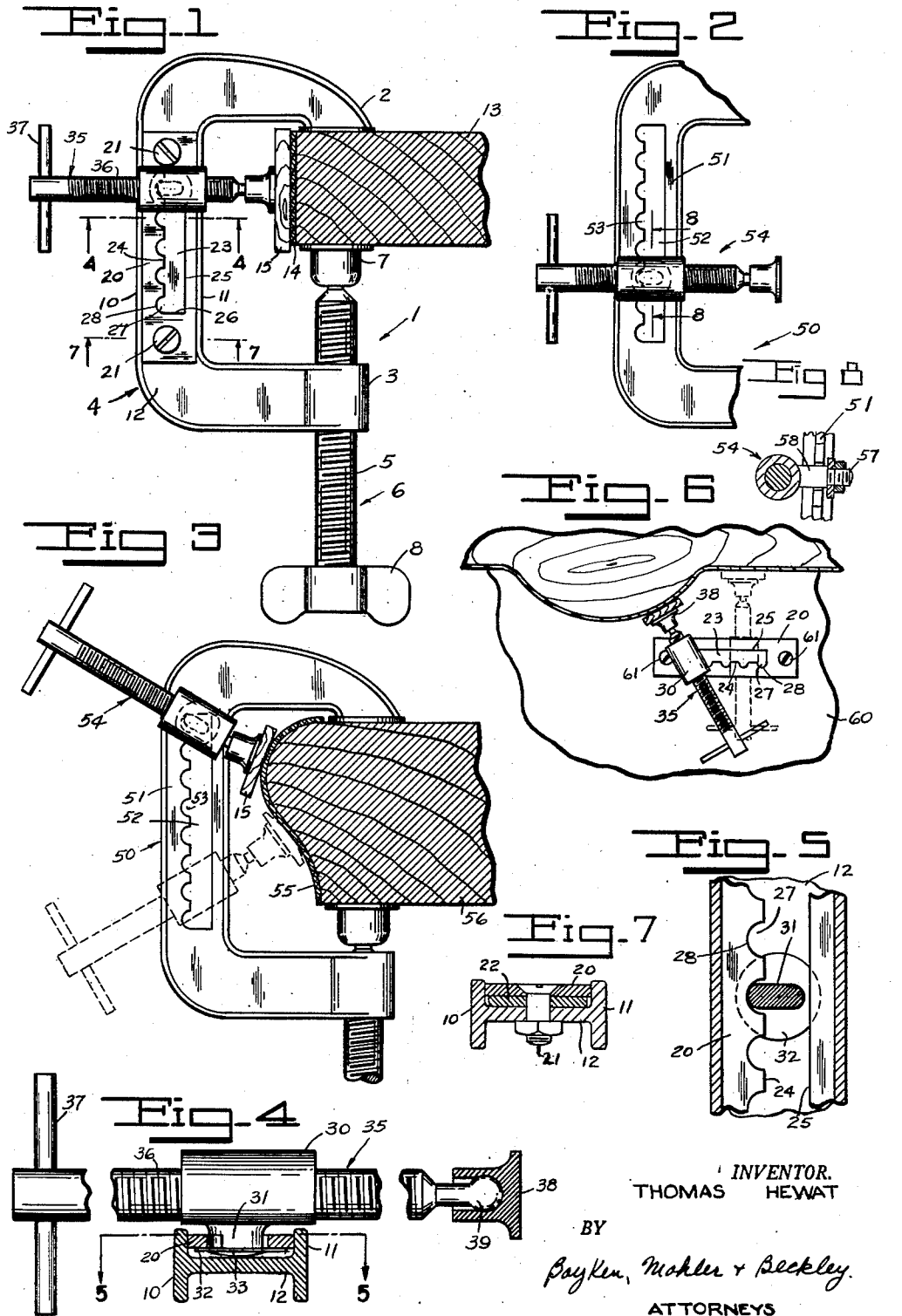


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WORK HOLDING CLAMP WITH AN ANGULARLY
ADJUSTABLE PRESSURE ELEMENT
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WORK HOLDING CLAMP WITH AN ANGULARLY ADJUSTABLE PRESSURE ELEMENT

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This invention relates to work-holding clamps and more particularly to a type of work-holding clamp which is adapted to be clamped to an article in the usual manner and also to perform certain additional clamping operations on such an article.

It is common practice in trades such as cabinet making to employ a clamp having a pair of opposed jaws for holding an article between such jaws for gluing portions of an article together. In the metal trades such clamps are also employed for securing portions of an article together while certain machining operations are being performed on the article. However, regardless of the actual operation involved, no successful clamp has, to my knowledge, been provided for performing additional clamping operations after the article has been clamped or after portions of the article have been clamped.

In the cabinet-making trade, it is often necessary to securely fasten a strip of material to an article as by gluing and in some instances, the contour of such articles is very irregular. In many of such cases, the use of a conventional clamp having two opposed jaws becomes impossible where the strip is being secured to an edge of a relatively wide member. When securing strips of wood such as veneer to an article it is a simple operation to clamp strips to two opposite sides of the article which may be engaged by the jaws of the conventional clamp, but surfaces which are at right angles to such opposite sides present difficulties which to my knowledge have not been satisfactorily overcome.

In the past, clamps have been made having an auxiliary clamping element provided on the frame of the clamp for engaging the work at right angles to the line of action of the conventional jaws but these clamps have been generally unsatisfactory since the auxiliary element acts only at right angles to such line of force or, if such element is inclined to such a line, no means is provided for adjusting the clamping element to various positions to suit irregularities in the surface to be worked on. United States Letters Patents to Naglee and Crandall Nos. 242,959 and 1,371,073 respectively dated June 14, 1881 and March 8, 1921 are examples of prior devices.

It is therefore one of the objects of the present invention to provide a work-holding clamp which overcomes the disadvantages of these prior art devices.

Another object of the invention is the provision of a work holding clamp which is adapted to be

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clamped to an article in the conventional manner and which is provided with means for applying additional clamping forces to the article at various angles thereto and at various points along the surface to be clamped.

Another object is the provision of an attachment suitable for existing C-clamps to convert such clamp to one having added advantages.

Other objects and advantages will be apparent from the appended specification and from the drawings wherein:

Fig. 1 is a cross-sectional view through an article showing the invention in elevation and in clamping relationship to the article.

Fig. 2 is a fragmentary view of a portion of a modified form of the clamp shown in Fig. 1.

Fig. 3 is a view similar to Fig. 1 but showing the modified form of the invention in clamping relationship to an article of different shape from that shown in Fig. 1.

Fig. 4 is a cross-sectional view through the frame of the clamp shown in Fig. 1 as taken along the lines 4—4 and showing the auxiliary clamping element in elevation.

Fig. 5 is a cross-sectional view through the frame of the clamp and the auxiliary clamp showing the means for adjustably positioning the auxiliary clamping element with respect to the frame of the clamp.

Fig. 6 is a plan view of a conventional bench showing a portion of the invention detached from the clamp and mounted on the bench in work-holding relationship with respect to an article.

Fig. 7 is a cross-sectional view through the frame of the clamp of Fig. 1 and as taken along the lines 7—7 of that figure.

Fig. 8 is a fragmentary sectional view taken along line 8—8 of Fig. 2.

The invention as illustrated shows a conventional C-clamp generally designated 1 having a pair of spaced jaws 2, 3 respectively connected together by a frame member generally designated 4. While a "C-clamp" is illustrated in the drawings, it will be apparent that other forms of clamps may be employed without materially altering the invention.

The jaw 3 is threadedly apertured to receive the shank 5 of a clamping screw generally designated 6 which clamping screw is in alignment with the work engaging portion of jaw 2. The screw 6 is also provided with a work engaging portion 7 at one of its ends between jaws 2, 3 and a portion 8 at its other end outside of jaw 3 may be engaged by the fingers of the user for turning the screw. The frame member 4 may take different

forms, but it is preferable and customary for it to have an H-shaped cross-section formed by a pair of spaced flanges 10, 11 and a web 12 integrally connecting the flanges.

In Fig. 1, the clamp 1 is shown in clamping relationship with an article 13 which is shown on the drawings as a wooden member such as a shelf. For the purpose of explaining the operation of the invention, it will be assumed that it is desired to secure a relatively thin strip 14 of wood or veneer to the edge of article 13 as by gluing.

Referring to Fig. 1, a generally elongated mounting plate or strip 20 is secured at its ends to the web 12 as by machine screws 21 and is spaced from the web by means of spacers 22 (Fig. 7) positioned at each end of the plate 20 and apertured to receive the screws 21. This plate 20 is longitudinally slotted as at 23 (Fig. 1) for a portion of its length providing a generally rectangular opening in said plate having a pair of longitudinally extended opposed side edges 24, 25 and a pair of end edges 26. The edge 24 of plate 20 is formed with a plurality of similar recesses 27 having arcuate side walls 28 and which recesses open into the slot 23 and are equally spaced along said slot (Fig. 5).

Carried by the plate 20 is a generally cylindrical support member 30 (Fig. 4) which is provided with a radially outwardly projecting pin 31 integral with the member 30 and which is adapted to be received within slot 23. This pin 31 is generally oblong in cross-section, but has its opposite shorter sides rounded to produce the shape shown in Fig. 5.

The length of the pin 31 is such that it may extend through the slot 23 and a washer 32 on the side of the slot 23 opposite from the side carrying the mount 30. The free end of the pin 31 is riveted over the washer to form a head 33 (Fig. 4) so that the mount is securely held on the plate 20, but slidable therealong with the pin 31 extending through said slot at all times, and when the wider sides of the pin extend generally parallel with the slot.

The mount 30 is centrally apertured and threaded for an axially extending clamping screw 35 which is similar to the clamping screw 6 hereinbefore described, and which screw 35 has a threaded shank 36, a turning handle 37 and a work-engaging portion 38. The portion 38 is preferably provided with a spherical socket to receive the spherical end 39 of the clamping screw 35 so that the portion 38 may directly engage the work even though the surface of the latter is disposed at various angles to shank 36.

A modified form of the invention is illustrated in Figs. 2 and 3 wherein a clamp generally designated 50 is shown having a web 51 corresponding to the web 12 of Figs. 1, 4, 5 and 7. A slot 52 is provided in the web 51 and arcuate recesses 53 are formed in a similar manner to the recesses 27 in mounting plate 12 as hereinbefore described. A clamping screw generally designated 54 is mounted on the frame member 51 in the manner described above thus obviating the mounting plate required in the first described embodiment. In some instances, it may be preferable to install the auxiliary clamping element directly on the web of the clamp as shown in Figs. 2 and 3 especially if it is not desired to use the device as a conventional clamp, although it is obvious that by making the outer end 57 of pin 58 which extends through slot 52 cylindrical and threading said end 57, a nut may be threaded into said

end 57 with a washer clamped between the nut and the shoulders on pin 58 at the juncture between said threaded end and said pin (Fig. 8). By removal of the nut the clamping screw including all parts carried thereby may be quickly removed from the C-clamp. The use of the removable plate 20 and associated parts is preferable in most instances because a conventional C-clamp can merely be drilled for bolts 21.

In Fig. 6, the plate 20 is shown removed from the web of the clamp and secured to a conventional work bench 60 by screws 61 so that the clamping screw may be employed for other work not requiring the use of a conventional clamp as desired.

In operation, referring to Fig. 1, the clamp 1 is secured to the article 13 adjacent an edge of the latter and the strip 14 is placed in its desired position with glue (not shown) between the strip and the article. The clamping element 35 is then moved along the frame 4 to a point where direct engagement of the portion 38 of the clamping element with the strip 14 may be effected with the shank 36 at right angles to the strip if possible. The screw 35 may then be turned as required to engage the strip 14. In the drawings a cleat 45 is shown between the work and the clamping screw in the manner normally employed in the cabinet-making trade to prevent marring of the strip 14.

In Fig. 3 the modified form of the invention is shown as it may be employed to clamp a strip 55 on a curved surface of an article 56. As may be seen from this figure, the invention has a flexibility which permits its use in many different situations.

It will be understood, of course, that both forms of the invention herein disclosed may be employed with equal facility. By virtue of the recesses 27 in the plate 20, the clamping element 35 may be employed when it is almost in alignment with the slot 23. It is pertinent to note in this respect that the slot 23 could be made longer than shown in the drawings so as to permit the clamping screw 35 to be disposed substantially parallel to the main clamping screw 5 but it is obvious that in such a case a conventional clamp could be employed in lieu of the device illustrated herein.

The present invention does not require undue weakening of the conventional clamp, it being obvious that the slot 52 formed in the web 51 of the modified form of the invention (Figs. 2, 3) and the holes required in the web 12 for the screws 21 are formed approximately at the bending axis of the clamp frame and thus do not affect the resistance to bending of the clamp.

One of the desired features, in addition to the swinging of the clamp screws 35, 64 is the speed with which the screw mountings may be shifted to any desired position along the slots 23 or 52. A mere rotation of the pin 31 or 58 in the slot until out of the recess 27 or 53 will permit immediate movement of the pin along the slot to the desired point. No screws or other elements need be actuated to effect this adjustment. The jaw 2 of the C-clamp is always fixed and single screw 6 is the only one that need be manipulated to secure the C-clamp to the work. The other clamping screw 35 or 54 is then almost instantly adjustable to the desired position along the slot 23 or 52 and the angle of said screw relative to the work is obtained just as quickly.

The fact that the device of Fig. 1 may be attached to any conventional C-clamp by merely

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drilling two holes for the attaching bolts enables owners of such clamps to quickly convert them to cabinet clamps of the type herein shown. If the auxiliary clamping screw is not desired, it can be quickly removed and the C-clamp is not impaired in any way. It is possible that other means may be employed for securing the plate 20 to the frame member 4 of the C-clamp for sliding therealong without necessarily constituting invention, but in any event the clamping screw 35 or 54 is moved along the frame member of the C-clamp to the desired position and may be swung to the desired angle relative to said member.

It will be understood that the particular application of the present invention illustrated in the drawings is only by way of example and that many other useful applications will be apparent to those skilled in the art.

The embodiment herein disclosed is not to be construed as a limitation of the invention but only as a preferred form thereof and it is obvious that various modifications may be made without departing from the spirit of the invention.

I claim:

1. A clamping element adapted to be employed with a work holding clamp having an elongated frame provided at its ends with a pair of opposed jaws for oppositely engaging an article therebetween in clamping relationship comprising: a support secured to said frame member intermediate the ends of the latter, a clamping element secured to said support for adjustable movement along said frame member to various work holding positions and interengaging elements on said support and said clamping element for angularly positioning the latter with respect to the former when the jaws of the frame are in engagement with such an article, said support being provided with a slot extending longitudinally of said frame member, and means on said clamping element extending through said slot and movable along the latter with said element when said element is moved to said positions.

2. In a device of the character described: an elongated support adapted to be releasably secured to the frame connection between the opposed jaws of a C-clamp, a screw having a handle at one end for manually rotating said screw and a work engaging element pivotally supported on the opposite end for universal movement, a swivel threadedly apertured for said screw with the latter extending through such aperture in

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threaded engagement therewith, said support being provided with a longitudinally extending slot for slidably receiving said swivel and a plurality of recesses opening into said slot and directed generally toward the space between said jaws for engaging said swivel whereby said screw may be selectively positioned in any desired recess for positioning said screw at various angles with respect to said support as desired.

3. A work holding clamp comprising: a clamping member having a pair of opposed jaws adapted to oppositely engage an article positioned in the space between said jaws, an elongated frame connecting said jaws, a clamping screw, a support threadedly supporting said screw and a pivot rigid with said support, said frame including a portion provided with a slot extending longitudinally of said frame for receiving said pivot to permit movement of the latter to various points as desired along the length of said frame and a plurality of recesses communicating with said slot for receiving said pivot therein, said recesses opening outwardly toward said space whereby said screw may be positioned in engagement with an article between said jaws with said pivot received in one of said recesses, the cross-sectional shape of said pivot being elongated in a direction parallel to said screw and having an extent in said direction greater than the width of said slot to prevent movement of said support longitudinally of said slot when said screw is directed toward said space.

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