

April 29, 1924.

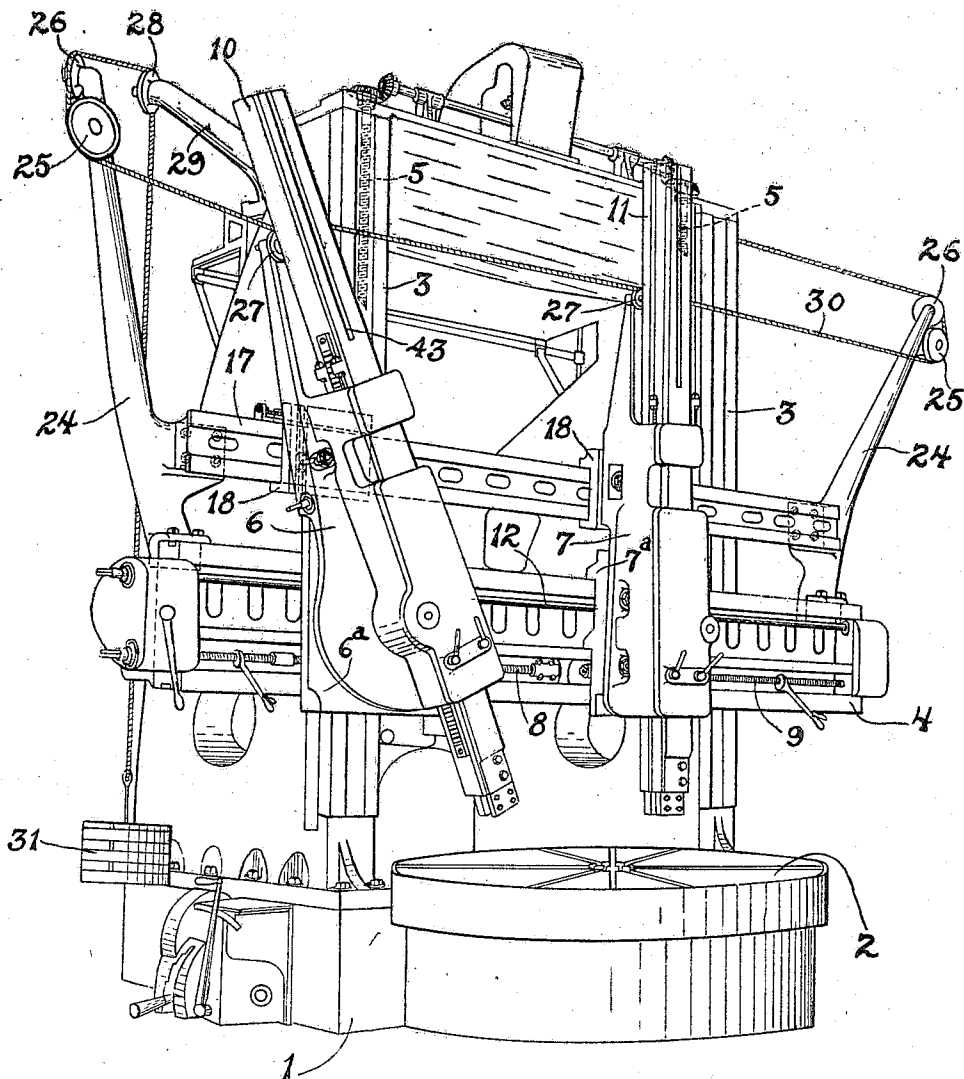
A. W. PARKES
BORING MILL AND THE LIKE

1,492,103

Filed Dec. 9, 1921

3 Sheets-Sheet 1

Fig. 1.



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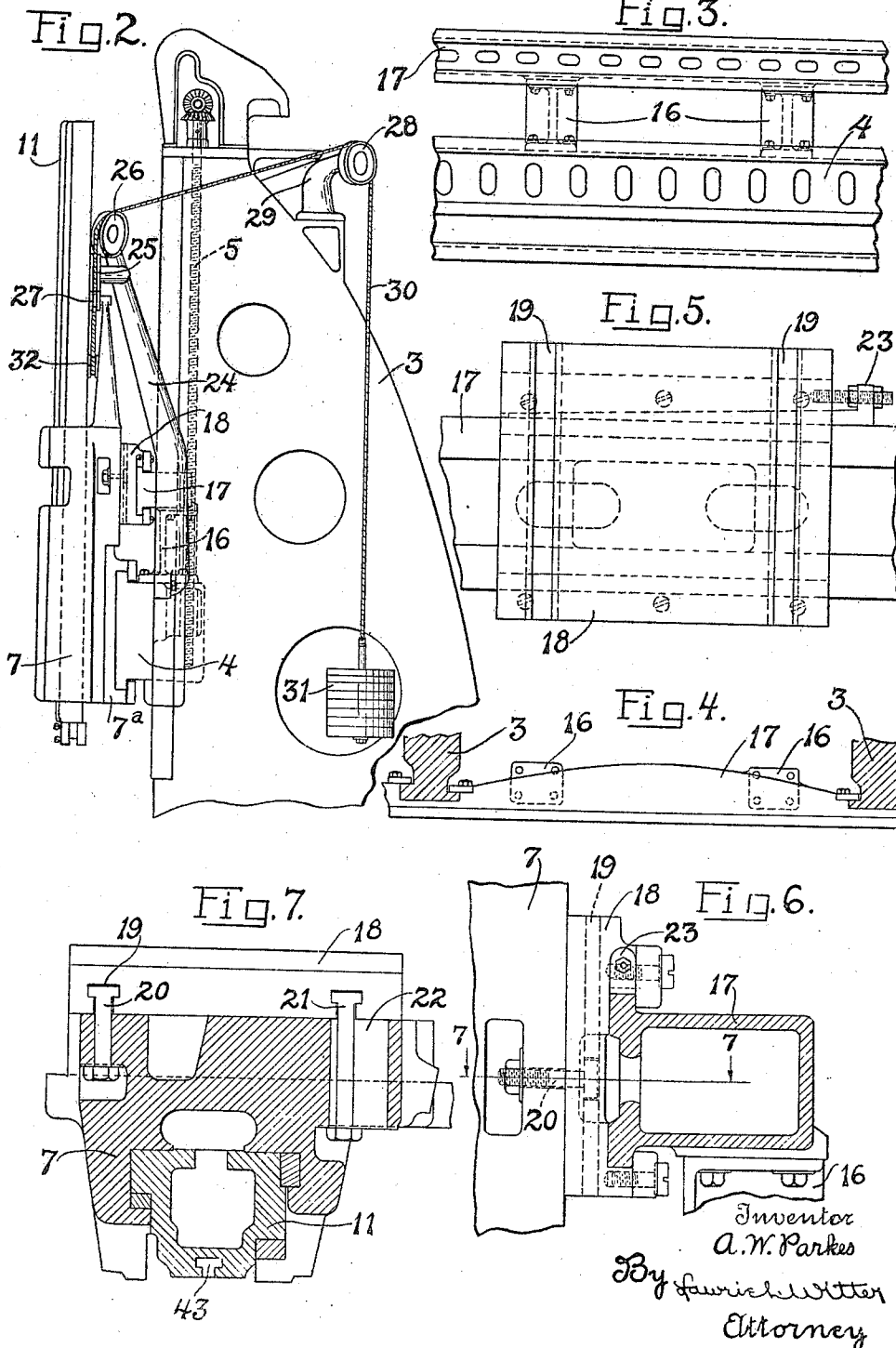
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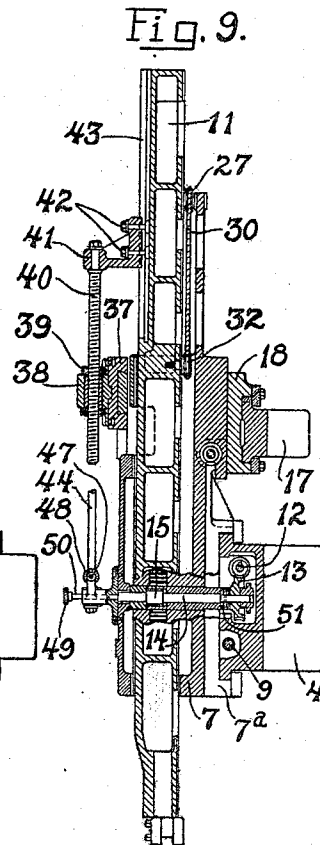
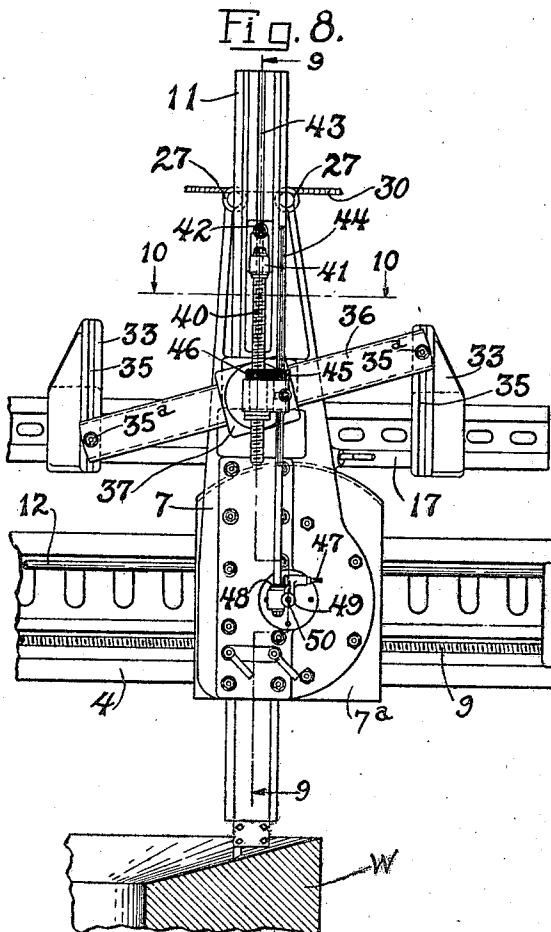
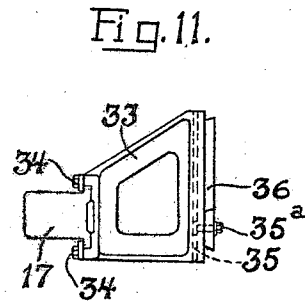
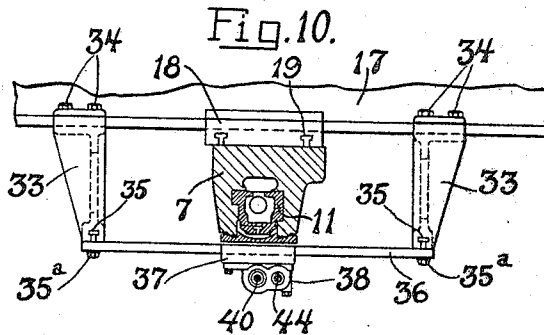
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

ALBERT W. PARKES, OF DUNDAS, ONTARIO, CANADA, ASSIGNOR TO NILES-BEMENT-POND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

BORING MILL AND THE LIKE.

Application filed December 9, 1921. Serial No. 521,172.

To all whom it may concern:

Be it known that I, ALBERT W. PARKES, subject of the King of Great Britain, residing at Dundas, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Boring Mills and the like, of which the following is a specification.

This invention relates to boring mills, planers and like machines wherein are provided a work table, one or more uprights adjacent thereto and a cross rail on the uprights for supporting a tool to operate on work carried by the table. In such machines, as commonly constructed, a tool support or saddle is mounted on the cross rail which must resist the entire thrust of the tool in operation. When operating with very long tool bars or slides, the bars will tend to vibrate and to bend or spring under the cutting strain and it is quite necessary to provide means for preventing such action. This action may be prevented to a certain extent by using an unusually wide cross rail. However, in order to more effectively prevent such action without changing the construction of the standard machine, I prefer to retain the standard cross rail and use in combination therewith an auxiliary cross rail. It is accordingly the primary object of the invention to provide in combination with a tool supporting cross rail, an auxiliary cross rail preferably mounted on the main rail and engaging the usual supporting uprights in a manner and position to supplementally support the tool bar and prevent the vibration and springing thereof during the tooling operation.

Again, with machines of long tool bar travel and the usual system of counterweighting the tool bars, it is necessary to carry the counterweighting chain pulleys at the back of the tool bar to an extreme height to permit the required travel of the bar. This requires the brackets which carry the pulleys at the ends of the rail to extend very far from their supporting base. The auxiliary rail above the main rail provides an auxiliary support for these long brackets. It is accordingly another object of the invention to provide in machines of the type defined, an auxiliary rail in combination with the main cross rail, and tool counterbalancing means rigidly supported on both said

rails and extending to a position of extreme height above the rails.

A further object of the invention resides in the provision of a taper bar attachment secured to and in combination with the said auxiliary rail. The auxiliary rail provides a means for supporting the taper bar without in any way disturbing or altering the standard machine.

With the above and other objects in view, my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawings. In such drawings annexed hereto and forming a part of this specification, I have shown my invention embodied in one standard type of boring mill but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

Referring to the figures of the drawings:

Figure 1 is a perspective view of a boring mill having my invention embodied therein.

Fig. 2 is a fragmentary side elevation thereon.

Fig. 3 is a fragmentary elevation of the cross rails showing the manner of supporting the auxiliary cross rail on the main cross rail.

Fig. 4 is a plan view thereon.

Fig. 5 is an enlarged fragmentary detail view of one of the tool bar supporting slides on the auxiliary rail.

Fig. 6 is a detail cross sectional view of the auxiliary rail with one of the tool supports thereon.

Fig. 7 is a detail cross sectional view through a tool support, taken on lines 7-7 of Fig. 6.

Fig. 8 is a fragmentary front elevation of the machine showing a taper attachment applied thereto.

Fig. 9 is a longitudinal vertical section thereof on line 9-9 of Fig. 8.

Fig. 10 is a cross section thereof on line 10-10 of Fig. 8.

Fig. 11 is an end elevation of the auxiliary cross rail with one of the taper bar supports thereon.

As above stated, the primary object of the invention is to provide in machines of the

type defined, an auxiliary cross rail spaced from the main tool-supporting cross rail and operative to assist the main cross rail in supporting the tool bar or slide against vibration and bending. The main object of the auxiliary rail is therefore to provide a secondary support for the tool bar, and to do so with a minimum additional weight and provision for a maximum effective length of travel for the tool bar. In earlier machines having a long bar travel and consequently great overhang to the tool bar from the saddle, much trouble has been experienced first by the vibration of the lower end of the bar when cutting at its maximum distance from its support, and secondly by the vibration of the upper end of the bar when the same has been raised and is being used at its highest point. The auxiliary rail rests against the uprights and provides a solid backing for the ends of the tool bars. The auxiliary rail also serves other useful functions as will be hereinafter more specifically pointed out. Among these functions are the auxiliary supporting of the tool counterbalancing means and the supporting of the taper turning attachment. It will furthermore be noted that the tool slides or bars are mounted on the rails in such manner as to permit angular movement thereof as in the standard machine. The specific mechanism illustrated in the drawings will now be described.

Referring more specifically to the drawings by reference characters, 1 indicates the bed of a boring mill having a table 2 rotatably mounted thereon. A pair of uprights 3 are secured to the bed adjacent the table. A main tool-supporting cross rail 4 is mounted on the uprights and may be moved vertically thereon by means of screws 5. Tool supports 6 and 7 are mounted on the rail and may be moved therealong by means of screws 8 and 9. Tool bars or slides 10 and 11 are mounted in the supports and may be moved longitudinally therein by means of a feed shaft 12 operating through a worm and worm wheel 13, shaft 14 and rack and pinion 15 in the usual manner.

As will be noted, the tool bars 10 and 11 illustrated in the drawings are unusually long. When operating with the cross rail 4 lowered to a position adjacent the table, the extended upper ends of the tool bars will vibrate in the tooling operation unless such bars are supplementally supported to prevent such action. Also when operating with the cross rail 4 raised to an extremely high position, the extended lower ends of the tool bars will tend to spring under the thrust of the work against the tools. To prevent such objectionable action of the tool bars, I provide an auxiliary support in the form of the auxiliary cross rail heretofore mentioned and now to be specifically described.

The main cross rail 4 has mounted there-

on two auxiliary rail supporting blocks or brackets 16 on which is supported a relatively small auxiliary cross rail 17. This rail 17 is preferably in direct sliding engagement with the uprights 3. The tool supports 6 and 7 may be swiveled about a pivotal center on the saddles 6^a and 7^a thereof in the usual manner, the engagement between the tool supports and the auxiliary rail being such as to permit this movement. As illustrated, a pair of slides 18 are mounted on the auxiliary rail and each is provided with a pair of T-slots 19 vertically therein. Bolts 20 and 21 projecting from each tool support have heads engaging in the slots. The opening 22 in the tool support through which the bolt 21 projects is slightly extended laterally whereby the tool support is permitted a slight lateral movement on the bolt 21 as the support is swiveled angularly about its pivot. A gib 23 is provided for accurately fitting each slide 18 to the auxiliary rail.

The tool bars must necessarily be counterbalanced and the length of such bars and the long travel thereof require that the supporting pulleys be placed at an extreme height above the main rail. The auxiliary rail is used in connection with the main rail for supporting these pulleys. A pulley supporting bracket 24 is provided at each end of the rails. Each bracket is bolted to both the main rail and the auxiliary rail and carries at its upper end pulleys 25 and 26. A pair of pulleys 27 is provided on each tool support and a pulley 28 is mounted on a bracket 29 secured to the side of each upright 3. A cord or chain 30 having counterweights 31 at its ends extends from the several pulleys and engages a pulley 32 on each tool bar in the usual manner. Each tool bar is thereby counterbalanced in all its positions and by means of the auxiliary rail 17, the pulleys 25 and 26 are firmly supported at their extreme height.

As will be noted, the use of the auxiliary rail requires practically no modification of the standard rail as used on boring machines. Furthermore the auxiliary rail engages directly against the uprights 3 and the tool supports have bearing against the auxiliary rail in a manner to firmly support the extended upper ends of the tool bars. The operative connection between the tool supports and the auxiliary rail is such that each tool support is permitted its usual pivotal movement without in any way interfering with the firm supporting thereby by the auxiliary rail. It will, therefore, be seen that the main object of the invention and the several advantages resulting therefrom are fully accomplished in an improved manner with a minimum additional weight to the machine, a minimum of cost and alteration to the machine, and with a maxi-

imum effective length of tool bar travel. Other features of advantage, including those heretofore defined, also result from the improved construction.

Another advantage resulting from the improved construction is that the auxiliary rail provides an easy means for applying a taper turning attachment to the machine without in any way disturbing the main rail or any of its operating parts. In Figs. 8 to 11 inclusive of the drawings, I have shown such an attachment applied to the auxiliary rail. A pair of supporting brackets 33 are slidably mounted on the auxiliary rail at opposite sides of the tool support 7 and may be secured in position thereon by means of bolts 34. Preferably, each of these brackets is provided with a vertical T-slot 35 in the front face thereof. A taper bar 36 is adjustably mounted on the brackets by means of bolts 35^a engaging in the T-slots. A saddle 37 is slidably mounted on the taper bar and is swivelly connected to a bracket member 38 carrying a rotary nut 39. A screw 40 is threadably engaged by the nut 39 and at its upper end is provided with a bracket 41 having bolts 42 engaged within a vertical T-slot 43 in the tool bar 11. A vertical shaft 44 parallel with the screw has splined thereto a gear 45 rotatable in the bracket 38 and meshing with a gear 46 on the nut. The shaft may be rotated from a stub shaft 47 operatively connected to the shaft 44 through bevel gears 48. A knob 49 is provided on a rod 50 operatively connected to the pinion shaft 14 whereby the shaft with the rack and pinion 15 may be drawn outwardly to disengage the clutch 51 thereon from the worm wheel 13 when using the taper attachment.

In operation, the taper bar supports 33 may be set to any desired position along the auxiliary rail. The taper bar may be angularly adjusted in a vertical plane through the T-slots 35 in the blocks to set the bar to the angle it is desired to cut the work W. The nut 39 may be rotated from the stub shaft 47 to raise or lower the tool bar to place the tool in proper position relative to the work. After these adjustments have been properly made, the cutting may proceed in the usual manner. It will be noted that as the tool support is fed along the rail 1, the saddle 37 traverses along the taper bar and moves the tool vertically to a degree corresponding to the angular position of the taper bar. It should be particularly noted that the taper attachment may readily be applied to the machine shown in Fig. 1 without in any way modifying such machine.

What I claim is:

1. In a machine of the class described, the combination of a bed, a table mounted thereon, an upright adjacent the table and having a portion of its exterior surface formed

into a vertical guideway, a cross rail mounted on the upright and engaging about the guideway, a screw extending vertically in the upright and engaging the cross rail to elevate the same, an auxiliary cross rail rigidly supported on and in spaced relation to the first named rail and in engagement with the upright, the auxiliary rail being parallel with the first named rail, and a tool support mounted on the first named rail and operatively connected to the auxiliary rail.

2. In a machine of the class described, the combination of a bed, a table mounted thereon, an upright adjacent the table, the upright having the front face thereof formed into a vertical guideway, a cross rail mounted to slide vertically on the guideway, the front face of the cross rail being formed into a horizontal guideway, means mounted on and extending upwardly from the rail, an auxiliary rail mounted on the said means above and in spaced relation to the cross rail, the auxiliary rail being in engagement with the upright and having a horizontal guideway thereon, and a tool supporting member slidably connected to the horizontal guideways.

3. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front surface thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, screw means engaging the cross rail for elevating the same, an auxiliary cross rail above and in spaced relation with the first named rail and in engagement with the uprights, and a tool support mounted on the first named rail and operatively connected to the auxiliary rail.

4. In a machine of the class described, the combination of a bed, a table movably mounted thereon, a pair of spaced uprights adjacent the table, a cross rail engaging the uprights for vertical movement thereon, a rail elevating screw engaging the rail adjacent each upright, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, the auxiliary rail being parallel with the first named rail and a tool supporting means mounted on the first named rail and operatively connected to the auxiliary rail.

5. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, means rigidly securing the rails together to move as

a unit on the uprights, and a tool support operatively connected to both rails.

6. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, a portion of each rail being formed into a guideway, means including bolts for securing the rails together to move as a unit on the uprights, means for elevating the rails, and a tool support operatively connected to the guideway of each rail.

7. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted to slide vertically on the guideways, the front face of the cross rail being formed into a horizontal guideway, a plurality of supporting elements mounted on and extending upwardly from the rail, an auxiliary rail mounted on the elements above and in spaced relation to the cross rail, the auxiliary rail being in engagement with the uprights and having a horizontal guideway thereon, and a tool supporting member slidably connected to the said horizontal guideways.

8. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, a rail elevating screw engaging the rail adjacent each upright, a plurality of supporting blocks mounted on the top of the rail, and an auxiliary cross rail mounted on the tops of the blocks and in engagement with the uprights whereby to rigidly support the auxiliary rail on the main rail.

9. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, means rigidly securing the rails together to move as a unit on the uprights, a tool slide on one of the rails, and means including a counterbalance weight supporting bracket secured to one of the rails outside of the adjacent upright for counterbalancing the tool slide.

10. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face

thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, means rigidly securing the rails together to move as a unit on the uprights, a tool slide on one of the rails, and means including a counterbalance weight supporting bracket secured to each end of the auxiliary rail outside of the uprights for counterbalancing the tool slide.

11. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, means rigidly securing the rails together to move as a unit on the uprights, a tool support operatively connected to both rails, a tool slide in the tool support, a counterbalance weight supporting bracket secured to one of the rails outside of the adjacent upright, and a tool counterbalancing means comprising a weight and a flexible connection therefrom supported by the bracket and operatively connected to the tool slide.

12. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, and a counterbalance weight supporting bracket secured to both rails outside of each upright.

13. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, a tool support mounted on the first named rail and operatively connected to the auxiliary rail, a tool slide in the tool support, a bracket secured to both rails outside of each upright, and a tool counterbalancing means comprising a weight and a flexible connection therefrom supported by the said brackets and operatively connected to the tool slide.

14. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, means rigidly

idly securing the rails together to move as a unit on the uprights, a saddle block slidable on the first named rail, and a tool supporting member swivelly mounted on the block and operatively connected to a block slidable on the auxiliary rail.

15. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, each upright having the front face thereof formed into a vertical guideway, a cross rail mounted on and engaging about the guideways, an auxiliary cross rail engaging the uprights above and in spaced relation with the first named rail, means rigidly securing the rails together to move as a unit on the uprights, a saddle block slidable on the first named rail, and a tool supporting member swivelly mounted on the block and having a bolt connection to a T-slot in a block slidable on the auxiliary rail, the bolt and T-slot connection being adapted to permit adjustment of the member about its swivel center and to secure the member in adjusted position.

16. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, a rail elevating screw engaging the rail adjacent each upright, a plurality of supporting blocks mounted on the top of the rail, an auxiliary cross rail mounted on the tops of the blocks and in engagement with the uprights, a tool supporting saddle mounted on the first named rail, a block slidably mounted on the auxiliary rail, and a tool support mounted for pivotal movement on the saddle and block.

17. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, a rail elevating screw engaging the rail adjacent each upright, a plurality of supporting blocks mounted on the top of the rail, an auxiliary cross rail mounted on the tops of the blocks and in engagement with the uprights, a tool supporting saddle mounted on the first named rail, a block slidably mounted on the auxiliary rail and provided with a plurality of T-slots therein, and a tool supporting element pivotally mounted on the saddle and having bolts therein engaging in the T-slots for pivotally connecting the element to the block and auxiliary rail.

18. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, a tool support mounted on the

first named rail and operatively connected to the auxiliary rail, a tool slide mounted in the tool support, a taper bar supported on the auxiliary rail, and an operative connection between the tool slide and taper bar.

19. In a machine of the class described, the combination of a bed, a table mounted thereon a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, a tool support mounted on the first named rail and operatively connected to the auxiliary rail, a tool slide mounted in the tool support, a taper bar supported on the auxiliary rail and adjustable in a vertical plane to various angular positions relative thereto, and an adjustable operative connection between the tool slide and taper bar.

20. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, a tool support mounted on the first named rail and operatively connected to the auxiliary rail, a tool slide mounted in the tool support, a taper bar supported on and adjustable longitudinally of the auxiliary rail, the bar also being adjustable in a vertical plane to various angular positions relative to the auxiliary rail, and an operative connection between the tool slide and taper bar.

21. In a machine of the class described, the combination of a bed, a table mounted thereon, a pair of spaced uprights adjacent the table, a cross rail mounted to slide vertically on the uprights, an auxiliary cross rail mounted on and in spaced relation with the first named rail and in engagement with the uprights, a tool support mounted on the first named rail and operatively connected to the auxiliary rail, a tool slide mounted in the tool support, a taper bar supported on the auxiliary rail and adjustable in a vertical plane to various angular positions relative thereto, a saddle slidably engaging the taper bar, a screw secured to the tool slide, a rotatable nut mounted in the saddle and threadedly engaging the screw, and means for rotating the nut to adjust the tool slide relative to the saddle.

In testimony whereof, I hereto affix my signature.

ALBERT W. PARKES.

Witnesses:

WILLIAM G. LAING,
JOSEPH IRWIN.