Nov. 1, 1949 S. LA PLACA 2,487,022

MACHINIST'S CLAMP

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Fig. 1.

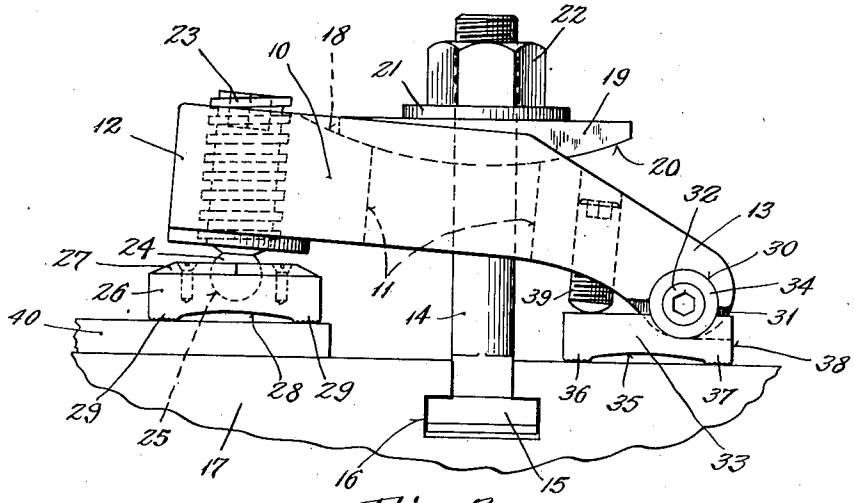


Fig. 2

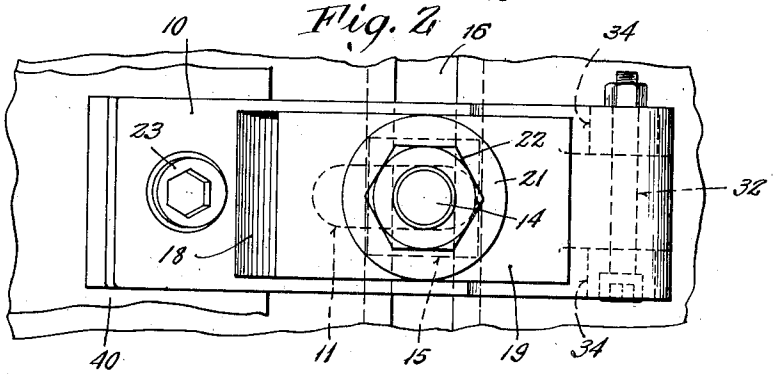
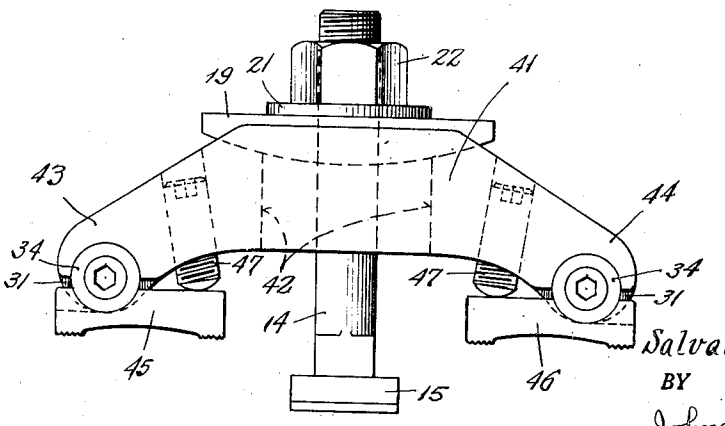


Fig. 3



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MACHINIST'S CLAMP

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5 Claims. (Cl. 90—59)

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This invention relates to clamps, and more particularly to machinists' clamps of the type used to secure work to the table of a machine tool such as a planer, shaper, milling machine and the like.

Clamps of the above type generally comprise an arm or bar which is slotted intermediate its ends for receiving a bolt, by which the arm is secured to and over the table of a machine in spaced relation therewith. The machine table usually has T-slots for receiving the head of the bolt, and the bar in some instances has shoes or feet pivotally carried at its ends.

An object of the present invention is to provide an improved clamp of the above type, which has considerable universality in its application whereby it may be used to securely and adequately hold a large variety of different sizes and shapes of workpieces with great reliability.

A further object of the invention is to provide an improved clamp as above, in which the pressures exerted by a pad or foot at different points thereon may be varied at will, to render the holding action of the foot, and of the clamp, more effective.

Still another object of the invention is to provide an improved machinists' clamp having pivotally movable feet, wherein greater clamping pressures may be applied to a workpiece at points inwardly removed from the edge of the piece, thereby resulting in a more secure clamping of the piece if for example it should have a rounded edge.

A still further object of the invention is to provide an improved bar-type machinists' clamp wherein the bar may be maintained more nearly parallel to the worktable under various conditions of use, without requiring the use of separate supplementary blocks, thereby saving time in the application of the clamp and insuring that a more positive and effective clamping action is had.

One specific embodiment of the invention illustrated herein, by which these objects are accomplished, includes a clamping bar and manually adjustable means engageable with the bar at a point intermediate its ends for securing the bar to a worktable in differently spaced positions, and includes an adjusting screw threaded into and passing through one end of the bar, having a ball-and-socket connection with a pad or foot. By this organization the foot, which is pivotally carried by the screw, may be spaced either closer or further away from the bar, and the adjustment made to suit any particular workpiece

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whereby the bar will be held relatively flat with respect to the worktable, without the use of separate blocks, thereby to enable the full effectiveness of the clamp to be conveniently utilized at all times.

The other end of the bar pivotally carries a second foot which at a point removed from its center is connected to the bar, the connection being located closely adjacent the outer edge of the foot. Thus the pressure transmitted to the foot is so distributed that the said outer edge applies the greatest pressure on the work, and this edge may engage the work at points inwardly removed from the edge of the work, resulting in a more secure clamping of the work where the latter has rounded edges or flanges.

An adjustment screw is threaded into, and passes through the said other end of the bar, the end of the screw bearing on the pivoted foot and enabling the angularity of the foot to be altered with respect to the bar, and thus the pressure applied by the foot at different points thereon may be varied whereby all pressures may be made equal, or unequal in different degrees, to achieve the most effective clamping action for each different workpiece.

In another embodiment of the invention both ends of the clamping bar having pivoted feet, and adjusting screws for varying the angularity of the feet to suit different shapes and configurations of the workpieces. Thus, by the provision of the movably-mounted feet and adjustable means whereby the positioning of the feet with respect to the bar may be controlled, a clamp is produced which is of universal use and application.

Other features and advantages will hereinafter appear:

In the accompanying drawings:

Figure 1 is a side elevational view of a clamp illustrating one embodiment of the invention, mounted on a worktable and holding a workpiece thereto.

Fig. 2 is a top or plan view of the clamp, worktable and workpiece of Fig. 1, and

Fig. 3 is a side elevational view of a clamp illustrating another embodiment of the invention.

The improved machinists' clamp of the invention as shown in Figs. 1 and 2 comprises an arm or bar 10 having a slot 11 extending longitudinally thereof and located substantially midway between the ends 12 and 13 of the bar. A bolt 14 passes through the slot 11, the head 15 of the bolt being carried in a T-slot 16 in a worktable

17 of a machine tool such as a milling machine, planer, or the like.

The upper surface of the bar 10 is provided with a groove 18 having a concave bottom surface as shown in Fig. 1, the groove accommodating a plate 19 having a convex undersurface 20 engaging and conforming to the bottom of the groove. The plate 19 has a hole to enable the bolt 14 to pass through it, the upper end of the bolt carrying a washer 21 and nut 22 by means of which the bar 10 may be forced downward toward the worktable 17 and held thereon.

In accordance with the present invention the end 12 of the bar 10 has threaded in it and passing through it an adjusting screw 23 which may be of the headless Allen type, the lower end of the screw having a ball 24 which is received in a socket 25 of a shoe or foot 26. The ball 24 is retained in the socket 25 by means of a pair of locking plates 27 secured to the upper surface of the foot 26 by screws as shown, the foot thereby having a universal mounting on the adjustment screw 23.

Preferably the undersurface of the foot 26 is provided with a hollow or depression 28, to produce a pair of pressure surfaces or pads 29 extending along opposite sides of the foot, the pads 29 being preferably knurled as shown.

The other end 13 of the bar 10 has a pair of circular recesses 30 in its underside and on opposite sides of a central depending tongue 31, which latter is apertured to receive a pivot bolt 32. A foot 33 is pivotally carried by the bolt 32, the foot having upstanding lugs 34 which are apertured to receive the shank of the bolt, as shown. The underside of the foot 33 has a hollow 35 providing a pair of pads 36 and 37 which are preferably knurled.

In accordance with the invention the lugs 34 of the foot 33 are located closely adjacent the outermost edge 38 of the foot, whereby a greater portion of the pressure applied to the foot 33 by the bar 10 is transmitted by the outermost pad 37, and only a lesser portion is applied by the innermost pad 36. Also, according to the invention, an adjusting screw 39 is threaded into and passes through the bar 10 adjacent the end 13 thereof, the lower end of the screw 39 engaging the upper surface of the foot 33.

The clamping device shown in Figs. 1 and 2 is positioned to clamp a workpiece 40 to the worktable 17, the workpiece being engaged by the foot 26 of the clamp, and the worktable being engaged by the foot 33 of the clamp. Such an arrangement may be advantageously used where the workpiece 40 is relatively thin; however, if the workpiece has considerable thickness, it may be engaged by and held under the clamping foot 33, and the clamping foot 26 may be used to engage the worktable 17. For this latter arrangement it may be found that the bar 10 is tilted at quite an angle with respect to the worktable 17 instead of being substantially parallel therewith. This condition may be easily rectified, to secure a more reliable and firmer clamping action, by adjustment of the screw 23. For example, the screw 23 may be threaded downward through the bar 10 to a considerable extent, thereby separating the foot 26 a substantial distance from the underside of the bar. This will result in the bar becoming more nearly parallel to the surface of the worktable 17, and will enable a more effective clamping of the workpiece to be had.

Also, it may be found desirable to equalize the pressures of the pads 36 and 37 of the foot 33 on the workpiece, or on the worktable as the case may be, and this may be readily accomplished by adjusting the screw 39 so as to cause it to bear on the foot 33 with a moderate amount of pressure. This also results in the clamp having a firmer mounting on the worktable 17 and lessens the likelihood of slippage of the clamp. In some instances it may be found desirable, in order to more securely hold a workpiece, to increase the pressures of the pad 36 over the pressure of the pad 37, and this may be done by adjusting the screw 39, or if the screw 39 is loosened or made to bear only lightly on the foot 33 the pressure of the pad 37 will be much greater than the pressure of the pad 36, since the latter pad is further removed from the pivot screw 32 and therefore has less force transmitted to it.

The clamp shown in Fig. 3 illustrates a modification of the invention. This clamp comprises an arm or bar 41 having a longitudinally extending, centralized slot 42 for receiving the drawbolt 14, the ends 43 and 44 of the bar pivotally mounting feet 45 and 46 respectively in the same manner that the foot 33 is mounted on the end 13 of the bar 10 of Figs. 1 and 2. The bar 43 has a pair of adjustment screws 47 which are threaded into it and bear on the upper surfaces of the feet 45 and 46, the screws 47 controlling the angularity of the feet with respect to the bar 41. Either one of the feet 45, 46 may be made to engage a workpiece and the other one made to engage the worktable, and the relative pressures of the knurled pads of the feet 45 and 46 may be adjusted to secure the most effective clamping action, by adjustment of the screws 47.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. A machinists' clamp comprising a bar; means engageable with the bar at a point intermediate its ends for securing the bar to a work table; a pair of feet, one of said feet having work-engaging surfaces at its ends; means for pivotally mounting said one foot at an off-center point on one end of the bar; a screw threaded into and passing through said end of the bar, said screw being engageable with said one foot to control the angularity of the foot with respect to the bar, thereby to equalize the pressure exerted by the work-engaging surfaces of the foot; a second screw, threaded into and passing through the other end of the bar; and a ball-and-socket connection between the second screw and the other foot, said second screw enabling the other foot to be positioned closer or further away from the bar.

2. A machinists' clamp comprising a bar; means engageable with the bar at a point intermediate its ends for securing the bar to a work table; a pair of feet, each having work-engaging surfaces at its ends; means for pivotally mounting said feet at off-center points respectively on the ends of the bar; and screws threaded into and passing through said ends of the bar, said screws being engageable with the feet to control the angularity thereof with respect to the bar, thereby to equalize the pressure exerted by the work-engaging surfaces of the feet.

3. A machinists' clamp comprising a bar; means engageable with the bar at a point intermediate its ends for securing the bar to a work table; a foot having work-engaging surfaces at its ends, pivotally secured at an off-center point to one end of the bar; and adjustable means for

controlling the angularity of said foot with respect to the bar, thereby to equalize the pressure exerted by the work-engaging surfaces of the foot.

4. A machinists' clamp comprising a bar having means at its ends for engagement with machine parts and workpieces to be clamped, said bar having a longitudinal slot extending through it intermediate its ends, having a recess in one face between said ends, said recess having a concave bottom curved longitudinally of the bar and extending along said slot on opposite sides thereof, and said bar having straight, longitudinal ribs on opposite sides of said recess and coextensive therewith to reinforce and strengthen the bar; an apertured bearing plate in said recess, having a convex face engaging the concave bottom of the recess whereby the plate is slidable in the recess to different angular positions and locations, said plate being interposed between the said ribs and having straight sides engaging the ribs to prevent turning of the plate; and a threaded draw bolt passing through the slot in the bar and through the aperture in the bearing plate, said bolt being adapted to apply pressure to the said plate whereby the bar may be clamped in different angular positions over workpieces located on the machine part.

5. A machinists' clamp comprising a bar having means at its ends for engagement with machine parts and workpieces to be clamped, said bar having a longitudinal slot extending through it intermediate its ends and having a recess in one face between said ends, said recess having a concave bottom curved longitudinally of the bar and extending along said slot on opposite sides thereof; an apertured bearing plate in said recess, having a pair of straight, opposite edges, and having a convex face engaging the concave bottom of the recess whereby the plate is slidable in the recess to different angular positions and locations; means on said bar, extending along opposite sides of said recess and engaging the straight edges of the bearing plate, for simultaneously reinforcing said bar and holding said plate against turning; and a draw bolt passing through the slot in the bar and through the aperture in the bearing plate, said bolt being adapted to apply pressure to the said plate whereby the bar may be clamped in different angular positions over workpieces located on the machine part.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,346,504	Mathison	July 13, 1920
1,490,063	Tower	Apr. 8, 1924
1,676,289	Schmalz	July 10, 1928
2,371,435	Galorneau	Mar. 13, 1945

FOREIGN PATENTS

Number	Country	Date
111,832	Switzerland	Sept. 24, 1924
570,518	Great Britain	July 10, 1945