WORKSECURING CLAMP
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1 Claim. (Cl. 269—233)

This invention relates to a work securing clamp, or holddown clamp and is an improvement over Patent 2,845,847, dated August 5, 1958, relating to a hold-down clamp.

In the prior patent construction, a pressure block was provided upon the interior of the housing supportably guided therein and included the transversely extending shaft which was moveable through an angular slot in the hold-down arm for the purpose of effecting a camming action.

In the present invention a pressure block is not itself moveable within any slotted portion of the housing, but on the other hand employs the same transverse shaft which does the camming action for the purpose of mounting supporting rollers, which are moveably mounted within a pair of longitudinally extending slots formed in the side walls of the housing, being a distinctive improvement over the prior patented construction, particularly due to the omission of the mounting means upon the interior of the housing and the improved manner by which a pressure block is guideably mounted upon the housing for the purpose of transmitting a camming action to the hold-down arms of the present clamp.

It is the primary object of the present invention to thus provide an improved hold-down clamp construction wherein a pressure block is reciprocally moveable within the housing being connected to a reciprocal motor, wherein the pressure block is guideably supported within the housing by means of a transverse activating shaft which is slidably and guideably mounted within the side walls of the housing, and with said shaft serving the further function of providing an actuating means for the work engaging hold-down clamp arms.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawings, in which:

FIG. 1 is a plan view of the present work securing clamp.
FIG. 2 is a side elevational view thereof with fragmentary indications of the supporting surface for the clamp, and the supporting surface for the workpiece, the retracted position of the hold-down arms being indicated in dotted lines.
It will be understood that the above drawings illustrate merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claims hereinafter set forth.

Referring to the drawings, the present work securing clamp includes a hollow housing generally indicated at 11 and including base plate 12 mounted and secured upon support S as by fasteners 13, and including the upright side plates 14 fixedly secured to base plate 12, as by welds, at 15, FIG. 2.

It is contemplated that any other means may be employed for securing the side plates to the base plate, such as by bolts or other fasteners.

The housing also includes upright transversely arranged end plate 16 which is fixedly secured to the base plate 12, as well as to the side plates by a series of welds 17.

Upright boss 18 is fixedly secured as by welds at 19 to base plate 12 upon the interior of the housing and is transversely apertured for receiving pivot pin 20, whose opposite ends project therefrom, said pin being fixedly secured within boss 18, as by the transverse locking pin 21, FIG. 2.

As shown in FIG. 1, the pivot pin 20 projects through end portions of the hold-down arms 22, with suitable bushings 23 being employed, if desired, and extends into and through the upright side walls forming a part of the housing.

In the operation of the present work securing clamp, one hold-down arm may be employed if desired. However, in the preferred illustrative embodiment two of such hold-down arms 22 are employed, as shown. These work hold-down arms are arranged in parallel spaced relation with their inner ends positioned within the housing, bearing against the side plates 14, and pivotally upon the end portions of the pin 20, as above described, with respect to FIG. 1.

The arms 22, adjacent their pivot ends, are enlarged as at 24 for cooperative engagement with the side plates 14. The work engaging adapter block 25 is interposed between outer end portions of the hold-down arms 22 in supporting engaging relation, and is fixedly secured with respect to said arms by the top securing plate 26, FIGS. 1 and 2, which overlies and interconnects the said arms and is secured to the adapter block as by the fasteners 27.

The undersurface of the adapter block 25 is formed as at 28 for cooperative engagement with the work W for anchoring, clamping or securing the same upon the table or other support 1, fragmentively shown in FIG. 2.

The motor is employed such as the hydraulic cylinder 29, with the heads 30 and 31, and with connections 32 and 33 respectively for providing for the introduction of pressure fluid such as compressed air to the respective opposite ends of said cylinder alternately for effecting reciprocal movements of the conventional piston 36, shown in dotted lines in FIG. 1.

Mounting plate 34 is fixedly joined to the cylinder head 31, bears against the upright end plate 16 of housing 11 and is fixedly secured thereto by a series of cap screws or other fasteners 35. The longitudinally reciprocal rod 37 at one end is fixedly secured to the piston 36, as shown in dotted lines, FIG. 1, extends through plate 34, and end plate 16 of said housing and on its reduced threaded end 38 is secured within the pressure block 39.

The support shaft 40 extends transversely through and is mounted upon pressure block 39 with the end portions of said shaft extending through the side plates of the housing, as best shown in FIG. 1. Rollers 41 are journaled on outer portions of shaft 40 and are guideably and movably slots 42, which are formed through the said side plates 14 to thus provide the sole support for the pressure block 39 for guiding the same in its reciprocal movements in union with the reciprocal rod 37 connected thereto, as at 38, FIG. 1.

Washers 43 on end portions of shaft 40 loosely bear against the outer surfaces of side plates 14, and are retained with respect thereto by the nuts 44. It is seen in the illustrated embodiment of the invention that the opposed elongated guide slots 42 for the rollers 41 provide the means for guiding and supporting the pressure block 39 during its reciprocal movements under the control of the hydraulic cylinder 29 and associated piston 36 and piston rod 37 connected thereto.

Opposed elongated slots 46 are formed through work engaging arms 22, the said slots 46 extending at an acute angle with respect to the longitudinal axis of the above described guide slots 42, as shown at 47, FIG. 2.

As shown in FIG. 2 the pivotal mounting of the hold-down arms 22, namely the pivot pin 20, is displaced from the longitudinal axis of the reciprocal rod 37 in order that reciprocal movements of the said rod as hereinafter described may effect camming pivotal actions of the hold-down arm 22.

Rollers 45 are loosely journaled upon the support shaft 40 adjacent and inwardly of the respective guide rollers.
The rollers 45 are movably positioned within the elongated inclined slots 46 in the respective work engaging arms 22. Accordingly longitudinal movement of the pressure block 39 and connected support shaft 40 is adapted to cam the arms 22 so as to rotate in an arc from the inoperative dotted line position shown in FIG. 2 to the work securing solid line position shown also in FIG. 2 and wherein the adapter 25 carried by the said arms operatively and retainingly engages the work W upon the support T, fragmentarily shown for clamping the same in position.

In the foregoing description, it appears that the pressure block 39 through the means of the transverse support shaft 40 and associated rollers 41 is guidably and movably mounted with respect to the housing and relative to the housing slots 42, best shown in FIG. 2 to thus provide for a longitudinal reciprocal and rectilinear movement for the said pressure block. The angularity of the opposed slots 46 in the hold-down arms 22 provides the means by which the arms 22 may be cammed through the action of the inner set of rollers 45, to either of the positions shown in FIG. 2, upon reciprocal movement of the rod 37 which forms a part of the hydraulic or pneumatic cylinder 29.

In the preferred embodiment of the invention, a pneumatic cylinder is employed, there being a suitable control valve provided by which air under pressure may be selectively directed to either of the two ports 32 or 33 for controlling reciprocal movements of the rod 37.

Having described my invention, reference should now be had to the following claim.

I claim:

In a work securing clamp, a hollow housing securable to a support and including upright side plates and end plate, a longitudinally reciprocal rod extending through said end plate and into said housing, a pressure block longitudinally movable in said housing and connected to said rod, a support shaft secured to and extending transversely through the pressure block, there being opposed elongated guide slots in said side plates parallel to said rod, and guidably and supportably receiving end portions of said shaft, a pair of parallel spaced elongated work hold-down arms within said housing on opposite sides of said pressure block bearing against inner surfaces of said side plates and pivotally mounted upon said housing, there being opposed elongated slots formed through said arms extending at an acute angle to the longitudinal axis of said guide slots, said shaft movably extending through said arm slots in operative engagement with said arms, and a motor secured to said end plate including a reciprocal means axially joined to said rod, longitudinal movement of said pressure block and connected shaft adapted to cam said arms to rotate in an arc from inoperative to work securing position, said shaft adapted to ride from one end of said arm slots to the other, independent release movement of said arm being resisted by transverse forces on said shaft acting through said side plates at an angle substantially at right angles to said slots, a work engaging adapter block adjustably interposed between end portions of and supportably engaging said arms and secured thereto, whereby said adapter block is adapted to transmit clamping pressure at substantially right angles to the axis of said arm, the guided receiving of said shaft within said side plates including a roller journalled and retained on each end of said shaft movably positioned within the guide slots, the operative engagement of said shaft with said arms including spaced rollers journalled and retained on said shaft movably positioned within said arm slots.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Inventor(s)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,320,590</td>
<td>Waters</td>
<td>Nov. 4, 1919</td>
</tr>
<tr>
<td>2,845,847</td>
<td>Blatt et al.</td>
<td>Aug. 5, 1938</td>
</tr>
<tr>
<td>3,080,983</td>
<td>Blatt</td>
<td>Mar. 12, 1963</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>22,822</td>
<td>Great Britain</td>
<td>Oct. 16, 1911</td>
</tr>
</tbody>
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