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Davis

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[54] **WORK CLAMP**

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[51] **Int. Cl.** **B25b 1/14**

[58] **Field of Search** 81/367–380, 81/5.1, 418, 424, 386; 269/138, 150, 166, 171.5, 201, 228

[56] **References Cited**

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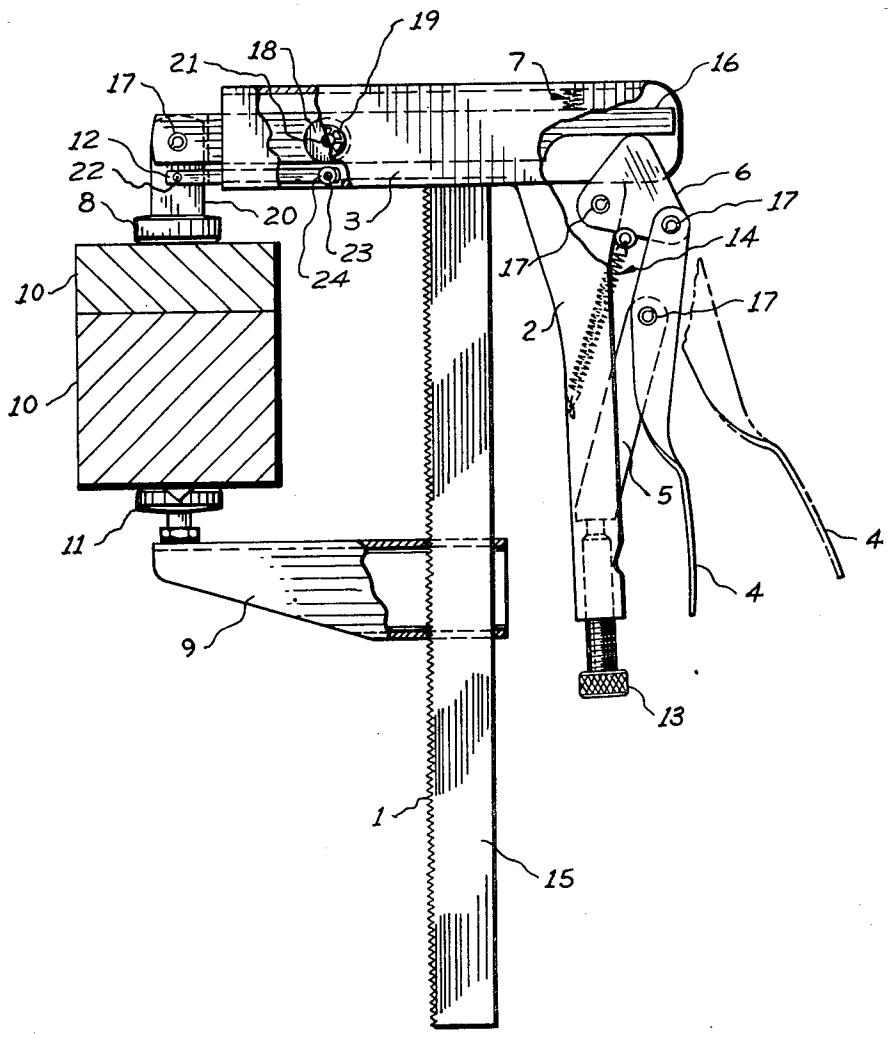
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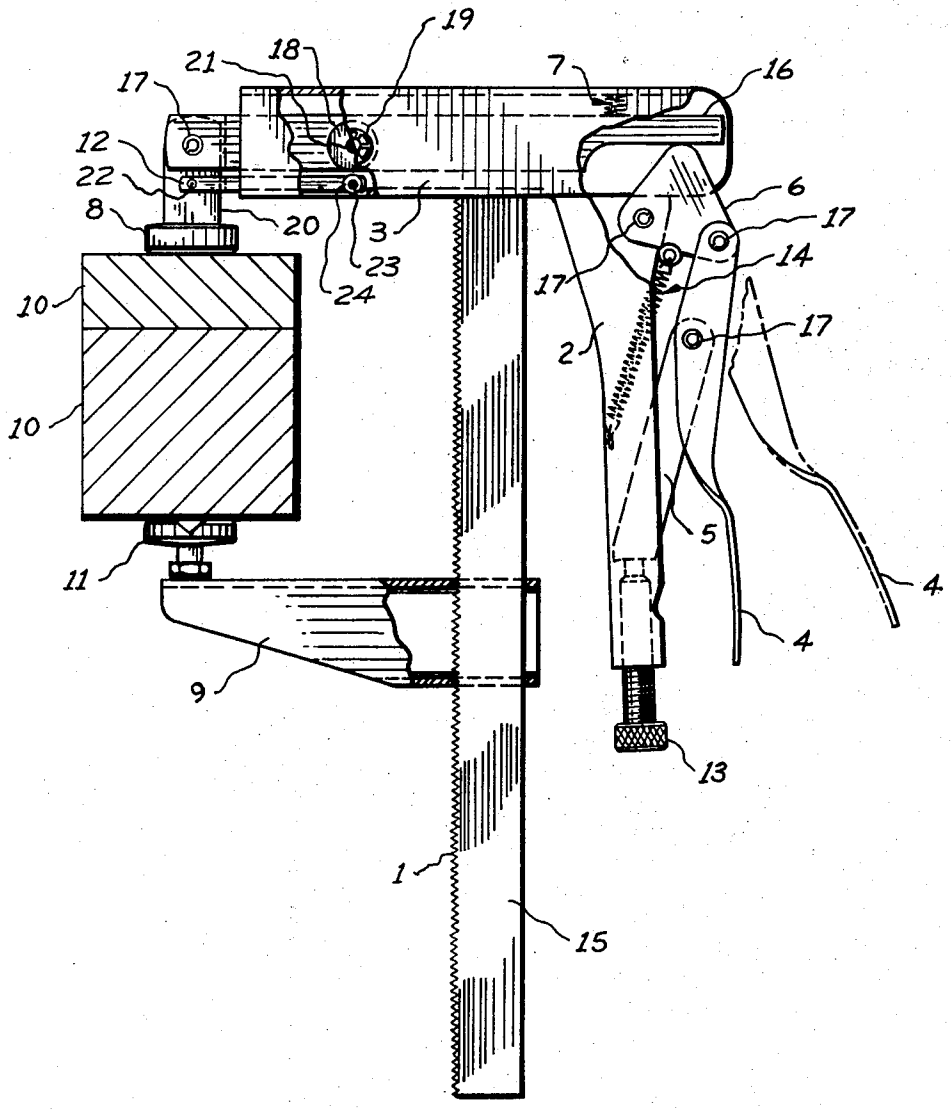
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[57] **ABSTRACT**

Work clamp has a frame member upon which is movably mounted a clamp pad. The frame member also pivotally carries a clamp arm. A movable jaw is pivotally mounted on the clamp arm. The cam pivots the clamp arm on the frame so that clamping is achieved and pivoting of the one jaw permits the jaws to be maintained in proper relationship.

1 Claim, 1 Drawing Figure




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WORK CLAMP

BACKGROUND OF THE INVENTION

The invention described herein relates to clamps and more specifically to work holding or work securing clamps which may be used in the capacity of either a fastening means, to clamp work to a supportive member, or as a vise, to clamp work directly between its jaws.

Clamps currently in use are rather slow and cumbersome to operate and limited in application. In some cases, due to the bothersome twist screw common to present day clamps, the workman is unable to get the clamp into confined or narrow spaces where clamping is desired, or if the clamp can be squeezed in, he is unable to get a hand in also to operate the clamp.

Therefore one of the primary objectives of the invention is to provide an improved clamp which totally eliminates the common twist screw method of operation, thereby giving a superior clamping device characterized by greatly increased applicability, usefulness, convenience and ease of operation.

Another object of the invention is to provide an improved work holding clamp which facilitates very fast, accurate, positive engagement of the work and quick, easy disengagement of the work.

An additional object of the invention is to afford a new and improved work holding clamp which may be fabricated largely from inexpensive structural parts such as metal stampings.

A further object of the invention is to afford an improved work holding clamp embodying a novel arrangement of a toggle lever, a cam and a fulcrum bar or lever for manipulating one of the clamping jaws into operative engagement with the work.

Still another object of the invention is to afford, in one embodiment thereof, a novel means of keeping the clamping jaw, which is attached to and pivots on the fulcrum lever perpendicular to the vertical frame member and parallel to the intended work surface.

An additional object of the invention is to afford in one embodiment thereof a novel movable clamp arm which slides on, but is captive to, the vertical frame member of the invention to provide fast adjustment to or from and engagement with or disengagement from the work, thereby eliminating the customary, bothersome, slow twist screw ordinarily used for the same basic purpose.

A further objective of the invention is to afford in one embodiment thereof, a vertical frame member featuring a finely ribbed surface on its narrow edge to provide an anti-skid, high friction engagement with the one normally slidable clamp arm at the moment clamping pressure is applied to the work.

Another object of the invention is to afford, in one embodiment thereof, a vertical frame member of such length and structural strength so as to provide a work holding clamp which gives the workman a device of substantially greater bite capacity and equal or greater holding pressure as compared with a conventional clamp of comparable size and weight.

An additional object of the invention is to afford, in one embodiment thereof, a means of quick, infinite pre-adjustment of applied clamping pressure through an adjustable screw which alters the travel distance, and therefore the clamping pressure, of the one clamp jaw.

A further object of the invention is to afford, in one embodiment thereof, swiveled clamp jaw pads, both upper and lower, embodying a V-slot of a depth and angle which facilitates use on nearly any round or curved surface without sacrificing safety or effectiveness.

Other objects and advantages of the invention will be apparent to persons skilled in the art from the following description, claims and accompanying drawing, which, by way of illustration, shows preferred embodiments and the principles thereof. Other embodiments of the invention embodying or utilizing the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE is a side elevation semi-cut-away view of the new clamp in common position of use showing the closed or clamped position, while also showing, by outline, the open position of the clamping pressure lever.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The improved clamp, as illustrated in the drawing, is presented in a preferred and typical embodiment and is shown associated with and as used upon work **10** which may be of various characters such as wood, wood products, metal, metal products and of either flat, round or curved configuration which may be clampingly held together by the new clamping device.

The form of the new clamping device is basically T-shaped and comprised of a vertical frame member **15** permanently fitted and fastened to the upper clamp arm housing **3** and comprising a ribbed or serrated anti-friction surface **1** on the work side edge. Frame member **15** should be made of hard steel.

As shown, the form of the improved clamp includes upper clamp jaw pad **8** as part of upper clamp jaw **20** which is pivotally mounted on upper clamp arm **16** at pivot pin **17** wherein clamp arm **16** is pivotally mounted to clamp arm housing **3** at location **18** by pivot pin **21** and internally spaced and retained by keeper/washer **19.** Further, clamp jaw **20** is restricted to movement parallel to frame member **15** by holding arm **12** which is pivotally attached at one end to clamp jaw **20** by pivot pin **22** and at the other end, internally, to clamp arm housing **3** by pivot pin **23** and retainer/-spacer **24.** Upper clamp arm **16** should be made of hard steel.

The inclusion of lower clamp arm **9** which is slidable on and captive to frame member **15** results in the U-shape configuration, common to clamping devices, wherein the swiveled clamp jaw pad **11** attached to lower clamp arm **9** may contact the one surface of the work **10** as lower clamp arm **9** is slid along frame member **15** for that purpose.

The form of the new device includes a manually operated lever assembly comprised of pressure lever **4,** fulcrum lever **5,** lever cam **6,** return spring **14** and pressure adjustment screw **13.** The assembly is hinged at the appropriate points by suitable fastening elements such as the hollow pivot pin **17.** Since the toggle princi-

ple is well known to those skilled in the art, it need not be discussed here.

As shown, the toggle lever assembly is captive to handle member **2** with such handle member integrally joined, as by welding or other means, to clamp arm housing **3** and with the assembly so positioned that cam **6** may be cammingly engaged with the leverage end of clamp arm **16** when pressure lever **4** is manually squeezed toward handle member **2** with the camming motion and the resulting clamping action of clamp jaw **20** fully adjustable for increase or decrease by means of pressure adjustment screw **13.**

The use and operation of the new clamp illustrated in the drawing is as follows:

The lower clamp arm **9** may be disposed in a suitable position relative to frame member **15** to allow positioning of the work **10** between the two clamp jaw pads **8** and **11.** Holding the device with either hand by handle member **2,** upper clamp jaw pad **8** is placed against one surface of the work **10** while lower clamp arm **9** is slid along frame member **15** until clamp jaw pad **11** is in firm contact with the opposite surface of the work **10.** It will be noted that lower clamp arm **9** remains in the place so positioned due to the anti-slip ribbed edge **1** of frame member **15** as well as the leverage/friction condition resulting from the weight of the clamp arm **9** fully imposed upon the points of contact between clamp arm **9** and frame member **15.**

The clamping jaw pad **8** may then be clampingly engaged with the work **10** opposite the clamping jaw pad **11** by manipulating the pressure lever **4** toward handle member **2** accomplishing the closed or clamped position.

This motion of the pressure lever **4** pivots the cam **6** against and along the bottom side of upper clamp arm **16.** This camming action pivots the clamp arm **16** about the pivot pin **21** and thus moves the clamp jaw pad **8** carried by clamp jaw **20** into clamping engagement with the work **10.**

Meanwhile, lower clamp arm **9** is forcibly set and retained in its position due to the high friction factor now present at the contact points between lower clamp arm **9** and frame member **15** resulting from the high leverage factor at the outer extremety of clamp arm **9.** Thus the work **10** is clampingly held between the clamp jaw pads **8** and **11** with a desired pressure determined by pre-adjustment of pressure adjustment screw **13.**

When it is desired to release the new device from clamping engagement with the work, this may be quickly accomplished by manipulating pressure lever **4** away from handle member **2** resulting in cam **6** backing away from camming engagement with clamp arm **16** such that compression spring **7** forces clamp arm **16** to pivot about the pivot pin **21,** downward, at its camming end, whereupon the opposite end of clamp arm **16** raises up carrying clamp jaw **20** and clamp jaw pad **8** attached thereto away from the surface of work **10.** Thus the new device and the work may be speedily separated one from the other.

Although I have illustrated and described the primary embodiments of my invention, it should be understood that the invention is not restricted to the details of construction shown and described, that the embodiments thereof are capable of variation and modification and I therefore wish not to be limited only to the details set forth but desire to avail myself of any and all changes and alterations as fall within the scope of the appended claim.

I claim:

1. A work clamp comprising:

a frame member;

first and second jaw supporting arms, a first jaw fixed on said first jaw supporting arm, said first jaw supporting arm being of such construction as to slide freely along said frame member so as to be selectively positioned on said frame member and lock on said frame member when positioned, said second jaw supporting arm being pivotally mounted on said frame member, a second jaw pivotally mounted on said second jaw supporting arm, a holding arm pivotally mounted to said frame and to said second jaw to control the pivoting of said second jaw with respect to said pivoted second jaw supporting arm to maintain said second jaw in clamping orientation with respect to said first jaw,

a cam pivotally mounted on said frame member said cam being engaged or disengaged with said second jaw supporting arm by means of a toggle assembly whereby the extent of motion of said cam may be increased or decreased by manipulation of an adjustment screw in said toggle assembly so that the total travel of said pivoted second jaw supporting arm and said second pivoted jaw carried thereon is thereby affected, thus providing for controllable manipulation of said clamping jaws toward and from each other and into and out of clamping engagement with an object positioned therebetween.

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