

S. G. BUSKARD.
 UNIVERSAL GRINDING MACHINE.
 APPLICATION FILED MAR. 19, 1917.

1,338,355.

Patented Apr. 27, 1920.
 2 SHEETS—SHEET 1.

Fig. 1.

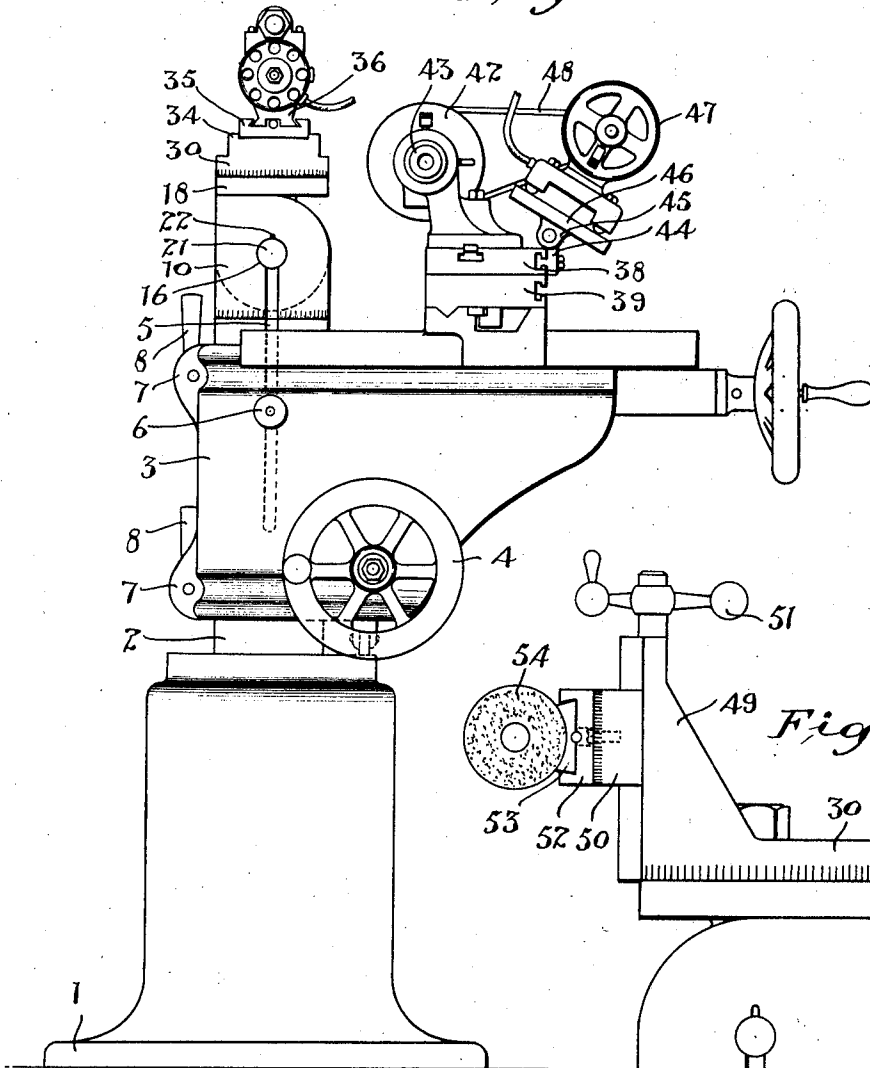
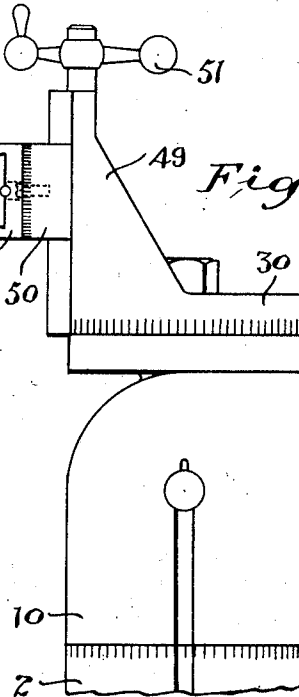


Fig. 3a.



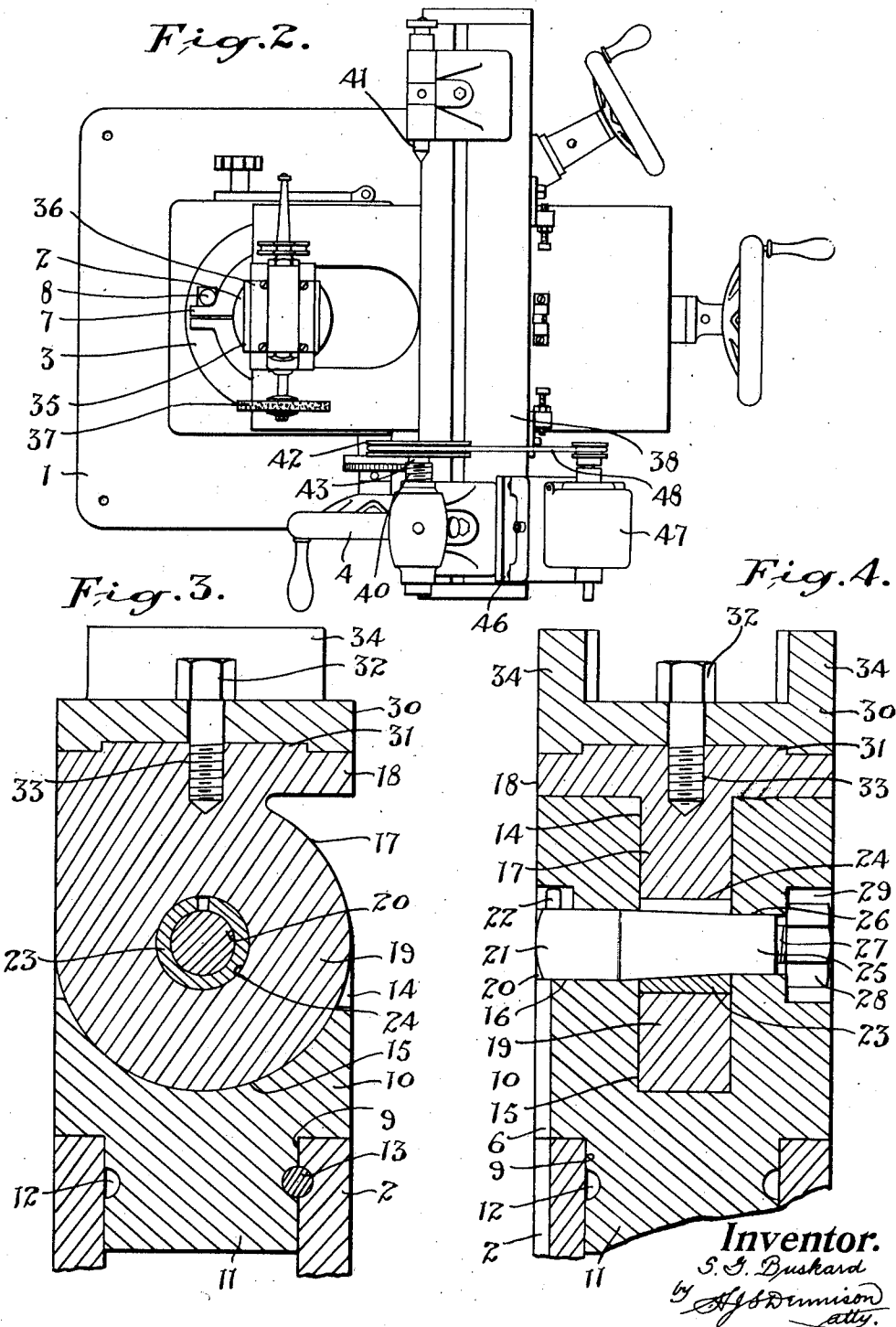
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 Atty.

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UNITED STATES PATENT OFFICE.

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UNIVERSAL GRINDING-MACHINE.

1,338,355.

Specification of Letters Patent.

Patented Apr. 27, 1920.

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To all whom it may concern:

Be it known that I, SAMUEL GORDON BUSKARD, a subject of the King of Great Britain, and resident of the city of Hamilton, county of Wentworth, in the Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Universal Grinding-Machines, as described in the following specification and illustrated in the accompanying drawings, that form part of the same.

The principal objects of the invention are, to devise a form of machine in which the grinder may be operated in a plane at any desired angle in relation to the work and may be quickly and accurately moved to various positions.

A further and important object is to devise a construction in which a small high speed grinding machine may be universally adjustably supported in relation to the work.

The principal feature of the invention consists in the novel construction and arrangement of parts, whereby a longitudinally and laterally adjustable work table is arranged in vertical adjustable relation to a column and a grinder head is supported on said column and is adaptable of adjustment rotatably and in lateral and oblique directions.

A further important feature consists in the novel arrangement of an electric motor upon a pivotal support carried upon the work bed, whereby the said motor may be swung upon its pivot toward or from the driving spindle in the head stock of the machine.

In the drawings, Figure 1 is a side elevational view of a grinder constructed in accordance with this invention.

Fig. 2 is a plan view of the machine.

Fig. 3 is an enlarged vertical sectional view through the grinder supporting column, transversely of the pivot of the pivotal head.

Fig. 3^a is a side elevational view of a modified form of the grinder supporting guide.

Fig. 4 is an enlarged vertical sectional view through the grinder head in right angular relation to the view in Fig. 3.

Like numerals of reference indicate corresponding parts in each figure.

On reference to the accompanying drawings it will be seen that the type of machine

to which the invention is herein shown applied is that of a vertical column machine with a swing table. The base 1 supports a rigid column 2 upon which the bracket 3 is rotatably supported, being raised and lowered thereon by means of the hand wheel 4. The operating connection between the hand wheel 4 and the column is not shown as no claim is made upon the structure which is not new. The column is provided with a vertical key-way 5 in which a key carried by the bracket 3 is adapted to slide, said key being adapted to be withdrawn by means of the handle 6.

The bracket 3 is of split type having the paired lugs 7 at the rear thereof adapted to be drawn together to lock the bracket upon the column by means of the screw handles 8.

The column 2 is preferably of tubular form or is bored out at the top having the central bore 9.

10 is a part cylindrical shaped member preferably of corresponding diameter with the column 2 and having the reduced portion 11 adapted to fit into the bore 9 of the column 2 and to rotate therein, said reduced portion being provided with an annular groove 12 intermediate of its height.

13 is a locking bolt secured in the column 2 and extending into the groove 12 being of tapered form and adapted to be drawn into locking engagement with the portion 11 of the member 10.

14 is a transverse socket or slot formed in the upper member 10 and opening to the top thereof having the arc-shaped recess 15 in the bottom formed concentric with the transverse orifice 16 extending across the jaw formed by the upper end of the cylindrical member 10.

17 is a block or table formed with a circular upper end 18 of corresponding diameter with the column and member 10, said table having a tongue member 19 arranged centrally of its width adapted to fit into the transverse socket in the member 10. The major portion of said tongue member forms a circle corresponding to and resting within the arc-shaped recess 15.

20 is a bolt having the head portion fitting snugly within the transverse orifice 16 and having a laterally extending key 22 to retain it from rotation.

The bolt 20 is tapered from the head portion 21 and extends through a tapered bush-

ing 23 arranged in the circular orifice 24 in the tongue 19. The bolt is also formed with a reduced end 25 fitting in the orifice 26 in the other side of the jaw of the member 10 and the outer end 27 is threaded to receive a nut 28 which is bedded within a recess 29 in the side of the member 10. The table 17 may be swung to any desired position upon the pivot formed by the bolt 20 and the circumferential surface of the circular portion 24 is marked with suitable protractor graduations to indicate the degrees of rotation.

30 is a cylindrical block rotatably mounted upon the top of the table 17 being centered thereon by the boss 31 and secured by the cap screw 32 axially arranged therein and threaded into the hole 33 in the top of the table 17.

The block 30 is provided with a pair of upwardly projecting lugs 34 on opposite sides to the top of which is secured a dovetailed guide table 35 in which a carriage 36 carrying the grinder 37 is slidably arranged. The grinder 37 is of a small light high speed type of electric motor.

The rotatable member 10 is graduated upon its periphery at the point of contact with the column 2 and the column is likewise graduated into the degrees of a circle so that the upper end of the column may be rotated to any desired angle of setting for the swing of the pivotal block 17. The upper end of the block 17 and the base of the block 30 are also divided off into the degrees of a circle and correspondingly marked so that the upper block may be rotated in definite rotation with the block on which it is supported. This triple rotatable adjustment, one in a fixed transverse plane, one in a vertical plane and the other in a transverse plane carried by the swivel in the vertical plane gives to the device the possibility of adjustment to any possible angle of movement and the grinder machine is carried upon the table on the upper member so that it may be moved back and forth as may be desired according to the work.

In addition to the adjustment of the grinder supported upon the adjustable head the work table 38 which is in the form of a transverse slide is carried upon an adjustable table 39 arranged upon a horizontal slide upon the bracket 3. The work may be arranged upon a bed plate carried upon the table 38 or if to be rotated the work is carried between the head stock 40 and the tail stock 41. The head stock is in the form of a bracket slidably arranged upon the table 38 having a grooved pulley 42 secured to the spindle 43, any suitable form of chuck being secured to the pulley.

A bracket 44 is slidably arranged upon the table 38 and is provided with a hinge extension 45 on which a table 46 is pivotally supported.

A suitable motor 47 is mounted upon the pivotal table 46 and connected with the pulley 42 by a short drive belt 48. It will be seen that the adjustment of the belt 48 can be effected instantaneously by swinging the table 46 on its pivot and the motor can be swung down out of the way or readily removed if not in use.

In the modified form of head shown in Fig. 3^a the rotatable block 30 is formed with a rigid guide 49 arranged in perpendicular arrangement and a sliding block 50 operated by the screw handle 51 moves longitudinally therein.

A block 52 is rotatably mounted on the sliding block 50 and a sliding carriage 53 operates in the bed thereof, the grinder 54 being secured to said carriage.

In the operation of a grinder constructed as described it is possible to adjust the work table in relation to the column both vertically and transversely or swing the work table in relation to the column. The head of the column may be rotated to change the angle of the vertically swinging table thereon in relation to the work and the vertically swinging head may be adjusted so that the grinder may be operated in an oblique direction. And further obliquity may be obtained by rotating the upper block 30 carrying the grinder carriage which is operated forward and backward by the hand screw.

The modification shown in Fig. 3^a allows still further adjustment in angularity.

It will be understood from this description that a machine constructed as described may be adjusted to any operating position desirable and it is therefore truly universal in its adjustment and renders its use practically unlimited as it can be adjusted to get at work in any position.

The use of such a machine will be very valuable in the manufacture of small and complicated tools. The construction is very simple and there are no delicate parts to get out of order and it can be manufactured at very low cost.

Another important feature is that the grinders are directly operated and there are no overhead belts to interfere with the operator and he can therefore work from any side of the machine with equal facility.

What I claim as my invention is:—

1. In a universal grinder, a horizontal work support, a vertical column, a rotatable member adapted to be moved into oblique relation to said column, means for supporting a grinder member on said rotatable member, a grinder member, and means for moving the grinder member with its axis parallel with or in planes intersecting the plane of the work.

2. In a universal grinder, the combination with an adjustable work table, of a column arranged in vertically adjustable re-

lation to said work table, a grinder member, a table supported on a transversely arranged pivot on said column and adapted to be swung in a vertical plane, a head rotatably mounted on said pivotal table, a guide extending transversely of said table, and a carriage slidably arranged in said guide, said carriage being movable in a plane intersecting the plane of the work or parallel therewith.

3. In a universal grinder, the combination with an adjustable work table, of a column arranged in vertically adjustable relation to said work table, said column having a vertically disposed socket, a table having a perpendicularly arranged tongue extending into said socket and pivotally secured therein, a block rotatably mounted on said table having its axis of rotation arranged in right angular relation to the axis of rotation of said table, a guide extending transversely of said block, a carriage slidably arranged in said guide, and a grinder arranged upon said carriage.

4. In a universal grinder, the combination with an adjustable work table, of a column arranged in vertically adjustable relation to said work table, said column having a vertically disposed socket extending downwardly from the top and arranged centrally of the vertical axis of said column, a bolt extending transversely through said column in right angular relation to said socket and across the vertical axis of the column, a table having a tongue extending into said socket and formed with a central orifice through which said bolt extends and upon which said tongue is pivoted, a block rotatably mounted on the top of said table, a slide mounted transversely upon said block, a carriage mounted on said slide, and a grinder secured to said carriage.

5. In a universal grinder, the combination with an adjustable work table, of a column arranged in vertically adjustable relation to said work table, a cylindrical member rotatably mounted on the top of said column, a table being mounted on said rotatable member and adapted to swing in a

vertical plane, a block rotatably mounted on said table, a guide secured to said block and arranged transversely thereof, a carriage mounted in said guide and a grinder secured to said carriage.

6. In a universal grinder, the combination with an adjustable work table, of a column arranged in vertically adjustable relation to said work table, said column having a central cylindrical recess, a cylindrical member mounted on the top of said column and having a reduced portion extending into said cylindrical recess, means for locking said cylindrical member in any desired position of rotation on said column, said cylindrical member having a vertical socket in the top thereof arranged centrally of its vertical axis, a bolt extending transversely through said cylindrical member centrally of said socket, a table having a tongue extending into said socket and pivotally mounted on said bolt, a block mounted on the top of said table and rotatable around the vertical axis thereof, a guide secured to and extending transversely of said table, a carriage adjustably arranged in said guide, and a grinder secured to said carriage.

7. In a universal grinder, in combination with the supporting column, of a universal adjustable grinder head carried by said column, a work table adjustably arranged in relation to said column, a head stock carried on said work table a pivotal bracket adjustably supported on said work table, a motor secured to said bracket and operatively connected with the spindle of said head stock.

8. In a universal grinder, in combination with an adjustable work table, of a column arranged in vertically adjustable relation to said work table, a table pivotally mounted on the head of said column and adapted to swing in a vertical plane, a block rotatably mounted on said pivotal table, a guide rigidly secured to said rotatable block, a carriage slidably arranged in said guide, and a grinder adjustably supported upon said carriage.

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