Jan. 19, 1926. 1,570,092

J. A. SMITH

GRINDING MACHINE

Filed August 24, 1923

Fig. 1

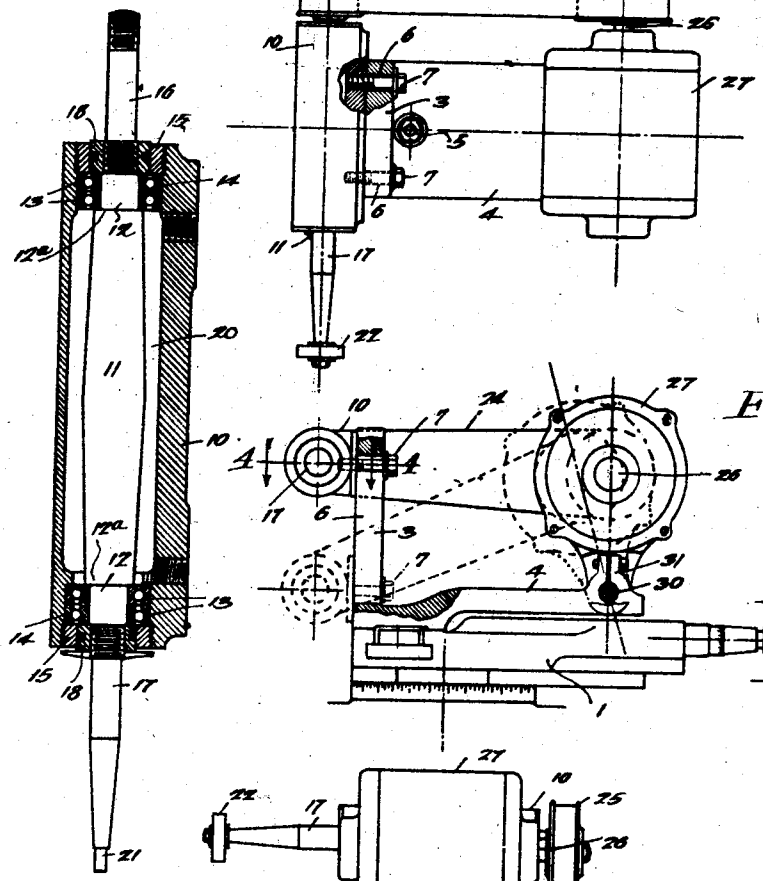
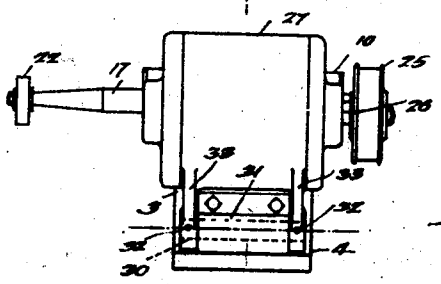


Fig. 2

Fig. 4

Fig. 3



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UNITED STATES PATENT OFFICE.

JOHN A. SMITH, OF BELLEVUE, KENTUCKY.

GRINDING MACHINE.

Application filed August 24, 1923. Serial No. 659,191.

To all whom it may concern:

Be it known that I, JOHN A. SMITH, a citizen of the United States, and residing at Bellevue, in the county of Campbell and State of Kentucky, have invented new and useful Grinding Machines, of which the following specification is a full disclosure.

This invention relates generally to improvements in grinding tools, and particularly to an adjustable grinding unit designed for attachment to the adjustable tool rest of a lathe or other metal-working tool.

An object of the invention is to provide a grinding tool unit which can be adjusted at various angles relative to the work, and wherein efficient driving connection between the power unit and grinder spindle is constantly maintained during and after such adjustment. The above object is accomplished by adjustably mounting the power unit and spindle bearing upon a common base, which base is in turn detachably and adjustably mounted upon a tool rest.

Other objects are to provide a broad and substantial bearing for the spindle, and to provide a chamber or lubricant receptacle about the central portion of the spindle.

Another object is the provision of a tool, the grinding element of which can be conveniently introduced into work of hollow configuration. This object is accomplished by extending the spindle a considerable distance beyond its bearing.

Other objects and certain advantages will be disclosed in the description of the drawings forming a part of this specification, and special reference is made to the appended drawings, in which:

Figure 1 is a top plan view of the unit.

Figure 2 is a side elevation showing my improved grinding unit applied to an adjustable tool rest.

Figure 3 is a side view, and

Figure 4 is a longitudinal section of the spindle bearing and spindle mounted therein.

The device is adapted for use upon an ordinary lathe, or other similar metal-working tool, and is herein placed upon an adjustable tool rest 1 suitably angularly adjustable upon a lathe carriage, not herein shown. My improved unit comprises an L-shaped frame providing two leg portions, at a right angle to one another, respectively 3, 4. The frame is pivotally adjustably attached to the tool rest 1, as at 5. The vertical portion 3 of the frame is provided with parallel vertically disposed slots 6, through which are loosely inserted headed bolts 7, having screw threaded connection with, and adapted to hold in adjusted positions upon the portion 3, a spindle bearing block 10. Horizontally aligned spaced pairs of openings may however, be provided in lieu of the slots 6. The bearing block 10 is of tubular formation and has mounted therein a spindle 11 having an enlarged diameter central portion and relatively opposite reduced counterturned portions 12, about which portions are engaged inner elements of ball bearings 13, the outer elements of which are suitably engaged with the bearing openings or portions 14. The shaft is thus rotatively held in double bearings at relatively opposite sides, the bearings being spaced a substantial distance apart in order to provide substantial mounting for the spindle. Plugs 15, having threaded connection with the bearing 10, engage the outer element of each ball bearing, to force the bearings together and hold the same against the shoulder 12^a formed between the enlarged portion of the spindle and the counterturned portions 12. The shaft is terminally counterturned, as at 16, 17, and each counterturned portion is threaded for engagement with jam nuts 18, which jam nuts engage the respective inner elements of the outermost ball bearing 13. The bearing 10, at that portion which surrounds the enlarged diameter of the spindle, is correspondingly enlarged between the openings 14 to form an oil chamber 20 as a reservoir which will contain sufficient lubricant to oil the bearings 13, over an extended period of time.

The counterturned portion 17, as an extension grinder wheel spindle, is of relatively greater length than the pulley extension 16 and is counterturned terminally as at 21. Upon the counterturned portion is placed the grinding wheel or element 22, the same being suitably non-rotatably fastened. Upon the counterturned portion 16 is non-rotatably placed a pulley 23, in driving connection, as by a belt 24, with a corresponding pulley 25, mounted upon the motor shaft 26 of the motor 27, pivotally attached as at 30 to a split bearing 31 at the outer end of the frame leg 4. The pivot 30 is pinned at opposite ends, as at 32, to spaced legs 33 extending from the bot-

tom of the motor casing, and the pivotal connection is such as to allow the motor to swing forwardly, as shown in dotted lines in Figure 2, when the bearing 10 is adjusted vertically, as shown by said dotted lines. The split bearing provides frictional clamping means for maintaining the motor rigidly in position after adjustment, so that efficient driving connection between the spindle pulley and motor pulley is maintained, whatever may be the adjusted relations between the spindle bearing and motor.

The grinding unit may be angularly adjusted with reference to the tool rest, and the tool rest may be angularly adjusted with reference to the carriage to give unusual range of adjustability. The length of the extension 17 of the spindle is sufficient to allow introduction of the tool within a piece of hollow work without engagement of the bearing with the work.

The pivotal relation of the motor to the bearing additionally permits of considerable increase in adjustment range of the spindle, and provides a tool unit of unusual adaptability.

Having described my invention, what I claim is:

1. A frame having angularly related extensions, means for adjustably attaching the frame to a support, a bearing adjustable lengthwise of one of the extensions having a spindle rotatable therein, a motor pivotally attached to the other extension and adapted to swing toward and away from the first extension, and having its pivot parallel with said spindle, means for clamping the motor after swinging adjustment, and driving connection between said spindle and motor.

2. A frame having angularly related extensions, a bearing adjustable lengthwise of one of the extensions toward and away from the other, said bearing having a spindle therein at right angles to the lengthwise dimension of said extension, a motor pivoted upon the other extension to swing toward and away from the first extension, the pivot being parallel with the axes of said spindle, means for clamping the motor in adjusted position, and driving connection between said spindle and motor.

3. A tool unit comprising a frame, having right angularly related extensions, a bearing upon one of the extensions adjustable lengthwise thereof toward and away from the other extension, said bearing having a spindle at right angles to the direction of adjustment, a motor pivoted to the other extension adjustable toward and away from the bearing, and having its pivot parallel with the spindle axis, and means for clamping the motor in adjusted position upon its pivot.

4. In combination with an adjustable tool rest, a frame adjustably attached to said rest and having angularly related extensions, a bearing upon one of said extensions adjustable thereon toward and away from the rest, said bearing having a spindle at right angles to direction of adjustment, a pivot rod non-rotatably attached to the other leg of said frame, a motor pivoted to said rod and adjustable toward and away from said bearing, means for clamping the motor in adjusted position, said rod parallel with the axis of said spindle.

In witness whereof, I hereunto subscribe my name.

JOHN A. SMITH.