United States Patent [19]

Schwab

[11] **3,881,888**

[45] **May 6, 1975**

[54] **FIXTURE FOR HOLDING BLADES DURING GRINDING**

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[22] Filed: **July 2, 1973**

[21] Appl. No.: **375,718**

[30] **Foreign Application Priority Data**

July 27, 1972 Switzerland 11237/72

[52] **U.S. Cl.** ..... **51/218 R;** 269/71; 269/78

[51] **Int. Cl.** **B23g 3/04**

[58] **Field of Search** ..... 51/218 R, 218 A, 256; 76/82, 82.1, 82.2; 269/45, 71, 75, 78

[56] **References Cited**

UNITED STATES PATENTS

1,320,462	11/1919	Fowler	51/218 R X
1,323,127	11/1919	Treuthardt	269/71 X
1,670,253	5/1928	Gilbert	269/45
1,915,247	6/1933	Holloway	51/218 A X
3,066,930	12/1962	Chinnick	269/71

FOREIGN PATENTS OR APPLICATIONS

724,318	1/1932	France	269/71

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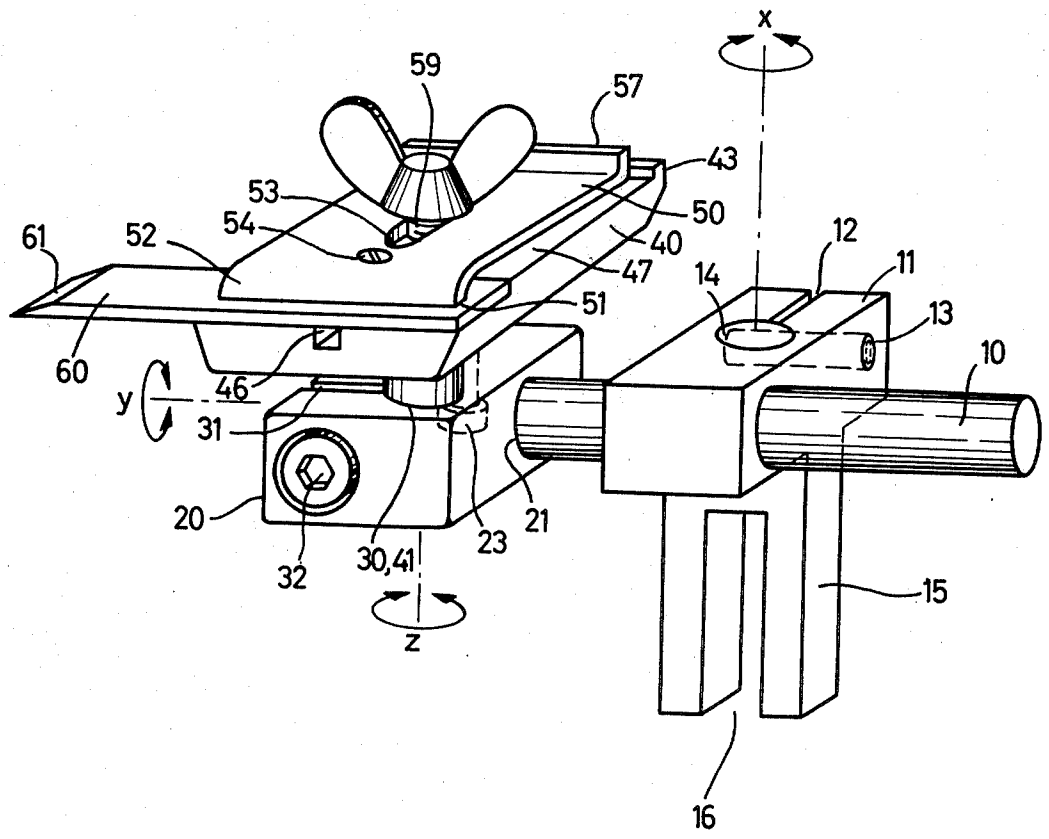
[57] **ABSTRACT**

A fixture for positioning a sewing machine cutting element in a grinding machine. A horizontally disposed bolt or shaft is carried by a grinding machine attachment mounting. A clamping plate is rotatably and longitudinally positionable on the shaft at selected positions along the axis thereof. A second bolt or shaft extends from the clamping plate, at right angles to the first shaft and is securable at selected angular and longitudinal positions with respect to its own axis. The second bolt has mounted at its end a chuck adapted to secure the sewing machine cutting element. The clamping plate can thus be adjusted with respect to the first and second bolts so that the sewing machine blade can be held at selected positions with respect to the cutting device of the grinding machine.

9 Claims, 5 Drawing Figures



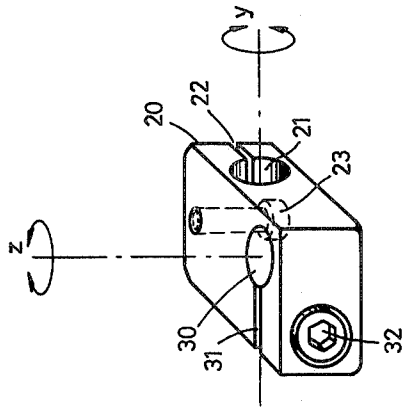


Fig. 2

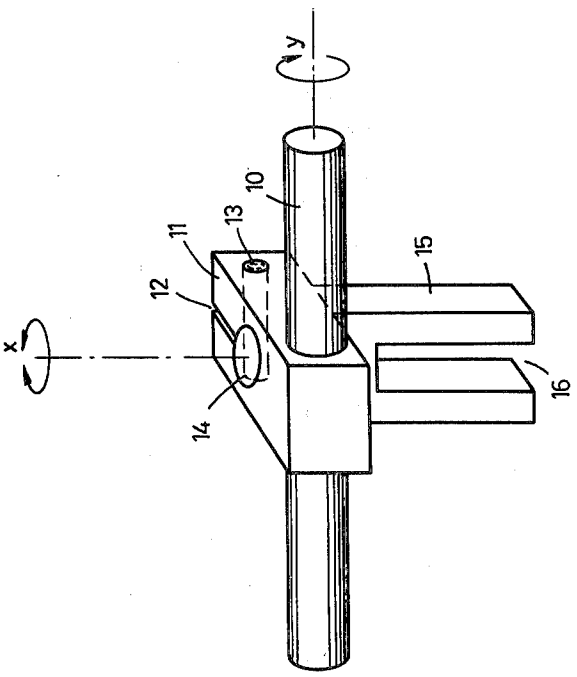


Fig. 1

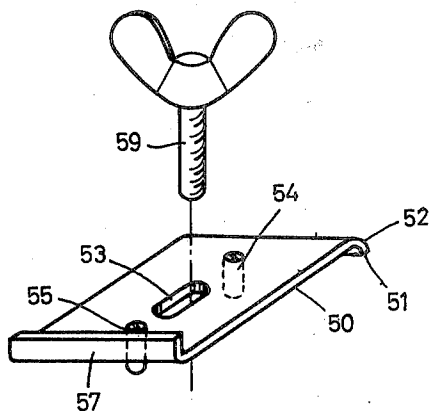


Fig.4

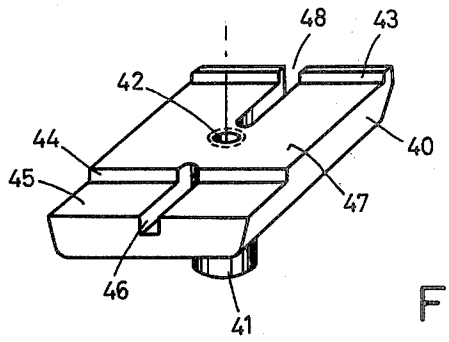


Fig. 3

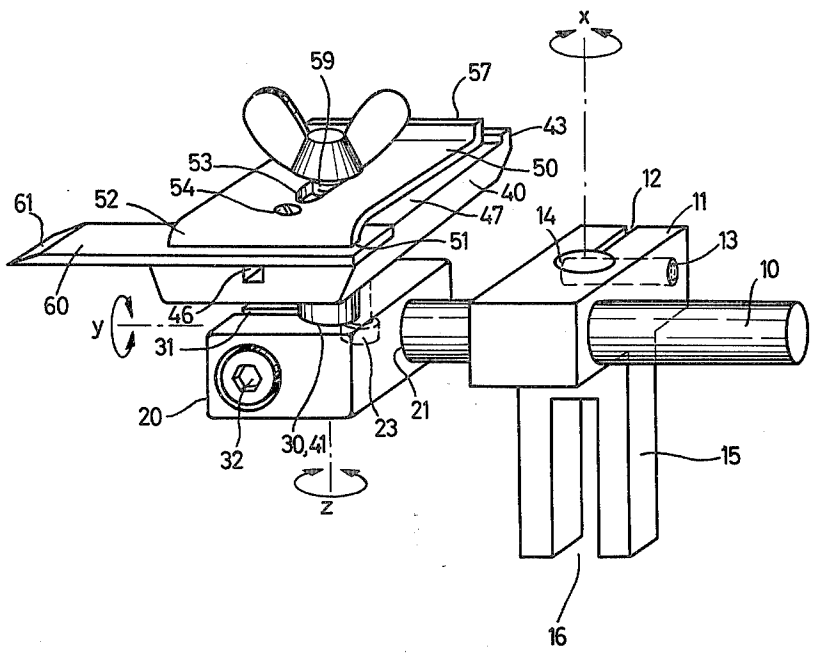

x
59
57
43
53
50
54
40
12
11
61
52
47
14
51
13
10
60
y
46
31
20
32
30,41
23
21
15
z
16

Fig.5

FIXTURE FOR HOLDING BLADES DURING GRINDING

BACKGROUND OF INVENTION

The present invention relates to a fixture or jig for positioning and holding the cutting elements of a sewing machine with respect to the grinder of a grinding or graving machine.

Many industrial sewing machines are provided with cutting elements to perform a variety of cutting or slicing functions. These cutters differ a great deal in overall shape as well as in the shape of its cutting edge. The cutting edges run at a variety of angles in relation to the longitudinal and transverse axes of the element. Moreover in different cutting elements the inclination of the surface of the cutting edge varies in relationship to the plane or surface of the cutter itself. Because of the relatively fine work these cutting elements must perform it is necessary to maintain the cutting edges in as perfect and as sharp a condition as is possible.

The graver or grinding machines by which the cutting elements are ground in general has a fixed grinding plane. Special jigs or clamping devices have been provided to hold sewing machine cutting elements. These fixtures consist of a machine attachment mounting and a plate like chuck having one or more clamping claws or clamping elements. The attachment mounting enables the chuke plate to be always fixed in a preset position with respect to the plane of the grinding device of the grinding machine. As the angle of the cutting edge must be accurately honed the chuck plate is provided with a guide which matches the similar guide of the sewing machine cutting element. This guide takes into account the predetermined angle for the cutting element blade and permits the blade to be accurately ground. This requires, however, that a clamping device adapted to each individual sewing machine cutting element be provided. In view of the large number of different sewing machine cutting elements this represents an unacceptable burden in both the manufacture and storage of these elements.

It is an object of the present invention to provide a fixture or jig for holding and positioning a sewing machine cutting element on a grinding machine which is of improved construction and utility over those of the known piror art.

It is another object of the present invention to provide a universal fixture or jig by which any one of a variety of sewing machine cutting elements may be held and positioned with respect to the grinding device of a grinding machine.

It is a further object of the present invention to provide a fixture or jig for holding and positioning sewing machine cutting elements which has a uniform clamping device which may be used to hold any one of the number of cutting elements.

The aforementioned objects together with numerous other objects and advantages of the present invention will be seen from the following disclosure of the invention and from the illustration of its preferred embodiment.

SUMMARY OF THE INVENTION

According to the present invention a fixture for positioning a sewing machine cutting element in a grinding machine is provided which comprises a horizontally disposed bolt or shaft carried by a grinding machine attachment mounting. A clamping plate is rotatably and longitudinally positionable on the shaft at selected positions along the axis thereof. A second bolt or shaft extends from the clamping plate, at right angles to the first shaft and is securable at selected angular and longitudinal positions with respect to its own axis. The second bolt has mounted at its end a chuck adapted to secure the sewing machine cutting element. The clamping plate can thus be adjusted with respect to the first and second bolts so that the sewing machine blade can be held at selected positions with respect to the cutting device of the grinding machine.

The clamping device according to the present invention thus can perform adjustably the functions of any well known clamping device which is specifically designed for a given individual cutting element but it overcomes the drawback of these conventional devices in that only a single device consisting of the same parts can be used for any cutting element. Thus, the device according to the present invention may be prefabricated and stored by the grinder for use with any cutting element. Matching the device to a predetermined sewing machine cutting element is purely a matter of adjustment of the angular and longitudinal position of the clamping plate with respect to the first and second bolts. This adjustment need only be done once for each particular sewing machine cutting element. The present device affords the further advantages that adjustment to another sewing machine cutting element is easily obtainable and quite feasible without the necessity of fabricating additional parts.

Preferably, the machine attachment mounting is subdivided into a base portion and a block portion which are connected together by a third bolt or shaft extending at right angles to the first bolt or shaft. By adjusting the clamping block with respect to the base, the plate chuck can then be adjustable in all three coordinate planes with respect to the grinding device. Preferably, the first bolt, that is the bolt connecting the attachment member and the clamping plate extends horizontally while the third bolt which connects the base and the clamping block of the attachment mounting extends vertically thereto. The base of the attachment mounting body is made bifurcated so that the device as a whole can be adjusted longitudinally and angularly with respect to the grinding device by easily attachable and detachable clamping members.

Quite frequently, several identical sewing machine cutting elements, or sewing machine cutting elements belonging to a set, have to be ground simultaneously. Preferably, therefore, the first bolt on which the clamping plates are secured is made sufficiently long so that it extends from the body of the attachment mounting so that several clamping plates may be rotatably and longitudinably mounted thereon. Each clamping plate contains an associated chuck each receiving one of the cutting elements. It may be further preferred to provide the bolt protruding on both sides of the body of the mounting member so that clamping plates and associated chucks may be mounted symmetrically with respect to the attachment mounting. Securement of the attachment mounting and/or the clamping plates is achieved according to the preferred form of the present invention by extending the shafts through a bore which bore is provided with a slot extending to the edge of its member so that the bore may be compressed or clamped resiliently. Associated clamping screws or

locking bolts are provided so that the member may tighten the bore about the bolt in its selected position.

The present invention further provides for an increased number of possibilities of fixing the sewing machine cutting elements themselves to the chuck plates. Accordingly the chuck plate is provided with a plurality of stepped clamping surfaces each provided with a stop edge. The cutting elements may thus be positioned on any one of the multiple stepped surfaces. In addition the cutting elements are clamped to the clutch plate by a top plate or claw which is fixed to the plate chuck by screw means. Preferably, the top plate is provided with an oblong hole through which the screw means extend so that it too may be adjustably positioned. Guide pins and coordinated guide slots are provided by which the exact movement of the chuck plate and the top claw plate can be made with respect to each other.

The setting up or positioning of the sewing machine cutters with respect to the grinding member of the grinding machine is further simplified by the fact that the top plate or clamping claw of the chuck is provided with an edge set at an angle and opposite to the working edge of the cutting machine blade. This clamping edge acts as a guide coordinated to the exact guide of the cutting element itself.

Full details of the present invention are given in the following description and are illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is an isometric view of the grinding machine attachment mounting body showing the horizontal first bolt,

FIG. **2** is an isometric view of the clamping plate which is received on the first bolt and which itself receives the chuck,

FIG. **3** is an isometric view of the bottom portion of the chuck and the second bolt,

FIG. **4** is a similar view showing the top plate or clamping claw and means for attachment to the bottom portion of the chuck.

FIG. **5** shows the device in its assemble configuration.

DESCRIPTION OF THE INVENTION

In the drawings, the device has been separated into its component parts and somewhat exploded so as to more clearly illustrate their construction. Before turning to the specific construction, it would be interesting to note that the clamping plate shown in FIG. **2** is mounted on the bolt of FIG. **1** in the direction of the Y axis while the chuck plate shown in FIGS. **3** and **4** is mounted on the clamping plate shown in FIG. **2** along the Z axis.

Turning now to FIG. **1** the device comprises a grinding machine attachment mounting consisting of a bifurcated mounting base **15**, the parallel legs of which define a bight or slot **16**. The base **15** can be easily and rapidly set up on the conventional guide shoulders of the commonly employed graver or grinding machine with well known clamping devices. Although a certain coordination between the grinding plane and the grinding disc or grinding member itself must be maintained and properly respected, this does not provide any difficulty since the bifurcated base member does not depart significantly from the manner in which conventional fixtures are presently mounted.

Extending in a vertical axis from the top of the base **15** is a shaft or bolt **14** on which is rotatably mounted a block **11**. The bolt **14** extends through a bore in the block **11**, which bore is provided with a transverse slot **12** extending outwardly toward an edge thereof. Extending transversely through the block **11** is a clamping screw **13** which when tightened clamps the block **11** about the bore in which the bolt **14** is retained. The size of the slot **12** and the nature of the material from which the block **11** is formed determines the resilient degree to which the bolt **14** can be held. Fixed within the block **11** at an axis at right angles to the bolt **14** as indicated by the axis Y, is the first mounting bolt **10**. The block **11** and the first bolt **10** mounted in it are thus rotatable about the X axis of the bolt **14** as indicated by the arrow. By tightening the clamping screw **13** the block **11** can be locked and secured in any selected adjustable angular position and linear position with respect to the bolt **14** as desired.

One or more clamping plates **20** as seen in FIG. **2** can be thus slit over the horizontally extending first mounting bolt **10**. While only one such clamping plate is shown it will be obvious that each can be constructed in exactly the same manner. The clamping plate **20** has a horizontally directed bore **21** which is itself provided with an associated clamping slot **22** extending to its edge and a transversely extending clamping screw **23** similar to that of the clamping screw **13**. Through this type of mounting, the clamping plate can be adjustably positioned along the axis of the bolt **10** and fixed in any angular position rotatable about the axis Y as indicated by the arrow.

The clamping plate **20** is further provided with a second bore **30** extending at right angles to the bore **21** and thus at right angles to the axis of the bolt **10**. The bore **30** is also provided with a clamping slot **31** and a clamping screw **32** by which it may be tightened in the manner previously described. The bore **30** is adapted to receive a second adjustment or mounting bolt **41** which is secured to the bottom portion of a plate chuck **40** as seen in FIG. **3**. The bottom portion of the chuck **40** can thus be adjusted angularly as well as longitudinally with respect to the bolt **41** about the axis Z as indicated in FIG. **2** and then locked in position with respect to the clamping plate **20** by manipulation of the clamping screw **32**.

From the foregoing it will be observed that the chuck **40** can therefore be adjusted as desired and as selected in all three coordinate directions corresponding to the X, Y, and Z axes and locked in position so that any predetermined disposition and angle with respect to the plane of the grinding element can be obtained for the cutting element mounted on the chuck.

The sewing machine cutting element or blade which is to be ground is set upon the lower portion of the chuck **40** and is clamped thereto by a top plate or claw member **50** as seen in FIG. **4**. The lower portion of the chuck **40** is stepped at least twice in depth as shown to provide clamping surfaces **45** and **47** which are in parallel planes to each other. Each of the stepped clamping surfaces **45** and **47** is terminated along one edge with a perpendicularly extending wall **44** and **43** respectively extending transversely across the surface. The edges **44** and **43** act as clamping stop members against which the cutting element or blade may be positioned. Approximately in the center of the chuck **40**

there is provided a threaded bushing 42 into which a thumb screw member 59 passes.

The shaft of the thumb screw 59 passes through an oblong hole 53 in the clamping claw or top plate 50 permitting the top plate to be thus longitudinably adjustable with respect to the bottom portion of the chuck. The front edge 51 of the top plate or claw 50 is bent downwardly to provide a stop surface 52. The opposite or rear edge of the top plate is bent upwardly to form a wall 157 which provides the working edge or control edge of the clutch. Projecting downwardly near the front edge 51 is a blade pressure pin 54. The pressure pin 54 is received in a guide slot 48 which is cut within the bottom portion of the chuck 40 transversely to the clamp stop edge 43. Aligned with the pressure pin 54 but along the rear edge is a second depending adjustable screw pin 53 which protrudes downwardly from the lower surface of the top plate 50. The screw pin is movably received in a guide slot 46 cut transversely through the lower step 45 from the rear edge of the bottom portion of the chuck 40.

In operation, the sewing machine cutting element or blade which is to be ground is placed with one edge against the front clamp stop wall 43 on the upper step 47 of the lower member of the chuck 40. The clamping claw or top plate 50 is guided by the oblong hole 53 until the cutter pressure pin 54 rests on the free edge of the sewing machine cutting element or blade which is to be ground. Thus the cutting blade or cutting element is held between the pressure pin 54 and the stop edge 43 resting upon the flat horizontal surface 47 of the lower chuck member 40. This linear adjustment can be obtained by forcing the clamping member 50 in the forward direction by manually engaging the working edge 57. Thereafter the thumb screw 59 is tightened forcing the top plate or claw 50 into tight position holding the blade. It is to be noted that the edge 51 of the top plate thus bears downwardly upon the cutting element or sewing machine blade holding the same in fixed position. Thus a three point support for the cutting element or the blade defined by the stop edge 43, the pressure pin 54 and the bearing edge 51 guarantees a definite and non-movable tolerance-free setting up of the sewing machine cutting element to be ground so that the cutting edges are always ground at the proper predefined and preset angle. Adjustment of the chuck about the X, Y and X axes can thereafter follow so that the cutting element is presented to the grinding member or grinding disc in its proper position.

The screw pin 55 at the rear of the top plate or claw makes possible the horizontal alignment of the claw 50 when the bearing surface 51 rests on the sewing machine cutting element or blade. By adjusting the height of the screw pin 55 as it bears against the bottom of the guide 46 the top plate or clamping claw 50 maybe adjusted transversely to the clamping stops 43 and 44 of the plate chuck 40. By rotating the clamping claw or top plate 50 180° in its horizontal plane, a sewing machine cutting element or blade can be made to rest against the clamp stop 44 and held against the flat horizontal surface 45. The set up proceeds in the same manner as previously described when the blade is positioned against the forward edge 43.

From the foregoing it will be seen that the present invention provides a simple fixture of jig for holding the cutting element or blade for grinding. The chuck which actually holds the blade is adjustable about a first axis defined by the bolt 10 and simultaneously about a second axis perpendicular thereto defined by the bolt 14. Furthermore, by forming the mounting member in two parts, (this is desirable but not absolutely necessary) further adjustment about the third coordinate axis defined by the bolt 14 can also be obtained. The split clamping blocks and the clamping screw mechanisms provide for easy and simple adjustment without the necessity of completely taking the device or apparatus apart or without the necessity of substituting or replacing parts. It will also be seen from the foregoing that a novel and simple chuck member is provided whereby a variety of cutting elements or blades may be accommodated and which provides for a secure but adjustable pressure mounting and holding of the blades in their proper position.

Various modifications and changes may be made in executing the present invention. It is therefore intended that the present disclosure be taken as illustrative only and not to limit the invention whatsoever.

What is claimed is:

1. A fixture for positioning the cutting element of a sewing machine for grinding on a grinding machine comprising an attachment body having a base adapted to be secured in a fixed position on said grinding machine, a first shaft fixed thereon, a separable block securable in selected angular and axial positions on said first shaft, a first bolt carried by said block extending along an axis perpendicular to said shaft, a clamping plate securable in selected angular and axial positions on said first bolt, a chuck for holding said cutting element, a second bolt integral with said chuck securable in said clamping plate in selected angular and axial positions along an axis perpendicular to the axis of said first bolt, said chuck comprising a bottom portion having a plurality of stepped planar surfaces perpendicular to said second bolt, each adapted to receive a cutting element, said stepped surfaces having transverse stop edges for locating said cutter element thereon and a separable top member having a depending edge adapted to contact the surface of the cutting element and means for securing said top member to said bottom portion to clamp the cutting element therebetween.

2. The fixture according to claim 1 wherein said base is bifurcated.

3. The fixture according to claim 1 wherein said first bolt is sufficiently long to hold a plurality of said clamping plates, each being provided with an associated chuck.

4. The fixture according to claim 3 wherein said first bolt extends through said block on both sides thereof.

5. The fixture according to claim 1 wherein said clamping plate and said block are provided respectively with a bore for receiving said bolts, said clamping plate and said block having slots extending from the bores to the edge thereof and means for clamping said slots to form a resilient clamp securing said bolt therein.

6. The fixture according to claim 1 wherein said top member comprises a claw plate adapted to be placed over said cutting element, said claw plate having an oblong slot therein, and said means for securing said top member includes a threaded screw adapted to pass through said slot, said bottom portion having a threaded hole for receiving said screw to thereby permit said claw plate to be selectively positioned thereon.

7. The fixture according to claim 6 wherein the bottom portion of said chuck is provided with at least one

guide slot extending transversely to the edge stops and said top plate is provided with a guide pin located within said slot, said cutting element being adapted to be positioned between the edge stop and said guide pin.

8. The fixture according to claim **7** wherein the depending edge extends along the front edge of the claw plate, and said guide pin is offset toward the rear of said depending edge.

9. The fixture according to claim **8** wherein the top claw plate is provided with a second edge opposite to the depending edge and along its rear end extending upwardly from the plane thereof to form a working edge for positioning said top plate with respect to said chuck, an adjustable screw pin depending from the top claw plate toward the bottom portion of said chuck adjacent said rear edge, a slot formed in the bottom portion of said chuck for receiving said screw pin said slot extending transversely to the edge stops of the bottom portion of said chuck whereby adjustment of said screw pin can be made to adjust the depending edge opposite thereto.

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