Oct. 28, 1930. S. EINSTEIN 1,779,807

FEELER FOR SIZING

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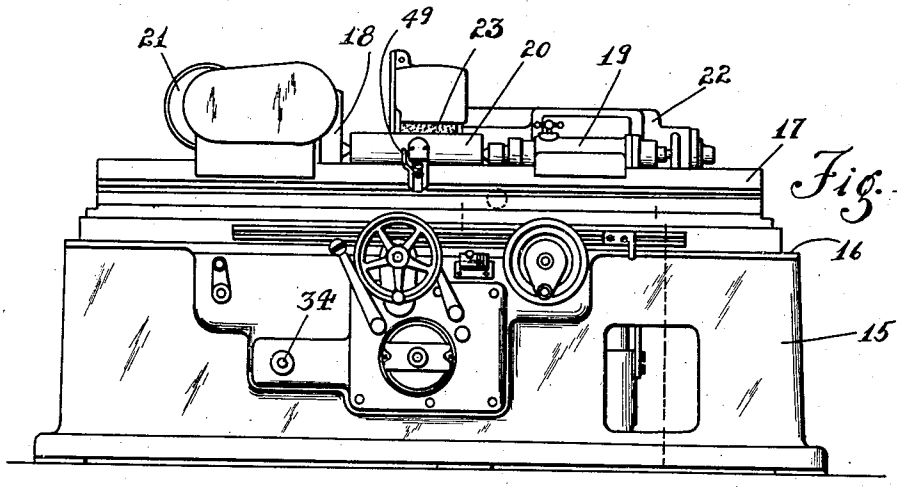


Fig. 1

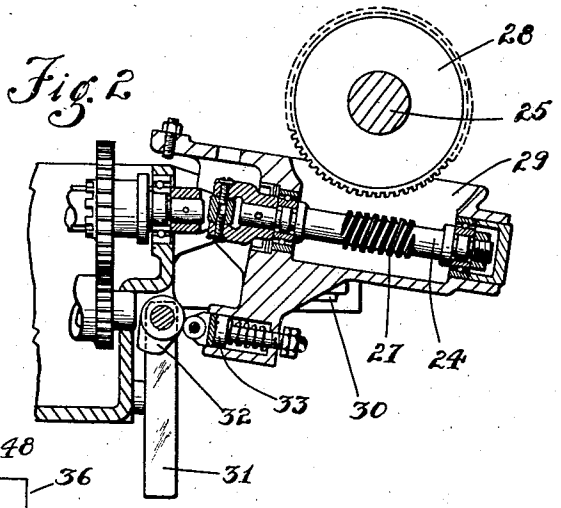


Fig. 2

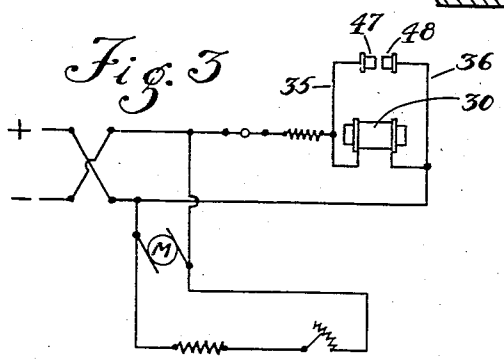


Fig. 3

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Fig. 4

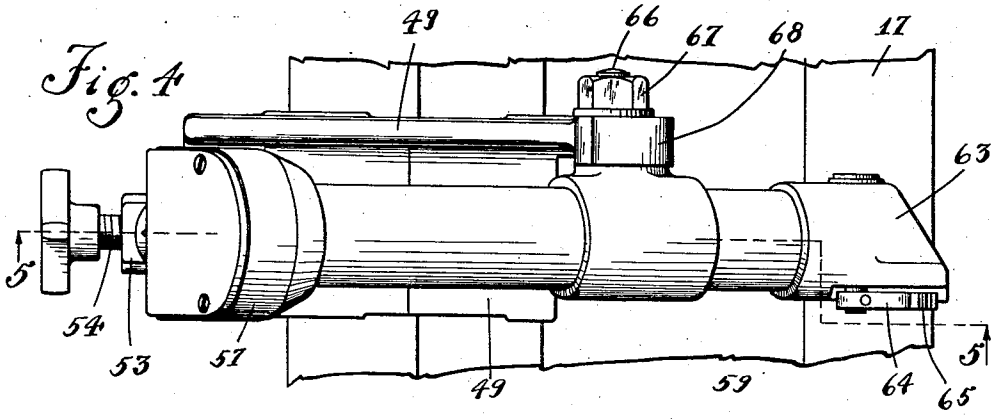
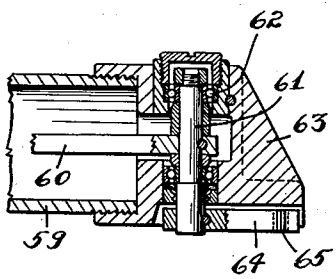


Fig. 6



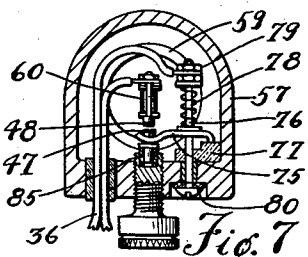


Fig. 7

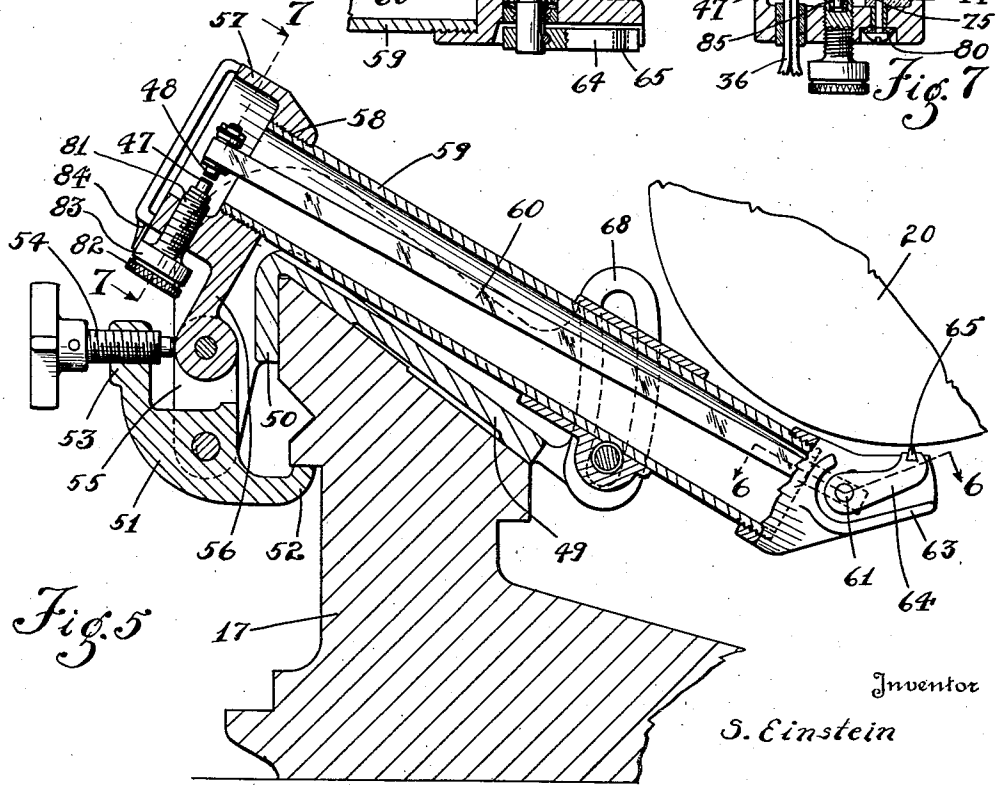


Fig. 5

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Patented Oct. 28, 1930

1,779,807

UNITED STATES PATENT OFFICE

SOL EINSTEIN, OF CINCINNATI, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CINCINNATI GRINDERS INCORPORATED, OF CINCINNATI, OHIO, A CORPORATION OF OHIO

FEELER FOR SIZING

Application filed July 29, 1925. Serial No. 46,816.

This invention relates to improvements in grinding machinery and more especially to mechanism for automatically controlling the size of the finished product of such machines.

Prior to the present invention it has been the general practice in commercial cylindrical grinding machines to make use of a stop mechanism for limiting the relative feeding movement of the workpiece and grinding tool, which stop is mechanically related to the feed mechanism in such manner as to establish a limit for the action of the feed mechanism which in no wise takes into consideration the wear of the surface of the wheel during grinding.

As distinguished from this the present invention contemplates the provision of feed-controlling mechanism which shall be operated by the work itself and which will serve to stop the feeding action when the work is brought to pre-determined size and is entirely independent of any mechanically determinable amount of feeding movement.

The principal object of the present invention, therefore, is the provision of a mechanism with co-operates with the workpiece being operated upon in such manner that successive workpieces may be brought to exact corresponding size regardless of the wear of the grinding member in the production of such workpieces.

A further object of the invention is the provision of an improved structure of work-engaging size-governing mechanism which may be readily adjusted for operation upon different sizes of workpieces and which may also be given suitable fine adjustments for minute stock removal.

Another object of the invention is the provision of an improved form of simple and durable stop-mechanism for use in connection with a cylindrical grinder or the like in which the several operating parts shall be properly protected from action of the abrasive bearing coolant and will, therefore, be of maximum durability and efficiency.

Further objects and advantages of the invention should be readily apparent by reference to the following specifications taken in connection with the accompanying drawings and it will be understood that any modifications 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 machine equipped with this improvement.

Figure 2 is a fragmentary view of the clutch mechanism for stopping the feed.

Figure 3 is a diagrammatic view of the electric controlling circuit.

Figure 4 is an enlarged plan view of the work-controlled sizing device.

Figure 5 is a longitudinal sectional view thereof, taken as on the line 5—5 of Figure 4.

Figure 6 is a section on the line 6—6 of Figure 5, and

Figure 7 is a sectional view on the line 7—7 of Figure 5.

In the drawings, in which similar characters of reference are employed to denote corresponding parts throughout the several views, the numeral 15 designates the bed of a conventional form of cylindrical grinder having the ways 16 for the work table 17. This table 17 includes the headstock 18 and tailstock 19 between which the workpiece 20 is mounted, said workpiece being suitably rotated as by motor 21 on the table.

Mounted on the bed in opposition to the worktable is a shiftable stone carriage 22 bearing suitably driven grinding stone 23. A suitable feed mechanism including a driving member 24 and rotatably driven feed shaft 25 serve to move the carriage and stone in the direction of the work.

Power for driving the member 24 and thus producing the feeding action is suitably supplied as from motor M.

The essential feature of the present invention is the automatic control of dis-connection of the power actuation from the feed. As illustrated member 24 is provided with worm 27 meshable with gear 28 on the feed-shaft 25, said worm being carried in the swinging bracket 29, held in operative position by action of electromagnet 30 on arm 31 of control cam 32 which bears against the resilient abutment 33 on the bracket. This electromagnet is in a branch circuit with the drive motor so that it is automatically ener-

gized when the main starting handle 34 of the machine is thrown to close the current supply circuit. In addition, however, there is provided the shunt circuit including the wires 35—36 and their respective contacts 47—48 carried by the hereinafter described control device. Engagement of these contacts serves to shunt the current flow from the electromagnet whereupon it will release arm 31 and allow cam 32 to move downward so that the clutch-connected mechanism will swing by gravity into dis-engaging position dis-connecting the power feed as indicated in Figure 2.

Referring now specifically to the control mechanism by which the shunt circuit is completed, there is illustrated in Figures 4 and 5 a bracket 49 having a flange portion 50, the parts 49 and 50 of the bracket being of shape to fit the table portion 17 of a conventional cylindrical grinder. Pivotally secured to the portion 50 of the bracket is the L shaped clamp member 51 having a portion 52 adapted to engage the shoulder at the back of the grinding table and having the threaded lug 53 for clamp screw 54. Portion 50 is slotted as at 55 to receive the clamp 51 and in addition receives between the furcations of the slot the pivot ear 56 of the base 57 of the automatic control member. The position of ear 56 is such that as screw 54 is tightened its inner end will bear against the ear and lock member 57 against pivotal movement or swinging relative to the bracket while also operating to force portion 52 of the clamp into tight engagement with the table. This arrangement, therefore, makes it possible to employ a single adjustable screw device for securing the entire mechanism in position on the grinding table and also for controlling the general angular adjustment of base 57 with respect to its supporting bracket.

This base is in the form of a hollow socket provided at one side with a tapped aperture 58 to receive one end of the sleeve 59 which together with the base forms a housing for the contact bearing lever 60. This lever is non-rotatably secured to spindle 61 which is journaled in anti-friction bearings 62 of head 63 mounted on the lower end of the sleeve 59. In addition the spindle has a portion projecting laterally of its bearings and exterior to head 63. This portion bears the feeler finger 64 provided with a contact point 65 adapted to ride on the surface being reduced by the grinding.

To secure the housing and contained lever mechanism just described in proper relation to the work, supplementing the frictional retaining action of screw 54, bracket 49 is preferably provided with the up-standing arcuately slotted flange 68 through which passes clamp bolt 66 provided with nut 67 which may be tightened to lock the parts in position as should be clearly understood by reference to Figures 4 and 5.

It will thus be seen that the member 59 and associate parts may be moved up or down to vary the contact of point 65 with the work and that as the work 20 engages this point the lever 60 will be shifted to separate point 47 and 48. In this manner a coarse adjustment or setting of point 65 is obtained. The purpose of the present device, however, is to complete the electrical shunt circuit by engagement of point 47 and 48 when the work has been reduced the exact desired amount and it is, therefore, necessary to have an extremely fine and accurate adjustment to determine the position of the lever at which the points will engage. It will be understood on account of the relative lengths of members 60 and 64 that there is a pronounced movement of contact 48 and a very slight movement of feeler 65. Opposed to contact 48 is a contact 47 carried by the contact plate 75 loosely supported by post 76 and having one end bearing against the insulation block 77 carried by base 57. By reference to Figure 7 it will be noted that this plate is fulcrumed on the block 77 and urged downwardly about the fulcrum by spring 78 on post 76. A pair of binding nuts 79 on the upper end of the post serve to attach thereto the current lead 36, the current thus flowing from the lead through the post and contact plate to contact 47. Suitable insulation 80 prevents current flowing to base 57. Carried by base 57 is the micrometer adjusting screw 81 for a knurled operating head 82 and the dial portion 83 for co-operation with the pointer or indicator 84. This dial may be suitably graduated as in ten-thousandths of an inch so that a number of graduations will be equivalent as respects contact 48 of a movement of one-tenthousandth of an inch of the feeler 65. This screw is provided with the non-conducting member 85 which engages the under side of plate 75 adjacent contact 47, the rotating movement of the screw serving to raise the contact against pressure of spring 78 or to allow the plate to move downward as influenced by said pressure. It will thus be noted that the general position of the device as an entirety is adjusted as by loosening of members 54 and 67 and that subsequently the exact point of engagement between circuit closing contacts 47 and 48 is determined by the micrometer adjustment of screw 81. The device having once been set for a standard size of finished workpiece new workpieces placed in position will press the feeler down swinging the lever 60 upward and lifting contact 48 which will be held up by the work until it has been ground down to the exact desired size whereupon the shunt circuit will be closed cutting out the infeed of the grinding wheel.

Particular attention is also invited to the

fact that the feeler 65 is disposed to engage the underside of the workpiece. This has a decided advantage inasmuch as the feeler is, therefore, not affected by the pressure of the grinding wheel against the work since this pressure takes place in a plane at right angles to the plane of movement of the feeler. Otherwise, for were these two contact points opposed one to the other, the grinding wheel pressure might cause a central springing or bowing of the work so that the automatic stopping would take effect before the true size had been reached.

I claim:

1. In a mechanism of the character described, the combination with a grinding machine, of a bracket for application thereto, a clamp jaw intermediately pivoted to the bracket and having a portion for engaging the grinding machine and a portion provided with a clamping device, and a work contact support and feed control means pivoted to the bracket in position to be engaged by the clamp member, whereby tightening of the clamping member will serve both to secure the device as an entirety to the machine and also to lock the said support against pivotal movement with respect to the bracket.

2. In a mechanism of the character described, the combination with a grinding machine, of a bracket for application thereto, a clamping jaw intermediately pivoted to the bracket and having a portion for engaging the grinding machine and a portion provided with a clamping device, and a work contact support and feed control means pivoted to the bracket in position to be engaged by the clamping member, whereby tightening of the clamping member will serve both to secure the device as an entirety to the machine and also to lock the support against pivotal movement with respect to the bracket, the bracket being further provided with a lug having an arcuate slot, and clamping means carried by the support and movable in the slot for aiding in securing the device against pivotal movement.

3. A work sizing device for application to a grinding machine table, including a bracket portion for engagement with the table, means for clampingly securing the bracket in position on the table, a dust proof housing carried by the bracket and projecting to underlie a work piece supported by the table, an oscillatable electrical contact mechanism contained within the housing and having a lateral extension exterior to the housing, a contact member carried by the extension and projecting for engagement with the underside of a work piece, and means for shifting the portion of the device underlying the work in a substantially vertical plane for proper engagement of work pieces of different diameters when carried by the table.

SOL EINSTEIN.