

May 22, 1928.

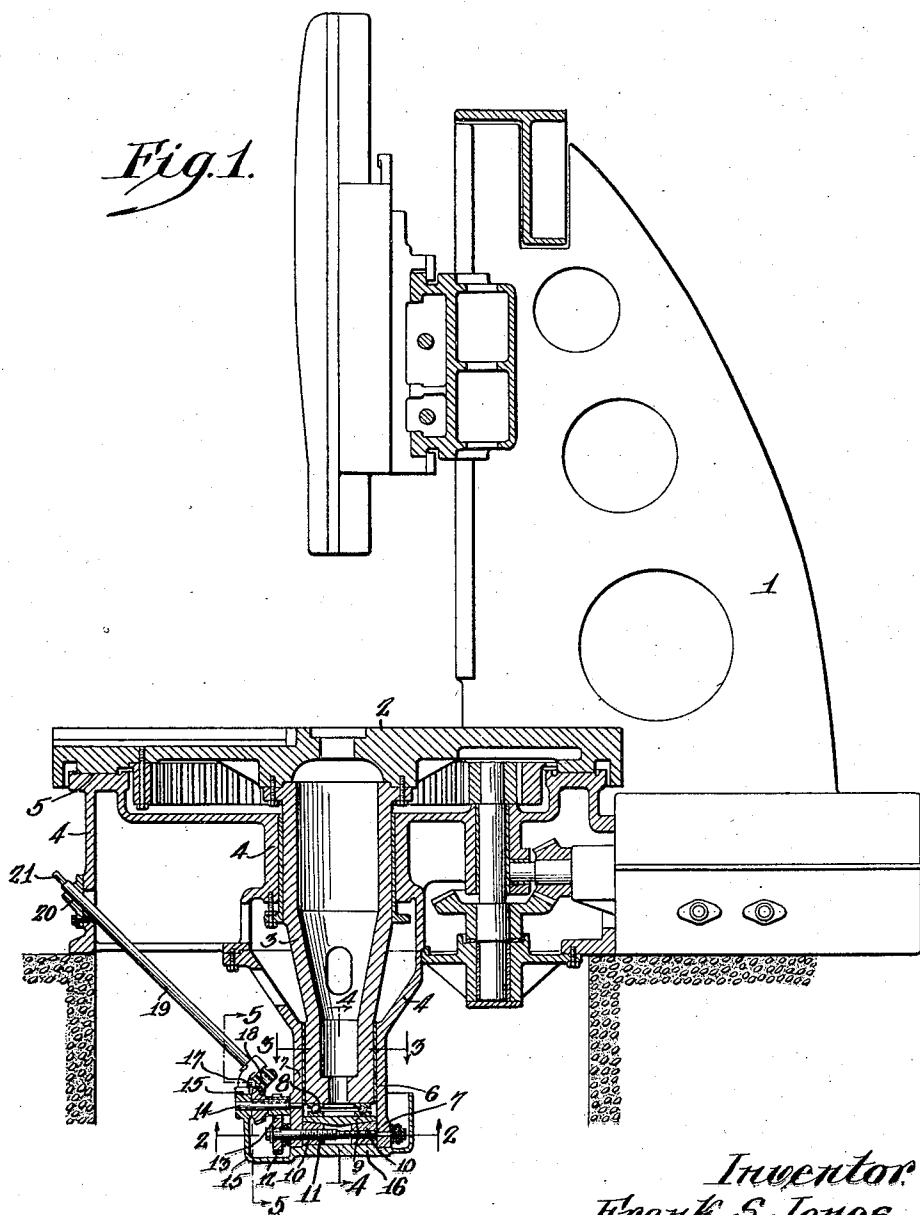
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F. S. JONES

VERTICAL BORING MILL

Filed July 9, 1925

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

Fig. 2.

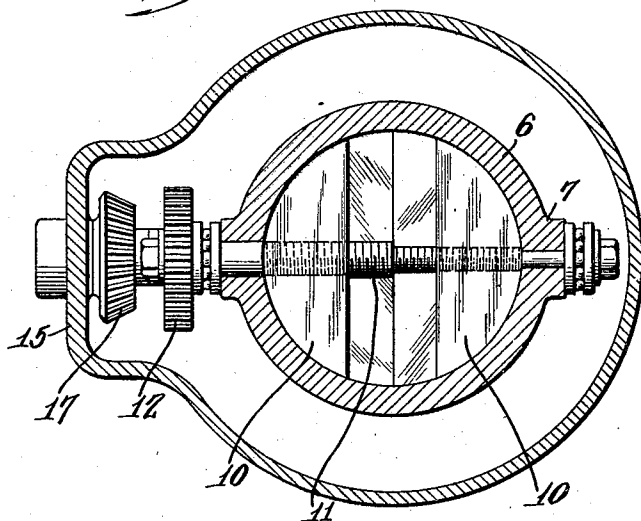
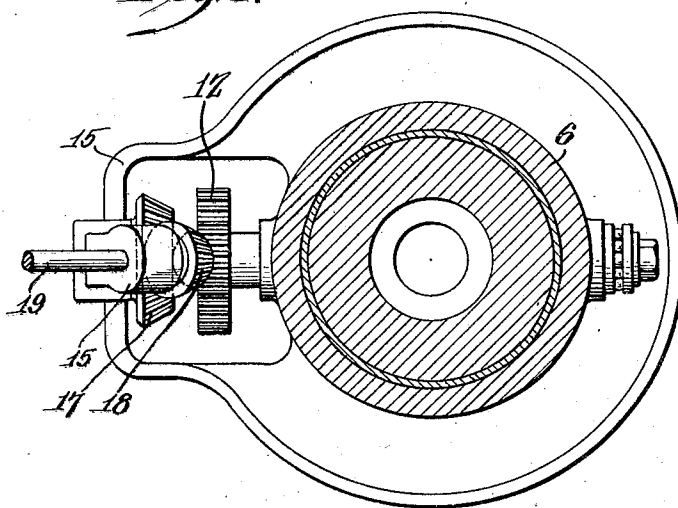


Fig. 3.



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4 Sheets-Sheet 3

Fig. 4.

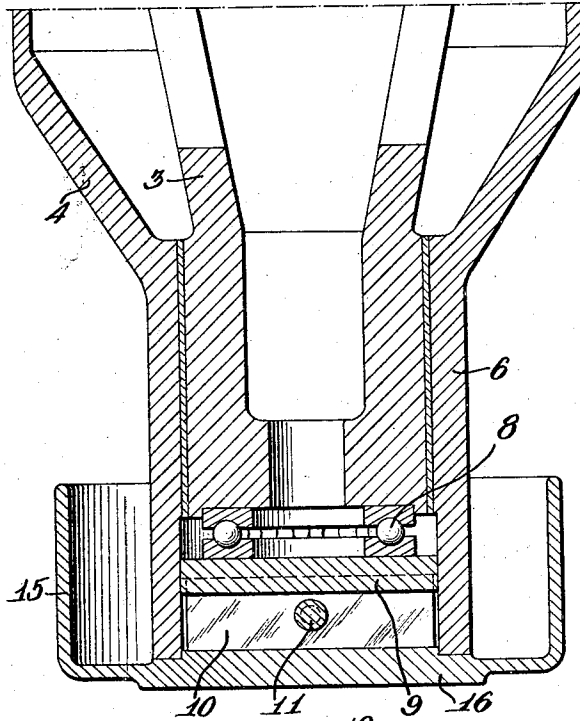
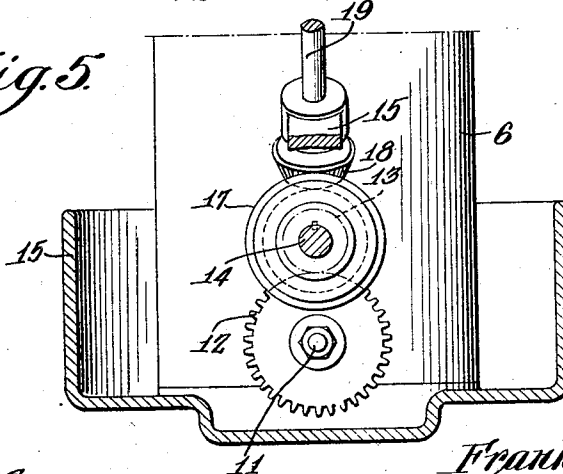


Fig. 5.



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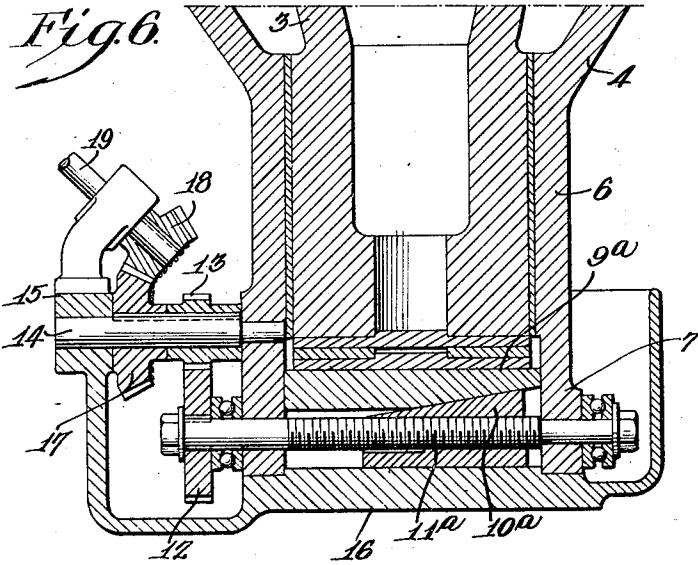
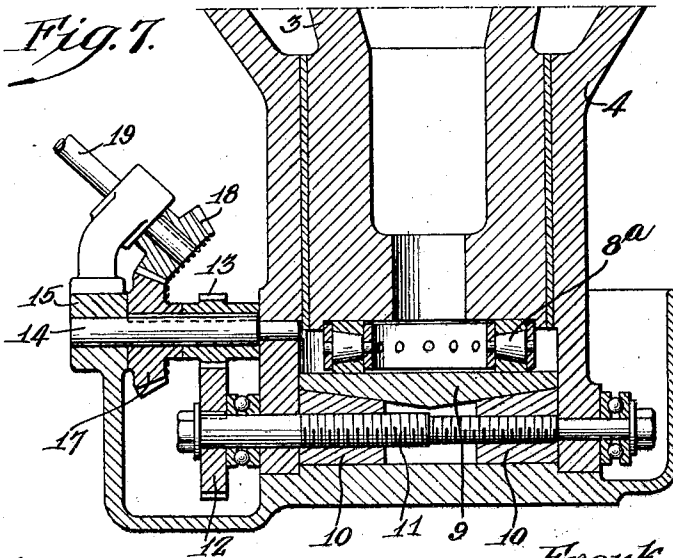
May 22, 1928.

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F. S. JONES
VERTICAL BORING MILL

Filed July 9, 1925

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

FRANK S. JONES, OF PHILADELPHIA, PENNSYLVANIA.

VERTICAL BORING MILL.

Application filed July 9, 1925. Serial No. 42,366.

In turning and boring mills of the vertical type, employed upon heavy work, the friction between the table and its bearings is so great that it is commercially impractical to rotate the table except at slow speed and it is a time consuming and therefore expensive job to impart a smooth finish to the work.

The object of my invention is to provide simple and efficient mechanical means for relieving the friction whereby a smooth finish may be quickly imparted to the work without increase of power.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which

Figure 1 is a vertical section through the table and its bearings, of a boring mill embodying my invention,

Figure 2 a section on line 2—2 of Figure 1,

Figure 3 a section on line 3—3 of Figure 1,

Figure 4 a section on line 4—4 of Figure 1,

Figure 5 a section on line 5—5 of Figure 1,

Figure 6 a fragmentary vertical section on the same line as that of Figure 1 showing a modified form of my invention, and

Figure 7 a like view showing another modification.

In the drawings, the numeral 1 designates the column of a boring mill, 2 the rotatable table, 3 the table-spindle and 4 the bearing frame for the table in which 5 is an annular flat bearing near the outer edge of the table, 6 the bearing member for the spindle, the bearing member having, at its lower end, a collar 7 embracing the lower end of the spindle. At its lower end the spindle is carried upon an anti-friction step-bearing 8 which is carried by an annular support 9 having its under face inclined upwardly and outwardly from its center. This support rests upon opposed wedge-blocks 10 which are reversely threaded and are connected by a reversely threaded screw 11 which has its bearings in collar 7. A pinion 12 is fixed to screw 11, outside collar 7 and meshes with a pinion 13 on a shaft 14 having one bearing in collar 7 and the other bearing in a bracket 15 extending from the base 16. Pinion 13 is fixed to or integral with a miter gear 17, rotatable on shaft 14 and meshing with a miter gear 18 fixed to a shaft 19 which has one bearing in bracket 15, extends through the outer wall of bearing

frame 4, has its other bearing in a bracket 20 fixed to or integral with said wall, and has an angular end 21 to which a wrench may be applied.

By imparting rotation to shaft 19, motion is transmitted through gears 18, 17, 13 and 12 to screw 11, rotation of which draws wedge-blocks 10 toward each other. The wedge-blocks, acting upon the inclined faces of bearing member 9, raise spindle 3 thereby releasing pressure and relieving the friction on the annular bearing 5 and enabling the table to be rotated at high speed without increase in power.

In the form shown in Figure 6 I have shown the table-spindle supported upon a bearing member 9^a having but one inclined face and engaging with a single wedge-block 10^a which is actuated by a screw 11^a threaded in but one direction.

In the form shown in Figure 7, I have shown the spindle supported upon roller bearings 8^a instead of upon ball-bearings, the arrangement of parts being otherwise the same as in Figures 1 to 5.

The operation in each case is practically the same.

While I have described my invention as taking a particular form, it will be understood that the various parts may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claim.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

In a vertical boring mill having a frame, table and spindle bearings on the frame, a table rotatable on the table bearing, and a spindle rotatable in the spindle bearing; means for raising and lowering the table including a base; opposed wedge blocks within the spindle bearing and slidable upon the base; a support, having inclined underfaces, on the wedge blocks and adapted to support the spindle; a right and left hand threaded screw shaft threaded through the wedge blocks and rotatably mounted in the walls of the spindle bearing; anti-friction bearings encircling each end of the screw shaft for taking the thrust thereof; a gear fixed on the screw shaft; a bracket formed on the base; a jack shaft rotatable in the bracket

and in the side of the spindle bearing; a pinion fixed on the jack shaft and meshing with the gear; a bearing on the bracket; an adjusting shaft rotatable in the bracket
5 bearing and in the frame; a bevel gear fixed on the jack shaft; a bevel pinion fixed on one end of the adjusting shaft and meshing

with the bevel gear; and means on the other end of the adjusting shaft whereby said shaft may be rotated for raising or lowering 10 the table.

In testimony whereof I have signed my name to this specification.

FRANK S. JONES.