A. M. DRAKE.

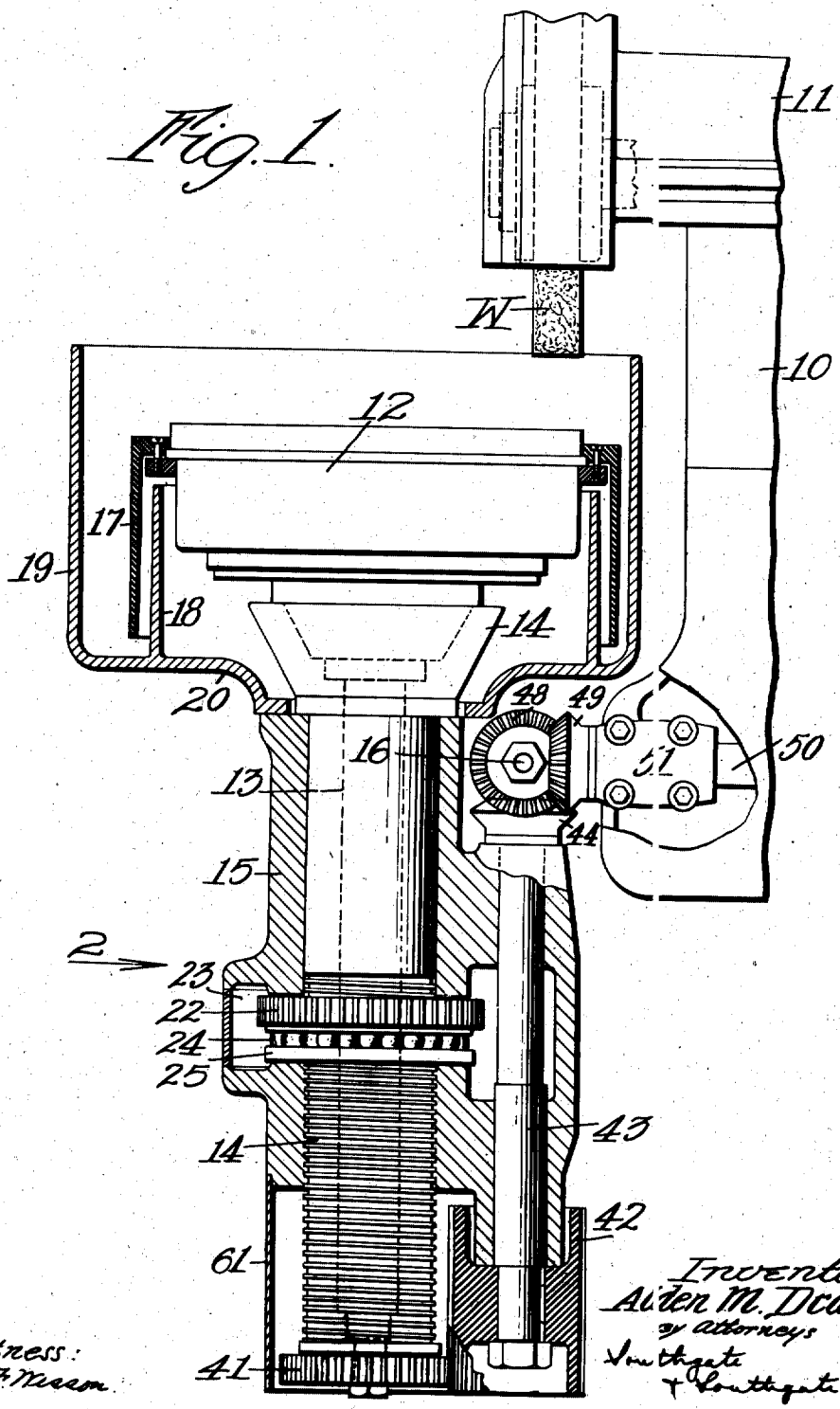
TABLE DRIVING AND FEEDING MECHANISM FOR GRINDING MACHINES.

APPLICATION FILED SEPT. 26, 1916.

1,223,155. Patented Apr. 17, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

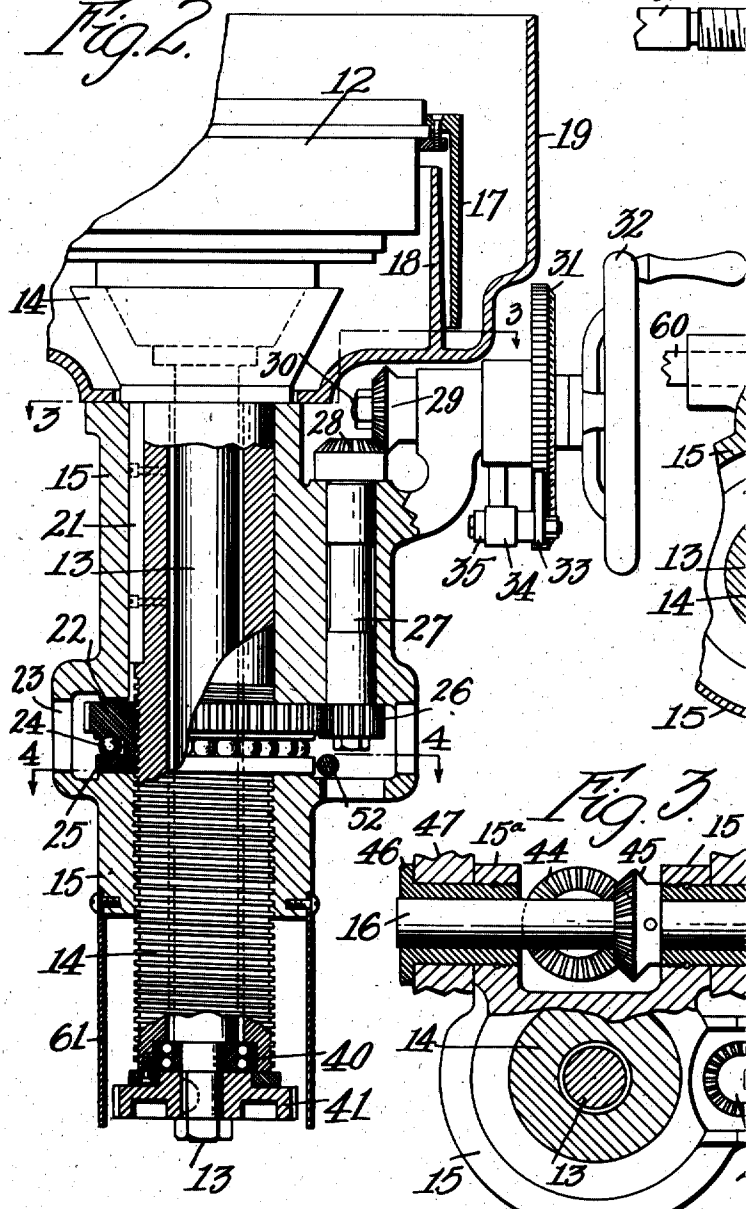


Fig. 5.

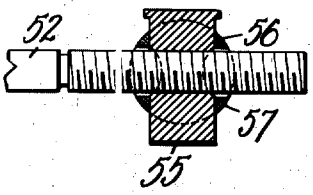


Fig. 4.

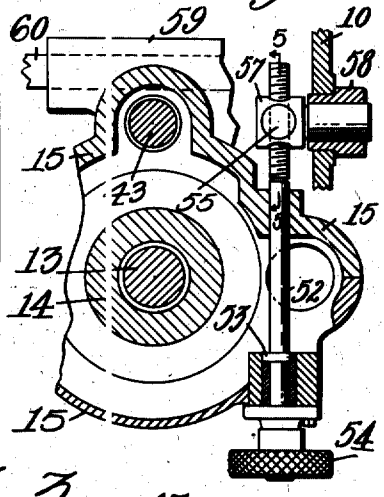


Fig. 3.

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UNITED STATES PATENT OFFICE.

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TABLE DRIVING AND FEEDING MECHANISM FOR GRINDING-MACHINES.

1,223,155. Specification of Letters Patent. Patented Apr. 17, 1917.

Application filed September 26, 1916. Serial No. 22,306.

To all whom it may concern:

Be it known that I, ALDEN M. DRAKE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Table Driving and Feeding Mechanism for Grinding-Machines, of which the following is a specification.

This invention relates to a table driving and feeding mechanism for grinding machines of the type in which the work table is rotatable about a substantially vertical axis.

It is the object of my invention to improve the construction of such mechanism making it more simple to manufacture, more reliable in operation, and more convenient in manipulation.

In the preferred form of my invention, the table-supporting spindle is adjustable longitudinally and also angularly about a horizontal axis.

One feature of my invention relates to the provision of improved devices for rotating the spindle in every position thereof, without interfering with the axial and angular adjustment thereof. The mechanism herein shown is so designed that this result is attained by a direct gear drive and without the use of swivel or sliding connections.

A further feature relates to the provision of an improved spindle adjustment which may be operated either manually or automatically, by the use of which great accuracy of adjustment may be secured.

My invention further relates to certain arrangements and combinations of parts which will be hereinafter described and more particularly set forth in the appended claims.

A preferred form of my invention is shown in the drawings in which—

Figure 1 is a side elevation partly in section of a portion of a grinding machine embodying my invention;

Fig. 2 is a vertical sectional view taken in a plane at right angles to the plane of Fig. 1;

Fig. 3 is a horizontal sectional view taken along the line 3—3 in Fig. 2;

Fig. 4 is a partial horizontal sectional view taken along the line 4—4 in Fig. 2, and

Fig. 5 is a detail sectional view taken along the line 5—5 in Fig. 4.

Referring to the drawings, I have shown a frame 10 supporting a wheel slide 11 upon which the grinding wheel W is rotatably mounted. Suitable mechanism, not shown, is provided for reciprocating the wheel slide both manually and automatically. The work is supported upon a rotatable table which is shown herein as a magnetic chuck 12 mounted upon the upper end of a spindle 13 rotatable in bearings in a sleeve 14. The sleeve 14 is slidable but non-rotatable in a support 15 which is mounted for angular adjustment about the axis of a horizontal shaft 16 (Fig. 3). The chuck 12 may be provided with a casing 17 extending downward between the flanges 18 and 19 formed on a member 20 secured to the upper end of the support 15. This casing protects the inside of the chuck from water and cutting compounds.

Rotation of the sleeve 14 is prevented by the provision of a key 21 (Fig. 2) slidable in a key-way in the support 15. The lower portion of the sleeve 14 is externally threaded, and extends through a nut 22 which is positioned within a pocket or recess 23 in the support 15, and is supported by a plurality of balls 24 resting upon a thrust plate 25. The outer portion of the nut 22 is provided with gear teeth meshing with a pinion 26 secured to the lower end of a short substantially vertical shaft 27 rotatable in bearings in the support 15, and having a bevel gear 28 fixed to its upper end. The gear 28 meshes with a corresponding bevel gear 29 mounted on the end of a horizontal shaft 30 to which is secured a ratchet wheel 31 and hand wheel 32. A pawl 33 is mounted on an arm 34 adapted to swing about the axis of the shaft 30, and connected by a link 35 to any suitable source of power. The pawl 33 engages teeth on the ratchet 31 and thus provides a driving connection through which vertical movement of the table 12 may be secured automatically, the

handle 32 providing means for manual adjustment of the table.

A ball bearing 40 is provided in the sleeve 14 for the lower end of the spindle 13 and a gear 41 is fixed to the spindle. The gear 41 meshes with a wide-faced pinion 42 carried by a shaft 43 mounted in bearings in the support 15 and having a bevel gear 44 secured to its upper end. The gear 44 meshes with a gear 45 fixed to the horizontal shaft 16, previously mentioned. The shaft 16 is rotatable in sleeves 46—46 which are threaded into projections 15^a extending rearwardly from the support 15. The sleeves 46 are pivoted in bearings 47—47 formed on the frame 10, and thus permit angular adjustment of the support 15.

A bevel gear 48 is secured to the end of the shaft 16, and meshes with a bevel gear 49 (Fig. 1) mounted on a horizontal shaft 50 rotatable in a bearing 51, and driven from any suitable source of power through connections, not shown. Driving engagement is thus provided between the shaft 50 and the spindle 13 in every vertical or angular position of the spindle, and this driving connection is a positive gear drive free from swivel joints and sliding connections of any sort.

For the adjustment of the support 15 about the axis of the shaft 16 I provide the adjusting screw 52 (Fig. 4) rotatably mounted in the support 15, and provided with a flange 53 which prevents axial movement of the screw in the support. The screw is provided with a hand wheel 54 by which it may be adjusted and its threaded rear portion extends through a threaded hole in a plug 55 which is slidable axially in a hole 56 extending transversely of a swivel head 57 pivotally supported in a bearing 58 on the frame 10.

By turning the hand wheel 54 the support may be moved in or out with relation to the swivel head 57 and frame 10, the swivel head and the sliding plug providing for the resulting displacement of the screw 52. The support 15 is provided with a rearward projection 59 through which extends a clamping bolt 60. This bolt also extends through slots, not shown, in the frame 10, and affords means for rigidly securing the support in any adjusted position.

A sleeve or casing 61 may be secured to the lower end of the support 15 to cover the threaded portion of the sleeve 14, and also the gear 41, while the sleeve is in its lowest position.

Having thus described my invention it will be evident that changes and modifications can be made therein by those skilled in the art without departing from the spirit and scope of my invention as set forth in the claims, and I do not wish to be otherwise limited to the details herein shown, but what I claim is:—

1. In a grinding machine, in combination, a work table, a spindle on which said table is mounted, a sleeve forming a bearing for said spindle, a pivotally mounted support for said sleeve, means to adjust said support angularly and to secure said support in adjusted position, and means to adjust said sleeve axially in said support.

2. In a grinding machine, in combination, a work table, a substantially vertical spindle on which said table is mounted, a sleeve forming a bearing for said spindle, a hinged support for said sleeve angularly adjustable in a vertical plane, a horizontal shaft about the axis of which said support is angularly adjustable, means to drive said shaft, an intermediate shaft parallel to said spindle, bevel gear connections between said horizontal and said intermediate shafts and gear connections between said intermediate shaft and said spindle.

3. In a grinding machine, in combination, a work table, a substantially vertical spindle on which said table is mounted, a sleeve forming a bearing for said spindle and having a portion of its cylindrical outer surface threaded, a support for said sleeve, a nut rotatable in a bearing on said support but confined against axial movement, and means to turn said nut, said means comprising gear teeth on said nut, a pinion meshing therewith, and positively actuated means for rotating said pinion by power.

4. In a grinding machine, in combination, a work table, a substantially vertical spindle on which said table is mounted, a sleeve forming a bearing for said spindle and having a portion of its cylindrical outer surface threaded, a support for said sleeve, a nut for said sleeve rotatable in a bearing on said support but confined against axial movement, a gear secured to said nut, a pinion meshing with said gear, a short shaft for said pinion parallel to said spindle and a short horizontal shaft, both shafts being rotatable in bearings in said support, driving connections between said shafts, an automatic pawl and ratchet feed for said horizontal shaft, and additional means for turning said horizontal shaft manually.

5. In a grinding machine, in combination, a work table, a spindle on which said table is mounted, a pivotally mounted support for said spindle, means to adjust said spindle axially, a driving shaft mounted in fixed bearings, and a direct gear drive from said shaft to said spindle.

6. In a grinding machine, in combination, a work table, a spindle on which said table is mounted, a pivotally mounted support for said spindle, and means to adjust said sup-

port, said means comprising a screw rotatable in said support but confined from axial movement, a swivel head mounted in the frame of the machine, and a plug slidable transversely in said head and threaded to receive said screw.

7. In a grinding machine, in combination, a work table, a substantially vertical spindle on which said table is mounted, a sleeve forming a bearing for said spindle and having a portion of its cylindrical outer surface threaded, a support for said sleeve, a nut rotatable in a bearing on said support but confined against axial movement, a gear and pinion drive for said nut, power driven devices for moving said pinion and additional means to move said pinion manually.

In testimony whereof I have hereunto affixed my signature.

ALDEN M. DRAKE.