed in said slot whereby said remaining leg portion of said clamping member may be moved in an arc relatively of said remaining face while being disposed in clamping relationship therewith; said means including an offset in said face of said flange and a pin carried by said leg portion and being received in said offset; said offset and said pin being complementary in contour.

7. A clamping fixture of the character described, comprising; a support member defined by a base and an upright flange having opposed faces and with said member including a through slot; a U-shaped clamping member defining opposed leg portions; and means for pivotally securing one end of one said leg portion about a point on

6

one face of said upright flange when said clamping member is disposed in said slot whereby said remaining leg portion of said clamping member may be moved in an arc relatively of said remaining face while being disposed in clamping relationship therewith; said leg portion that is movably disposed adjacent to said remaining face being provided with a shiftable clamping element.

8. A clamping fixture of the character described, comprising; a support member defined by a base and an upright flange having opposed faces and with said member including a through slot; a U-shaped clamping member defining opposed leg portions; means for pivotally securing one end of one said leg portion about a point on one face of said upright flange when said clamping member is disposed in said slot whereby said remaining leg portion of said clamping member may be moved in an arc relatively of said remaining face while being disposed in clamping relationship therewith; a clamping block secured to said upright flange and overlying said base; and a shiftable clamping element carried by said block and being movable with respect to said base.

9. The device of claim 4 further characterized by the fact said base includes at least one adjustment screw projecting therefrom in parallelism with said flange at a spaced distance therefrom.

10. The device of claim 8 further characterized by the fact said base includes at least one adjustment screw projecting therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

2,239,307	Weber	Apr. 22, 1941
2,491,559	Hargrett et al.	Dec. 20, 1949

FOREIGN PATENTS

688,365	Germany	Feb. 19, 1940
---------	---------	---------------