June 6, 1944. E. W. PEARSON 2,350,919

WORK HOLDER FOR BORING AND DRILLING MACHINES

Filed March 10, 1943 4 Sheets-Sheet 1

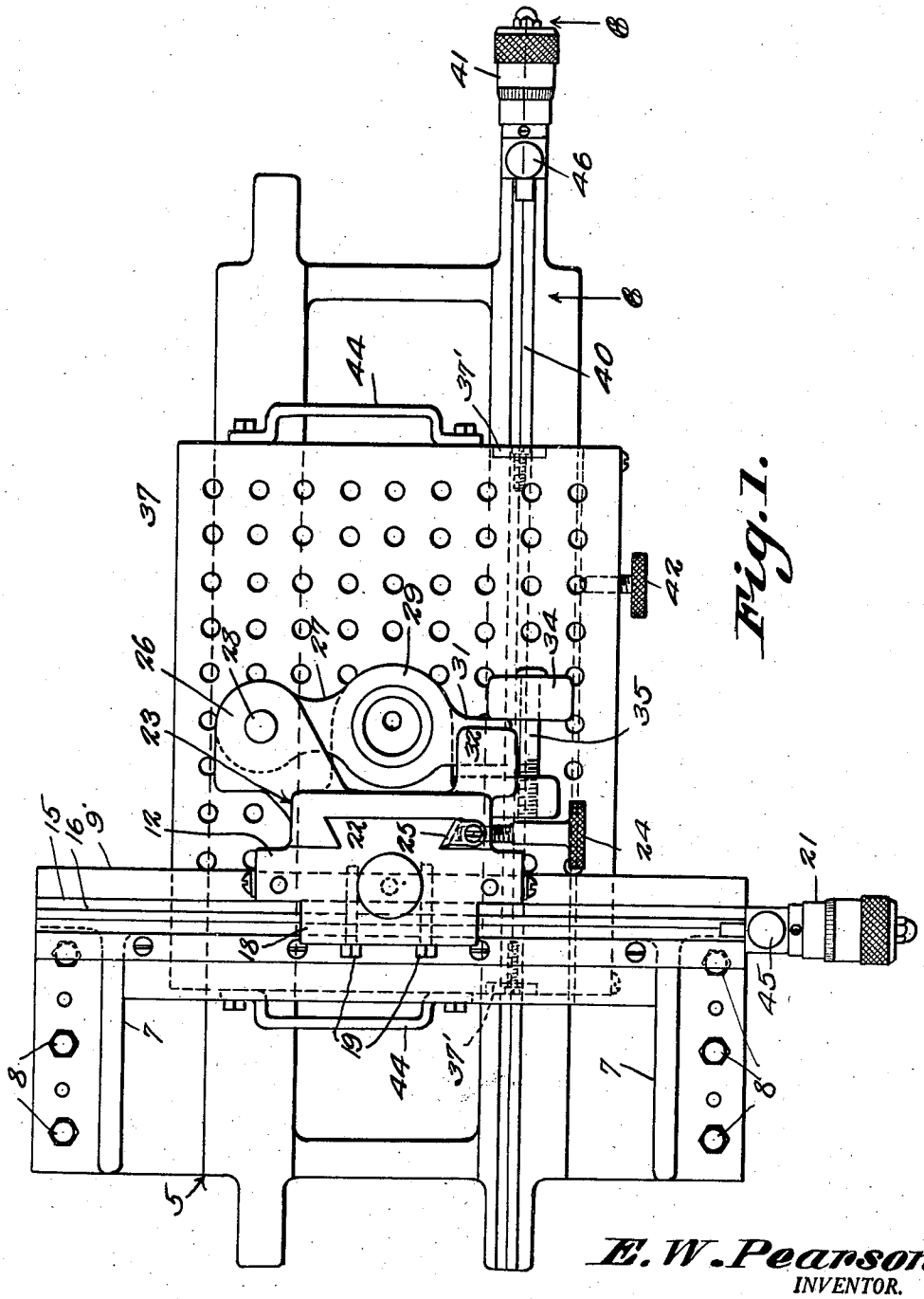


Fig. 1.

E. W. Pearson
INVENTOR.

BY C. A. Snow & Co.

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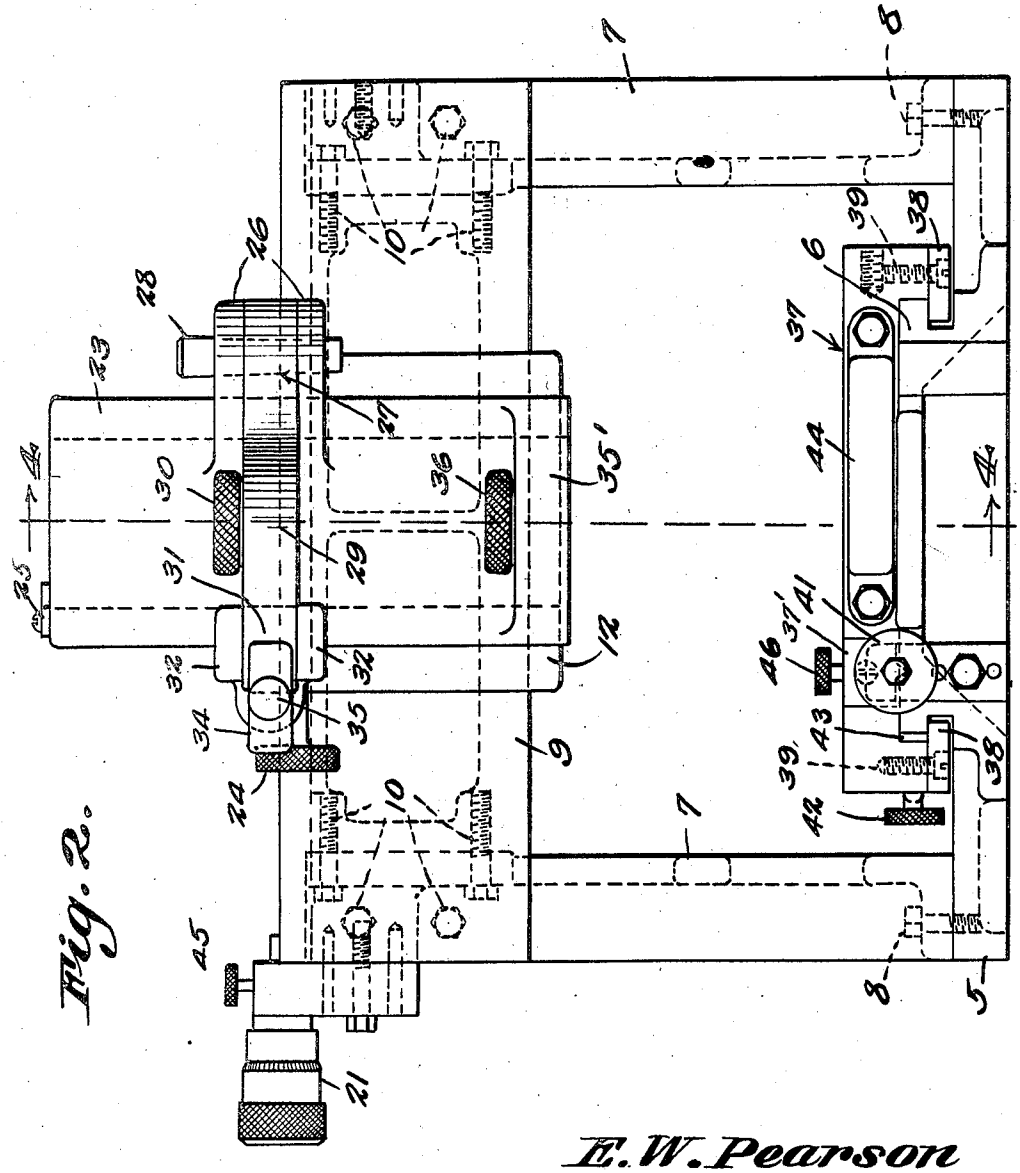


Fig. 2.

E. W. Pearson

INVENTOR.

BY A. Brown & Co.

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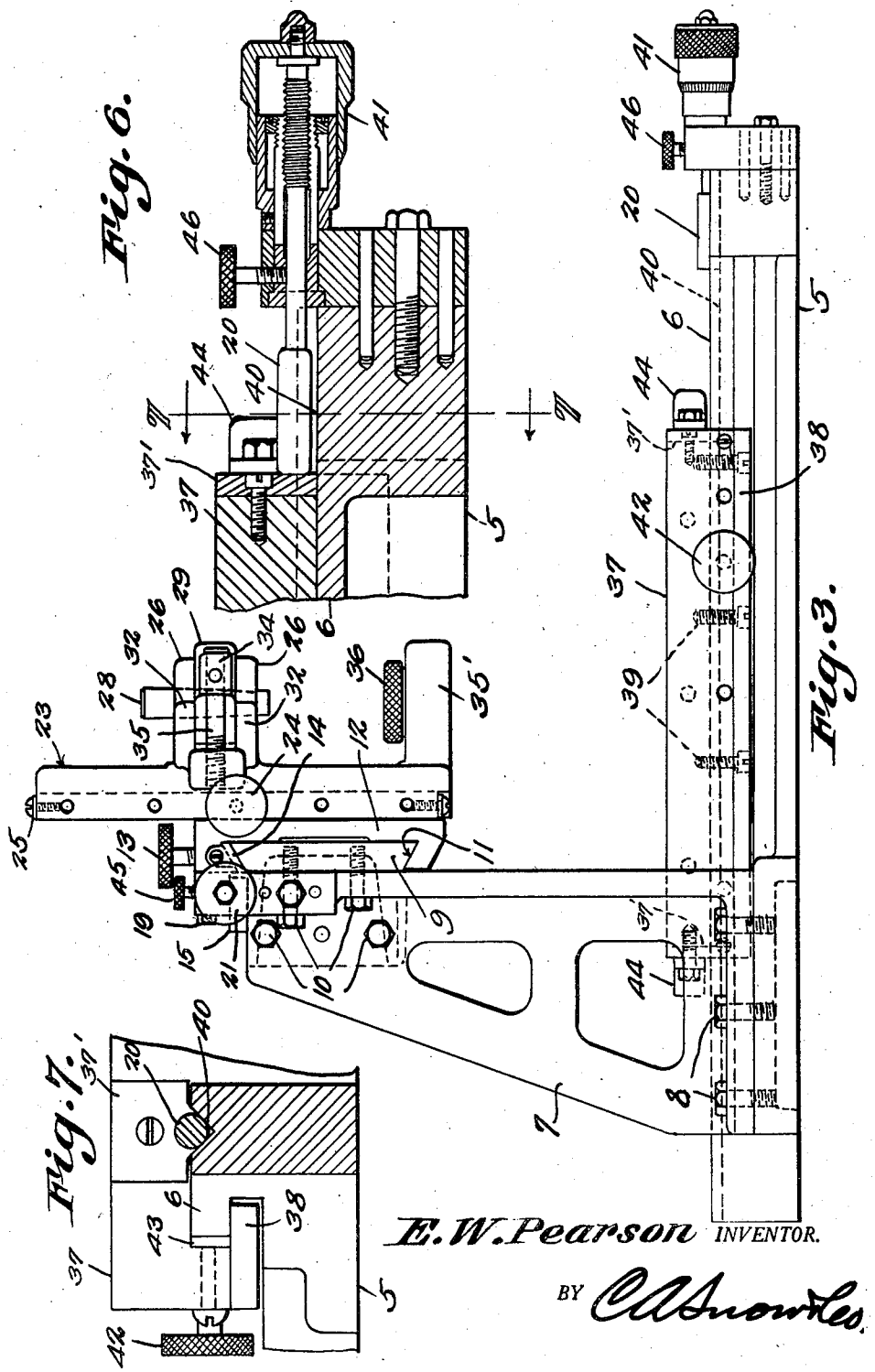


Fig. 6.

Fig. 3.

Fig. 7.

E. W. Pearson INVENTOR.

BY C. A. Knowles.

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Fig. 3.

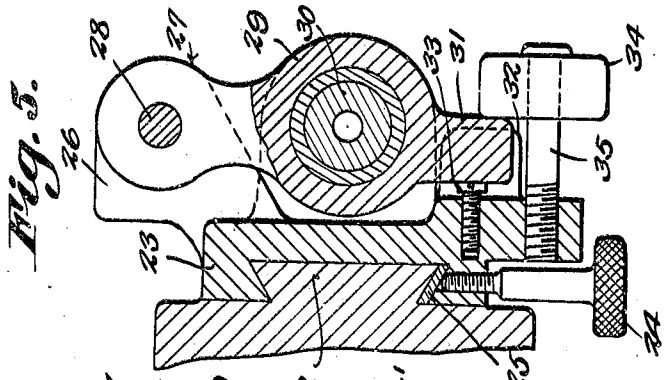


Fig. 4.

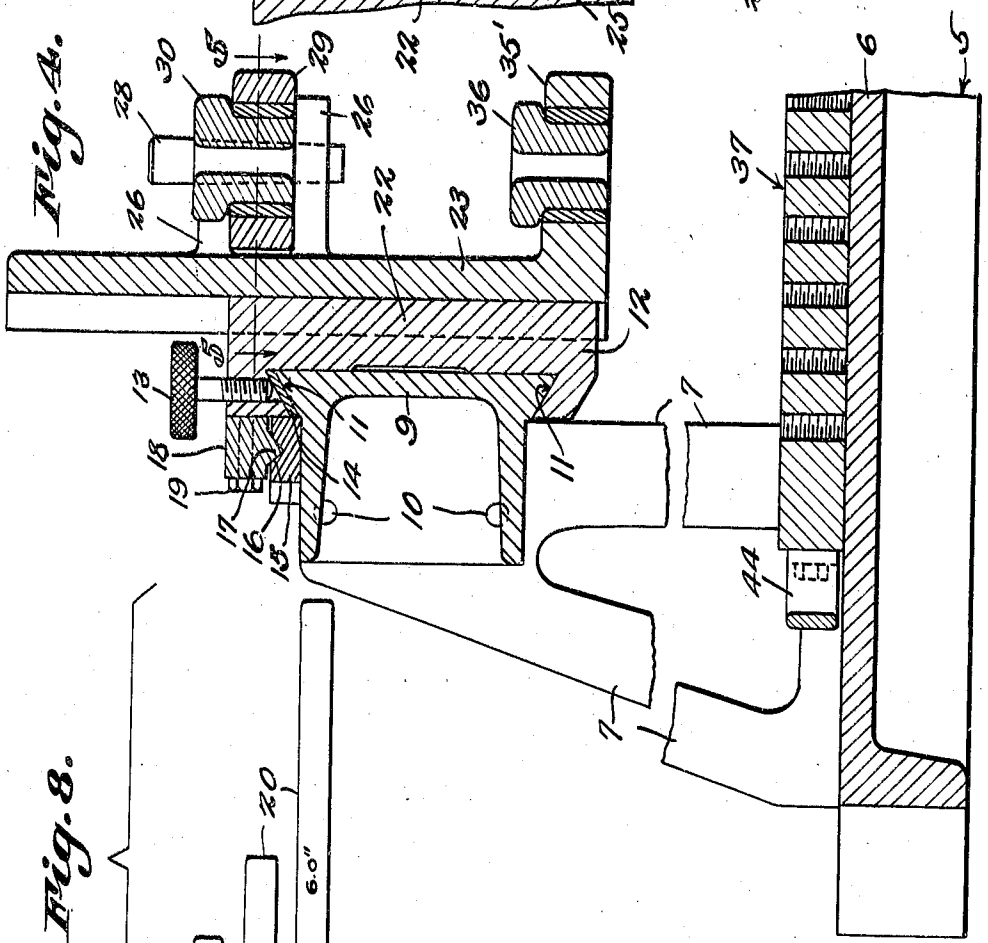


Fig. 8.

E. W. Pearson

INVENTOR.

BY C. A. Snow & Co.

Patented June 6, 1944

2,350,919

UNITED STATES PATENT OFFICE

2,350,919

WORK HOLDER FOR BORING AND DRILLING MACHINES

Elmer W. Pearson, Red Wing, Minn.

Application March 10, 1943, Serial No. 478,714

4 Claims. (Cl. 77—62)

This invention relates to a device designed for use with boring or drilling machines, the primary object of the invention being to provide a device which may be readily and easily positioned on the work table of boring and drilling machines, making it possible to accurately locate the work with respect to the tool of the machine, insuring the maximum accuracy in precision boring, during the operation of the usual boring or drilling machine.

An important object of the invention is to provide a device of this character which will be exceptionally quick acting, and one wherein a micrometer adjustment of the work with respect to the tool, may be had.

Another object of the invention is to provide a tool guide for boring and drilling machines, which guide may be adjusted vertically and laterally to properly center the work with respect to the tool.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings

Figure 1 is a plan view of a device constructed in accordance with the invention.

Figure 2 is a front elevational view of the device.

Figure 3 is a side elevational view of the device.

Figure 4 is a sectional view taken on line 4—4 of Fig. 2.

Figure 5 is a sectional view taken on line 5—5 of Fig. 4.

Figure 6 is a sectional view taken on line 6—6 of Fig. 1.

Figure 7 is a sectional view taken on line 7—7 of Fig. 6.

Figure 8 is a view illustrating the micrometer extension rod forming a part of the device.

Referring to the drawings in detail, the device comprises a base plate 5 which may be of any desired width and length, the base having a central raised portion 6 extending longitudinally of the base plate. At the rear of the base plate 5, and disposed adjacent to the side edges thereof, are vertical supports 7 which are bolted to the base plate, by means of the bolts 8.

A transversely disposed bar 9, connects the vertical supports 7, and has its ends bolted to the supports 7, by the bolts 10.

The upper and lower edges of the bar 9 are beveled, as clearly shown by Fig. 3 of the drawings, which beveled surfaces cooperate with the beveled surfaces 11 of the transversely movable bearing supporting plate 12.

A threaded opening is formed in the supporting plate 12, in which the set-screw 13 operates, the inner end of the set-screw contacting with the gib or plate 14 that rests on the upper beveled surface 11, of the bar 9. This set-screw acts to secure the supporting plate 12 in its positions of adjustment along the transversely disposed bar 9, after an adjustment on the bar 9 has been made. Secured along the upper edge of the bar 9, is a bar 15, which is formed with a V-shaped groove 16 formed in the upper surface thereof, the groove providing a track for the rib 17, formed on the block 18 which is secured to the rear surface of the supporting plate 12, by means of bolts 19. This V-shaped groove 16 also provides a recess for the measuring rods 20 shown by Fig. 8 of the drawings, the measuring rods cooperating with the micrometer 21 which is secured to the bar 9, at one end thereof. These rods 20 are used in making the final adjustment with micrometer accuracy, and are positioned between the adjustable member and micrometer measuring rod. The micrometer is now operated to move the rod or rods 20 used, to the proper positions, and the adjustable member is moved into engagement with the measuring rod, where it is secured against displacement.

A hard steel wear plate indicated at 37', is secured on the carriage 37, and provides a contact plate against which the measuring rods engage, when an adjustment is made.

Formed on the front face of the supporting plate 12, is a vertical rib 22 which has its longitudinal side edges beveled as clearly shown by Fig. 1 of the drawings.

The headstock of the device is indicated by the reference character 23 and is formed with a recess that has beveled surfaces to fit the beveled edges of the vertical rib 22, so that the headstock may move vertically with respect to the supporting plate 12. The set-screw indicated at 24, is positioned in a threaded opening of the headstock 23, and is adapted to extend through the headstock, and contact with the wear plate 25 fitted against one of the beveled surfaces of the rib 22. This set-screw 24 is designed for the purpose of securing the headstock in its positions of vertical adjustment over the rib 22. Extending forward-

ly from the headstock 23, are spaced ears 26 between which the arm 27, is pivotally mounted, for horizontal swinging movement.

A tapered pin 28, extends through openings in the ears 26, and through an opening in the arm 27, providing the pivot for the arm 27.

Thus it will be seen that due to this construction, the pin 28 may be readily removed and the arm withdrawn from its position between the ears 26, should it be desired to use the device without the pivoted arm 27.

The pivoted arm 27 is formed with an enlarged central portion 29 which is formed with an opening to receive the removable bearing 30, through which the boring tool or drill extends and operates.

Extending from the free end of the arm 29, is a lug 31 that is adapted to move between the spaced lugs 32 that extend forwardly from the headstock. Positioned within a threaded opening formed in the headstock, between the lugs 32, is a set-screw 33 against which the lug 31 is adapted to engage, the set-screw 33 limiting the inward movement of the free end of the arm 29. By this construction, the arm 29 may be readily adjusted with respect to the front surface of the headstock.

The reference character 34 designates a latch member which is mounted on the shank 35 that in turn is threaded in an opening formed in the headstock. When the arm 29 has been moved to its proper position, and the lug 31 rests between the lugs 32, the latch member 34 may be moved to a position as shown by Fig. 5, providing a stop to prevent the arm 29 from moving outwardly, when in use.

Extending forwardly from the lower front surface of the headstock, is a stationary arm 35' which is so disposed that it will normally lie below the bearing 30, so that the bearing 36 which is supported in an opening of the arm 35', will have its opening in direct alinement with the opening of the bearing 30. It will of course be understood that the drill or boring tool will be extended through the alining bearings 30 and 36, when the device is in use.

The reference character 37 designates the movable table or carriage on which the work is supported. This movable table or carriage 37 is formed with a recessed portion in the undersurface thereof, which recessed portion is fitted over the central raised portion 6 of the base plate, as shown by Fig. 2. Bars 38 are secured to the bottom of the movable table or carriage 37, and are of widths to extend slightly over the recessed portion of the movable table or carriage 37, securing the movable table or carriage in position on the central raised portion 6. The bars 38 are held in position by means of the screws 39 which extend through the bars 38 and pass into threaded openings formed in the movable table or carriage 37.

The base plate 6 is formed with a groove 40 which is substantially V-shaped, and extends throughout the length of the base plate. At the front end of the base plate, and arranged in direct alinement with the groove, is a micrometer 41 which is adapted to cooperate with a measuring rod 20 positioned in the groove, to engage the movable table or carriage 37 so that a micrometer adjustment of the movable table or carriage 37 may be had. In connection with the measuring rods, it might be stated that the supporting plate 12 or the movable table or carriage 37 are first adjusted by manually moving them to their approximate operating positions. A measuring rod of the proper length to extend between the micrometer and member to be adjusted, is now positioned and the micrometer operated to attain a precision adjustment of the member.

The movable table or carriage 37 is formed with a plurality of threaded openings formed therein, which openings accommodate securing screws adapted to be passed through openings of the work to secure the work on the movable table or carriage.

A set screw 42, extends through a threaded opening in the side edge of the movable table or carriage 37, and engages the wear-bar or gib 43, to hold the movable table or carriage 37 in its positions of adjustment.

Handles indicated at 44 are secured at the front and rear ends of the movable table or carriage 37, and afford means whereby the operator may readily slide the carriage 37 along the base plate to make the intial adjustment of the base plate.

It might be further stated that set-screws 45 and 46 are used in conjunction with the micrometers 21 and 41 respectively, so that the micrometers may be secured in their adjusted positions.

While I have shown and described the device as used in connection with boring and drilling machines, it is to be understood that the device may also be used in connection with reamers, taps and other cutting tools used in connection with and driven by any vertical drill press in its various operations. The device may also be used in bench work for layout, checking, stamping, and marking purposes.

In the use of the device, the device is positioned on the work table of a boring or drilling machine, and the work is properly positioned to aline it with the drill tool, which has been positioned in the braces or bearings 30 and 36. The work is now in direct alinement with the drill tool and may be accurately bored.

In view of the foregoing, it is believed that further description as to the operation of the device is unnecessary.

What is claimed is:

1. A tool guide adapted to be positioned on the work table of a boring and drilling machine, comprising a base plate, a frame rising from the base plate, said frame including a horizontal bar, a supporting plate mounted for movement longitudinally of the horizontal bar, a micrometer at one end of the bar and adapted to adjust said supporting plate, a headstock mounted for vertical adjustment on said supporting plate, bearings on the headstock and through which the tool of the machine with which the guide is used, operates, and a work carriage mounted on the base plate and adapted to be adjusted with respect to the tool whereby the work supported on the carriage is moved directly under the tool.

2. A tool guide adapted to be positioned on the work table of a boring and drilling machine, comprising a base, standards at one end of the base, a bar connecting the standards, the longitudinal edges of the bar being beveled, a supporting plate having a recess formed with beveled surfaces fitted over the beveled surfaces of said longitudinal bar and adapted to slide on said bar, a vertical rib on the suporting plate, a headstock having a recess, adapted to receive said rib, slidably mounting said headstock, a stationary bearing on the headstock, a pivoted arm mounted on the headstock, a bearing mounted on said arm, said bearings adapted to aline to accommodate the tool of the machine with which the device is used, and a work carriage movable longi-

tudinally of the base plate and adapted to be moved to a position under said bearings, whereby the work mounted on the carriage is alined with the tool.

3. A tool guide adapted to be positioned on the work table of a boring and drilling machine, comprising a base, uprights at one end of the base, a bar connecting the uprights, a supporting plate adjustable longitudinally of the bar, a headstock mounted on the supporting plate and adapted to be adjusted vertically, means for securing the supporting plate and headstock in their positions of adjustment, a pivoted bearing arm mounted on the headstock, a stationary bearing arm mounted on the headstock in spaced relation with the first mentioned arm, means for securing the pivoted arm against movement, said arms supporting bearings through which the drill tool operates, and a movable carriage mounted on the base and on which the work being drilled, is mounted.

4. A tool guide adapted to be positioned on the work table of a boring and drilling machine, comprising a base, uprights at one end of the base, a horizontal bar connecting the uprights, a supporting plate mounted on the horizontal bar for movement longitudinally thereof, a micrometer for adjusting the supporting plate, means for holding the supporting plate in its positions of adjustment, a headstock mounted on the supporting plate and adapted to be adjusted vertically with respect thereto, bearing arms on the headstock and through which the drill tool of the machine with which the device is used, operates, and a movable carriage mounted on the base and on which the work is supported, and adjusting means for the carriage, the adjusting means including a micrometer for moving the carriage with respect to the drill tool operating through the arms.

ELMER W. PEARSON.