

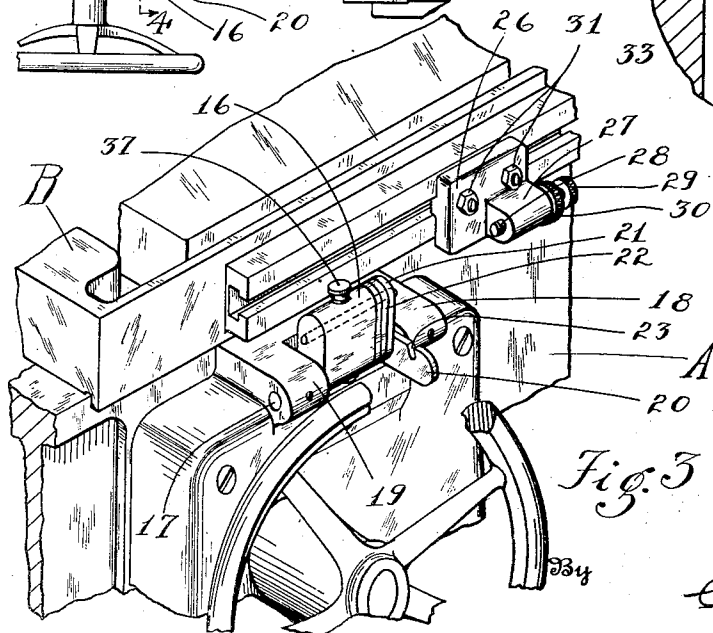
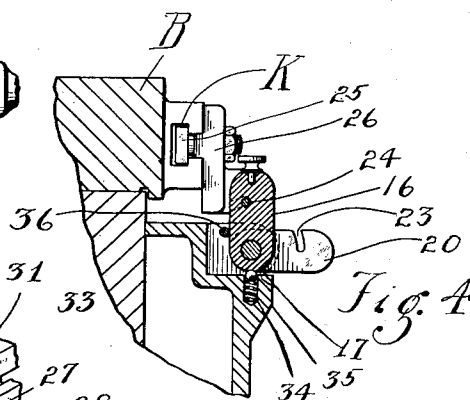
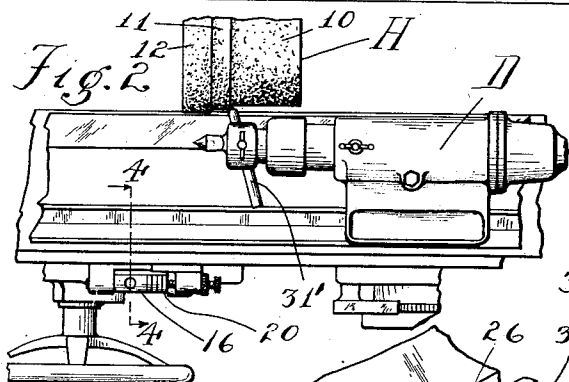
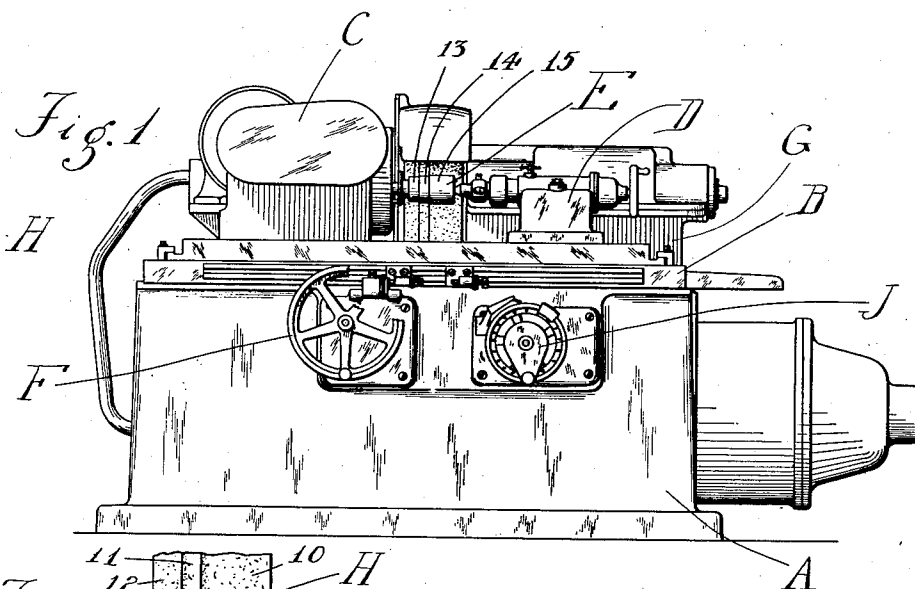
Dec. 7, 1926.

1,609,643

L. DALY

GRINDING MACHINE

Filed Dec. 5, 1924



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UNITED STATES PATENT OFFICE.

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GRINDING MACHINE.

Application filed December 5, 1924. Serial No. 754,181.

This invention relates to improvements in grinding machinery and more especially to the particular type of such machinery commonly termed plunge cut grinders in which the work piece and grinding member have a direct relative feeding movement, ordinarily without relative axial movement, as in the production of shouldered work.

In ordinary grinding where there is a relative transverse or axial movement of the parts during grinding, this movement serves, to a considerable degree, to true and properly maintain the cutting face of the wheel in operative condition. In those instances however, in which such relative movement is normally absent it is necessary to resort to a more frequent truing or reconditioning of the wheel surface. This is particularly necessary in the event that the wheel is being employed for shoulder or form grinding in which a particular configuration thereof must be maintained.

The present invention has to do particularly with the cooperative elements for positioning either the work or truing mechanism or both, and has for its primary purpose, the provision of simple and efficient mechanism for accurately, successively or alternately accurately positioning the work pieces or truing device.

A further object of the present invention is the provision of mechanism for readily sequentially controlling the advancing position of a truing device for producing a plurality of differing surface zones on the general operative surface of the wheel.

Another object of the invention is the provision of a device which may be readily applied to a standard form of grinding machine, and may be easily shifted into operative or inoperative position without removal from the machine or variation in adjustment thereof.

Other objects and advantages of the present construction should be readily apparent by reference to the following specifications taken in connection with the accompanying drawings, and it will be understood that any modification falling within the scope of the appended claims may be made without departing from, or exceeding the spirit of the invention.

Figure 1 represents a front view of a grinding machine embodying these improvements.

Figure 2 represents a fragmentary plan view of the truing device and associated parts.

Figure 3 represents a perspective view of the variable stop mechanisms.

And Figure 4 is a fragmentary sectional view as on the line 4—4 of Figure 2.

In the drawings, in which similar characters of reference denote corresponding parts throughout the several views, the letter A designates the bed of a grinding machine having mounted thereon the longitudinally movable table B bearing head stock C and tail stock D supporting and driving the work piece E. Longitudinal feed of the table is controlled by mechanism shown at F.

The bed A also supports the transversely shiftable carriage G for the grinding wheel H. Transverse or forward and back feeding movement is imparted to the wheel and carriage as by the mechanism shown at J.

By reference particularly to Figure 2 it will be noted that the grinding wheel H is shown as formed with three zones 10, 11 and 12 respectively of different diameters. The surface of the stone will therefore operate upon work piece E in such a manner that the portion 12 of larger diameter will produce a reduced portion 13 on the work piece, the portion 11 will produce a larger portion 14 on the work piece, while the major portion 10 will produce a longer and larger diameter body as indicated at 15, there being sharp shoulders at the division between the several zones or sections on the work piece.

As before mentioned the grinder here illustrated is designed for direct inward feed of the stone against the work piece in performing the grinding. This causes a tendency of the sharp edges to wear away together with some filling up of the surface of the stone so that relatively frequent re-truing is required.

The present invention is designed to facilitate this re-truing operation by providing a member on the bed which will facilitate accurate positioning of the table with respect to the grinding wheel, so that the work piece will always occupy the same relation to the zone wheel, and which will also accurately position the truing device for truing each individual zone. In the form illustrated this device comprises a block 16 pivotally supported on spindle 17 between the ear lugs 18 and 19 on the bed A. This block in-

cludes a plurality of hinged sections or leaves 20, 21, and 22 for example, which swing with and with respect to the main block 16 about the pivot 17. These leaves are formed with the aligning slots 23 adapted to swing over positioning pin 24, carried by the block. This pin therefore, serves as a limit for any swinging movement relative to the block in one direction. The table B is provided at its forward edge with the customary T-slot K adapted to receive the T head bolts 25 of the adjustable dog or bracket 26. This bracket has a sleeve portion 27 for the adjustable screw stop 28 projecting therefrom on the side toward the stop block and having on its opposite end the knurled adjusting head 29, and lock nut 30 for securing the stop in desired adjusted position relative to the sleeve.

It will thus be noted that the general position of the dog bracket may be adjusted along the table by loosening and tightening of the nuts 31 on the T head bolts 25, and that the final operative position of the stop may be determined by fine adjustment of screw 28.

By reference to Figures 1 and 2 the purpose and advantages of the structure in question will be best understood, and will be noted that in Figure 1 there has been illustrated the employment of two of the stop dog members 26. As shown in Figure 1, the left hand of these is so adjusted as to just come into contact with the right hand leaf 20 of the stop member when the table is adjusted to position properly the work piece with respect to the various zone forming portions of the grinding wheel. In this matter it is possible to adjust the table as may be desired as for truing or the like, and to always bring it back to initial position for properly operatively supporting the work.

Similarly for the truing operation a truing member 31' is carried by the tail stock D, and the right hand stop dog, and its screw is so adjusted that it will limit the movement of the table toward the left as the tool has reached the shouldered edged zone or portion 10 of the wheel H as indicated in Figure 2.

The swinging leaf or leaves 20, 21 and 22 are either individually or jointly of thickness corresponding to that of the intermediate zone 11 which it is desired to form on the wheel. In the present instance, for purpose of illustration, the zone has been shown as relatively large in size and equal to the combined thickness of the several leaves. This being the case, the first portion of the wheel having been trued till the screw 28 has come into contact with the face of the stop leaf, the series of leaves are then swung downward leaving the block in raised position, and the table given a traversing movement until the stop screw contacts with the

block. The amount of motion of the truing device will then have been just that of the width of the zone 11 of the wheel. The stone is then moved backward for truing of the final portion 12 of its surface, and the block is swung downward out of the path of movement of the dog 26 when the table can be again shifted to cause the truing device to properly traverse this last portion of the wheel face.

To secure the block in either raised or depressed position use may be made of a suitable resilient holding device such as the ball plunger 33 actuated by spring 34 and contained in a socket 35 of the bed A, intermediate the lugs 18 and 19. Also a rest rod such as 36 may be used connecting the lugs as an inward limit for the swinging movement of the stop block 16 and associated parts. A thumb piece or handle (37) facilitates such swinging movement.

From the foregoing it will be noted that there has been provided an extremely simple form of position controlling device for use in connection with grinding machines which will satisfactorily operate to determine the relative position or positions of certain of the portions of the machine for operation upon a work piece, and which will additionally serve to determine the several positions assumed by a truing or dressing tool or the like when it is desired to have such tool differently operate on different portions of the face of the wheel.

It will also be understood that while the device has been illustrated in its simpler form as for double shoulder work that it is equally applicable for use when varying contours are to be placed upon different peripheral zones of the grinding wheel, or when step by step movements are to be given the work piece axially with reference to the grinding wheel. Also it will be understood that the thickness and number of the adjustable leaves may be varied so that a single leaf will take care of a zone adjustment in place, of a plurality of leaves if preferred, and that the size of the stop member as an entirety may also be varied. Particular attention is invited to the fact that in the construction illustrated the member serves as a limit stop both in the positioning of the work and the positioning of the facing tool, and that should it be desired during facing to slightly vary the position of the shoulder of the zones as by moving it over slightly to the left to produce a sharper edge, this movement if less than the thickness of one of the leaves may be compensated for by backing off of the screw 28. A similar backing off of the stop screw controlling the work positioning will then insure the work similarly being adjusted to the left a corresponding amount, so that work pieces turned out by the new truing

of the stone will correspond in final form with those produced by earlier or previous truing.

I claim:—

- 5 1. The combination with the bed of a grinding machine, of a stop member pivotally mounted thereon for co-operation with a stop dog on the grinding machine table, said member comprising a main block projecting adjacent the grinding machine table, and a plurality of leaves mounted for movement with and for movement relative to the block, said block carrying a positioning pin extending in the direction of the pivot thereof, and the several leaves having cut away portions forming slots for interlocking engagement with the positioning pin when the leaves are swung into alignment with the block.
- 20 2. The combination with the bed of a grinding machine, of a stop member pivotally mounted thereon for co-operation with a stop dog on the grinding machine table, said member comprising a main block projecting adjacent the grinding machine table, and a plurality of leaves mounted for movement with and for movement relative to the block, said block carrying a positioning pin extending in the direction of the pivot there-

of, and the several leaves having cut away portions forming slots for interlocking engagement with the positioning pin when the leaves are swung into alignment with the block, the bed having means for limiting the pivotal movement of the block in the direction of the table, and having additional means frictionally securing the block and associate parts in desired angularly adjusted position about its pivot.

3. A grinding machine including a bed, a table reciprocable on the bed, lugs projecting from the bed adjacent the table, a stop device pivotally secured to said lugs and comprising a main block and a plurality of supplemental leaves mounted for movement with and movement relative to the main block, said leaves being of thickness corresponding to movements to be imparted to the table, and a stop member adjustably mounted on the table and having a supplemental contact portion adjustable relative to the remainder of the stop, for selective engagement with the leaves or stop block, to gage the movement of the table.

In testimony whereof, I have signed my name to this specification this 3rd day of December, 1924.

LUKE DALY.