April 7, 1953 W. RUSER 2,633,764

WORK HOLDER

Filed Aug. 17, 1946

Fig. 1.

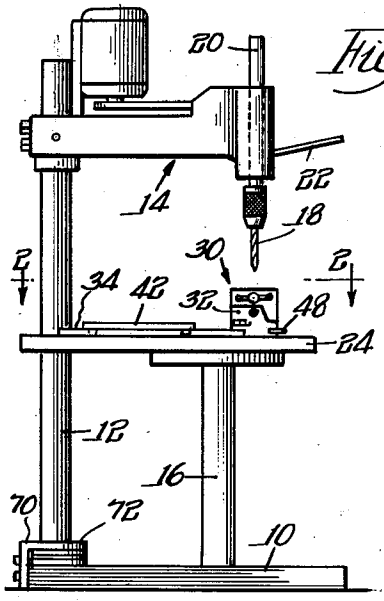


Fig. 2.

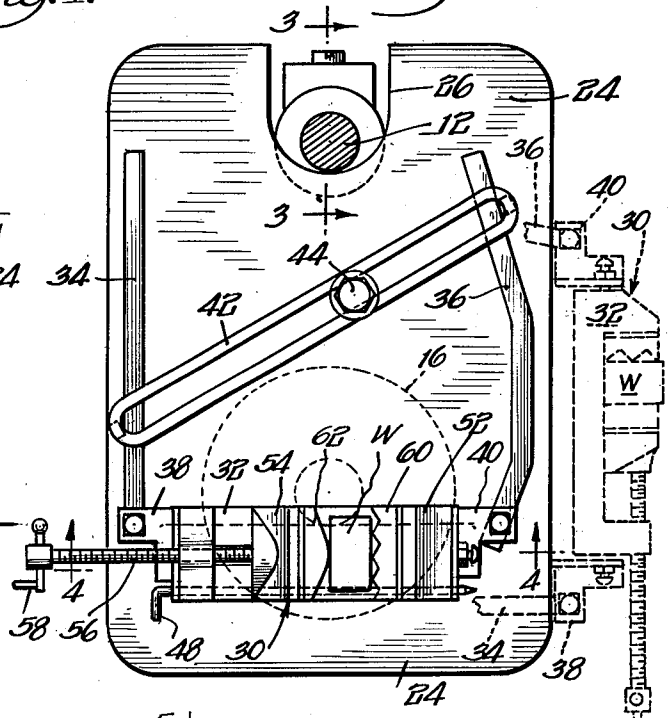


Fig. 3.

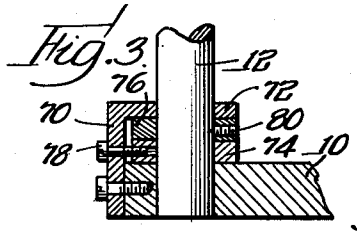


Fig. 4.

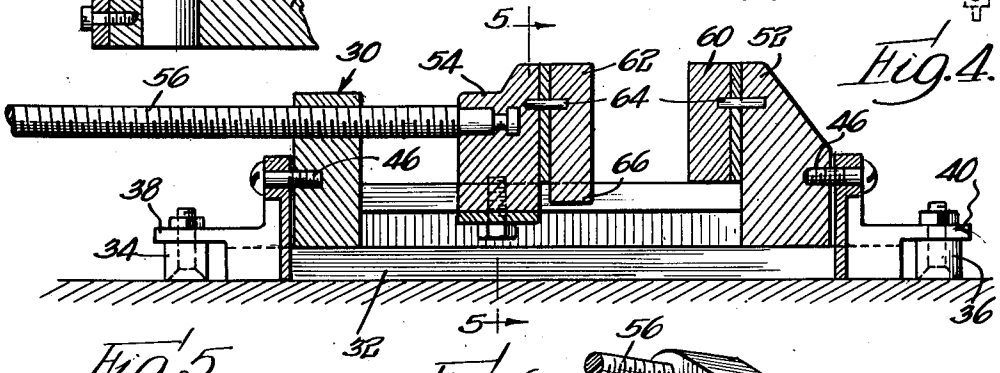


Fig. 5.

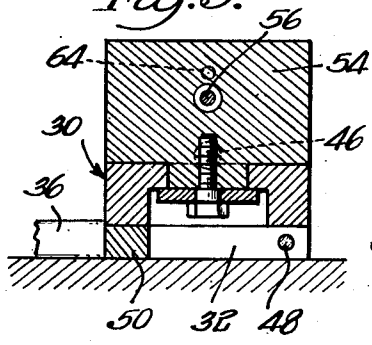
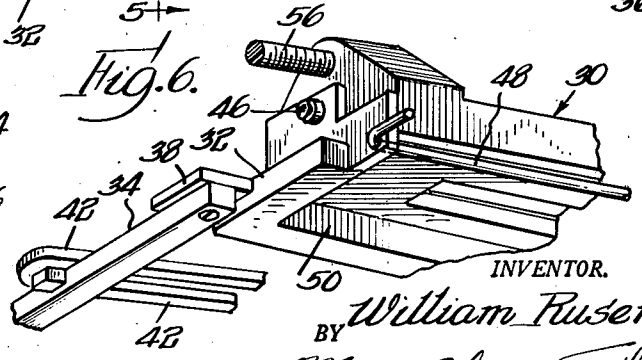


Fig. 6.



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WORK HOLDER

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2 Claims. (Cl. 77—63)

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This invention relates to machine tools, and particularly to work holders for drill presses and the like.

A principal object of this invention is to effect certain improvements in drill presses and the like to the end of affording a more flexible arrangement of parts and thereby increasing the utility of the machine over that of prior constructions.

The specific objects of this invention include the provision of an improved work holder that may readily be clamped in a desired position on a supporting table or overhanging the edge of the table, the arrangement of a vise on the work holder which can be rotated on a longitudinal axis and which has detachable vise jaw faces that will not drop out when the vise is turned, and a novel manner of coupling the supporting column of the drill head to the base of the press.

A further object is to provide a drill press or the like of improved, economical design having advantageous features which render the machine more universally adapted to perform its intended functions.

Various other objects, advantages and features of the invention will be apparent from the following specification when taken in connection with the accompanying drawings wherein a certain preferred embodiment is set forth for purposes of illustration.

In the drawings wherein like reference numerals refer to like parts throughout:

Fig. 1 is a view showing in side elevation a drill press of a basically conventional type having incorporated therein certain improvements in accordance with and embodying the principles of my invention;

Fig. 2 is a plan view taken on the line 2—2 in Fig. 1 and showing the work holder in greater detail;

Fig. 3 is a detail view in vertical section of an improved base construction for the drill press;

Fig. 4 is a longitudinal section through the work holder taken along the line 4—4 in Fig. 2;

Fig. 5 is a detail cross-sectional view taken on the line 5—5 in Fig. 4; and

Fig. 6 is a detail perspective view showing the mounting of the work holder.

A typical drill press to which the present invention may be applied is shown in Fig. 1. A base 10 supports a vertical column 12 to which is clamped or otherwise secured a drill head 14. A pedestal 16 extends up from the base 10 to support the work beneath the drill 18, which is carried by a spindle 20 mounted in the drill head 14. The work is fixed in a desired position relative to the drill 18 by the novel clamping means which will be described presently, and suitable means such as a handle 22 operating through a rack and pinion is provided to lower and raise the spindle 20, which has a splined connection with the driving means therefor.

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In accordance with the invention, a plate 24, Figs. 1 and 2, is secured in a horizontal position on the pedestal 16, this plate having a cutout portion 26 through which the column 12 passes. The work holder includes a vise generally designated 30, Figs. 2 and 4, mounted on a frame 32 which is bodily movable relative to the plate 24. Arms 34 and 36 extend from the frame 32 and are supported by the plate 24. The arms 34 and 36 are pivotally connected to the frame 32 in such a manner as to permit these arms to swing laterally relative to the frame. Lugs 38 and 40 on the frame 32 respectively extend over the arms 34 and 36 to prevent tipping of the frame 32 when the frame is moved beyond the edge of the plate 24, as indicated by the broken-line position thereof in Fig. 2, for a purpose which will appear hereinafter. For securing the work holder adjustably in a selected position, a slotted clamping bar 42 is provided, this bar 42 being adapted to straddle the arms 34 and 36 in any of the contemplated positions in which the work holder may be used. For securing the bar 42 to the plate 24, a bolt 44 is passed through the slot in the bar 42 and threaded into a tapped opening in the plate 24.

The vise 30 is mounted on pivots 46, Fig. 4, carried by the frame 32, and the frame 32 is cut away, as shown in Fig. 6, to provide clearance so that the vise 30 may be swung on a longitudinal axis from an upright to a perpendicular position, the upright position of the vise being indicated in full lines in the various views of the drawing, while the perpendicular position thereof is indicated in broken lines in Fig. 2. For normally retaining the vise 30 in its upright position, a pin 48, Fig. 6, is passed through openings in the frame 32 and is disposed beneath the body of the vise 30 to prevent the device from turning on its pivots 46. The vise 30 also rests on a bar 50 which is a part of the frame 32 so that it is securely held upright.

The vise 30 comprises a fixed jaw 52 and a movable jaw 54, Figs. 2 and 4. The jaw 54 is slidably mounted on the body of the vise 30, and the usual hand screw 56 is threaded through a tapped opening in the fixed portion of the vise 30, the end of this screw being journaled in the movable jaw 54.

By turning a handle 58 on the projecting end of the screw 56, the movable jaw 54 may be advanced toward or retracted from the fixed jaw 52. The work W, Fig. 2, is clamped between jaw faces 60 and 62 respectively provided on the vise jaws 52 and 54. The jaw faces 60 and 62 are supported by the vise body and are detachably connected to the respective vise jaws 52 and 54 by studs 64, Figs. 4 and 5, for a purpose which will be explained presently.

Normally the vise 30 is positioned in a selected position above the plate 24 as shown in full lines in Fig. 2, and the work W and drill 18, Fig. 1, are properly aligned with respect to each other. In event it is desired to drill a hole entirely through the work, this may conveniently be done by moving the vise supporting frame 32 into a position such as that indicated by the broken lines in Fig. 2 so that it overhangs the plate 24. To do this, the bolt 44 is loosened so that the frame 32 can be swung over the edge of the plate 24, and the arms 34 and 36 and clamping bar 42 then are repositioned accordingly, following which the bolt 44 is again tightened to secure the frame 32 in its new position. The pin 48, Figs. 2 and 6, then is removed and the vise 30 is swung on its pivots to a perpendicular position, as indicated by the broken lines of Fig. 2. The vise 30 is so mounted on the pivots 46 that it swings until the body of the vise is arrested by the bar 50, Figs. 5 and 6, which serves as a stop after the pin 48 is withdrawn. The studs 64, Fig. 4, prevent the jaw faces 60 and 62 from slipping out of the vise when it is turned sideways, and this may be supplemented by providing the jaw faces with tail portions, such as 66 in the case of the jaw face 62, which extend into the working channel of the movable jaw 54. With the vise 30 turned sideways, as shown in broken lines in Fig. 2, the drill can be passed entirely through the work W without danger of encountering obstructions beneath the work.

In drill presses of the type contemplated for use in conjunction with the present invention, it frequently is found convenient to journal the supporting column 12, Fig. 1, in the base 10 of the drill press so that the column 12 and drill head 14 can be swung as a unit to reposition the drill. With this arrangement, it may be desirable to provide means which will enable the column 12 to swing freely and yet prevent it from being lifted by the upward axial thrust which occurs when the drill 18 is brought down into engagement with the work. In other instances it may be desirable to lock the column 12 against any movement whatsoever. A construction which provides both of the foregoing features is illustrated in Fig. 3.

As shown in Fig. 3, a bracket 70 secured to the base 10 has a horizontal arm 72 which embraces the column 12. Two collars 74 and 76 are arranged on the column 12 intermediate the arm 72 and base 10. The collar 74 has a somewhat loose fit on the column 12. A cap screw 78 is passed freely through the bracket 70 and is threaded into a tapped opening in the collar 74. When it is desired to clamp the column 12 against any swinging movement thereof, the screw 78 is tightened to bring the diametrically opposed portion of the collar 74 into snug engagement with the column 12. To prevent upward movement of the column 12 due to the axial thrust which occurs when the drill is brought into engagement with the work, the collar 76 is secured to the column 12 by suitable means such as a set screw 80. When the collar 74 is loose, the column 12 can be swung to bring the drill head 14 into a desired position, the collar 76 rotating with the column 12 relative to the arm 72 and collar 74. Thus, the collar 74 can be left loose where the position of the drill head 14 is to be changed frequently, and the collar 76 will function to prevent any vertical displacement of the column 12.

The advantages derived from the various improvements in drill presses and the like which have been disclosed herein are believed to be obvious from the foregoing explanation. These improvements render the drill press adaptable to a wider variety of jobs than has been possible heretofore, due to the great flexibility in the arrangement of the parts. The manner in which the work holder is clamped to the supporting plate 24 facilitates positioning the work holder practically anywhere on this plate or in an outboard position overhanging the edge of it. The vise 30 can be swung away from its upright position when required, as in the case where the drill must completely penetrate the work. The jaw faces 60 and 62 are detachable and new jaw faces can readily be substituted where the character of the work requires this. There is no danger of the jaw faces dropping out when the vise is turned and the work is being drilled while the vise is in its perpendicular position. The novel base construction illustrated in Fig. 3 enables the column 12 to be clamped firmly in a particular position or swung as desired.

It is obvious that various changes may be made in the specific embodiment set forth for purposes of illustration without departing from the spirit of the invention. The invention is accordingly not to be limited to the specific embodiment shown and described, but only as indicated in the following claims.

The invention is hereby claimed as follows:

1. A work holder for a drill press or the like, and comprising a plate adapted to be supported in substantially horizontal position beneath a drill head, a U-shaped frame bodily movable over the surface of said plate to various preselected positions, the legs of said U-shaped frame having spaced vertical end flanges carrying aligned horizontal pivots, a vise pivotally carried by said pivots with an edge portion thereof resting on the closed end of said U-shaped frame when in horizontal position, removable support means associated with said vertical end flanges at points remote from the closed end of said U-shaped frame for supporting the opposite edge of said vise when in horizontal position, a pair of arms pivotally connected to said frame and extending along the surface of said plate, means including a cross bar engageable with both said arms for securing the assembly in fixed preselected position relative to said plate, said frame being shiftable to a position overhanging an edge of said plate in which position said support means may be removed permitting the vise to swing through ninety degrees and to abut against the adjacent inner surface of the closed end of said U-shaped frame as a support.

2. A work holder as claimed in claim 1, wherein lugs project from opposite ends of said frame in surface contact with adjacent ends of said arms which are pivoted to said lugs.

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