

Nov. 27, 1934.

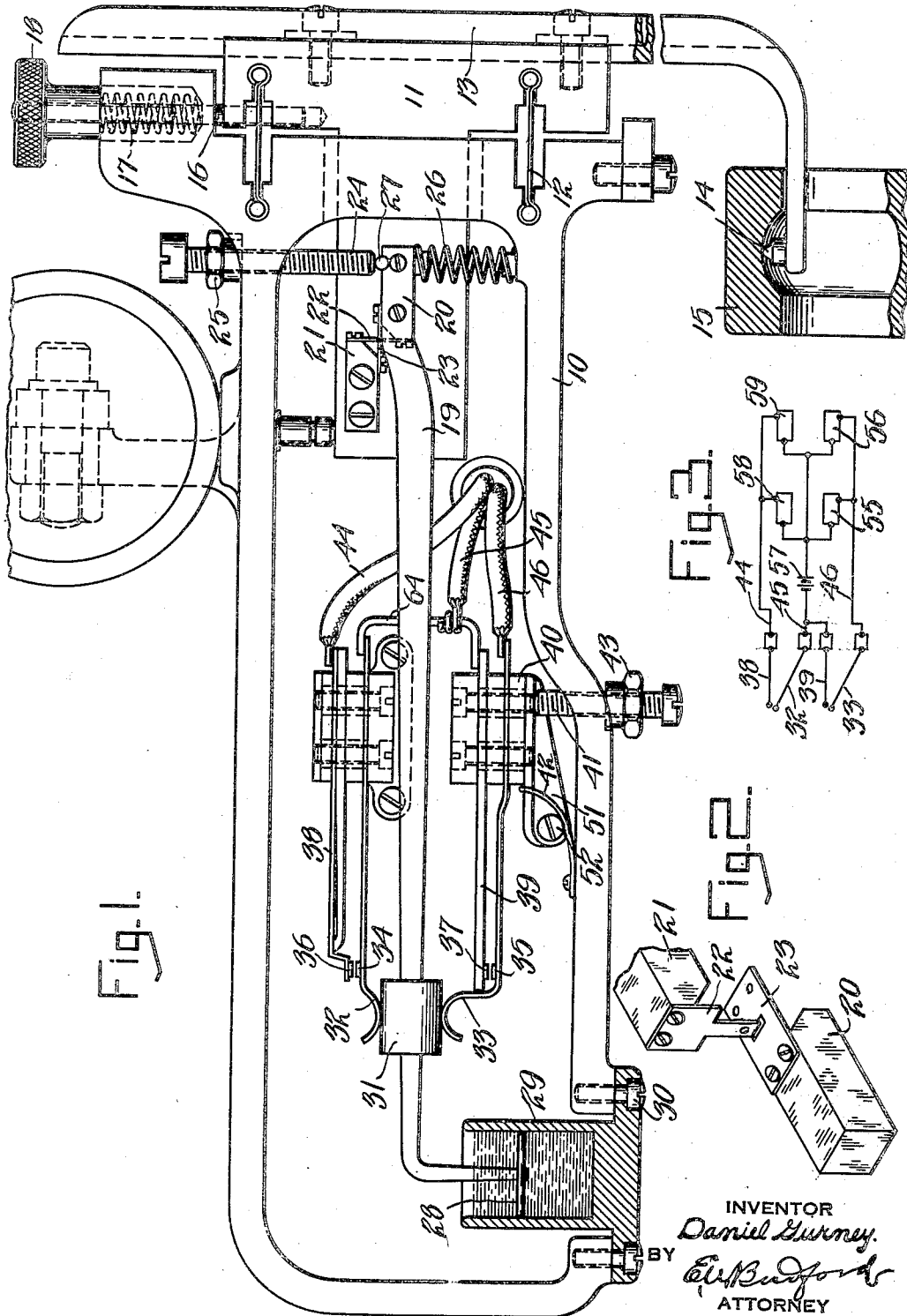
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1,982,161

SIZING DEVICE FOR GRINDING MACHINES

Filed Nov. 30, 1931

2 Sheets-Sheet 1



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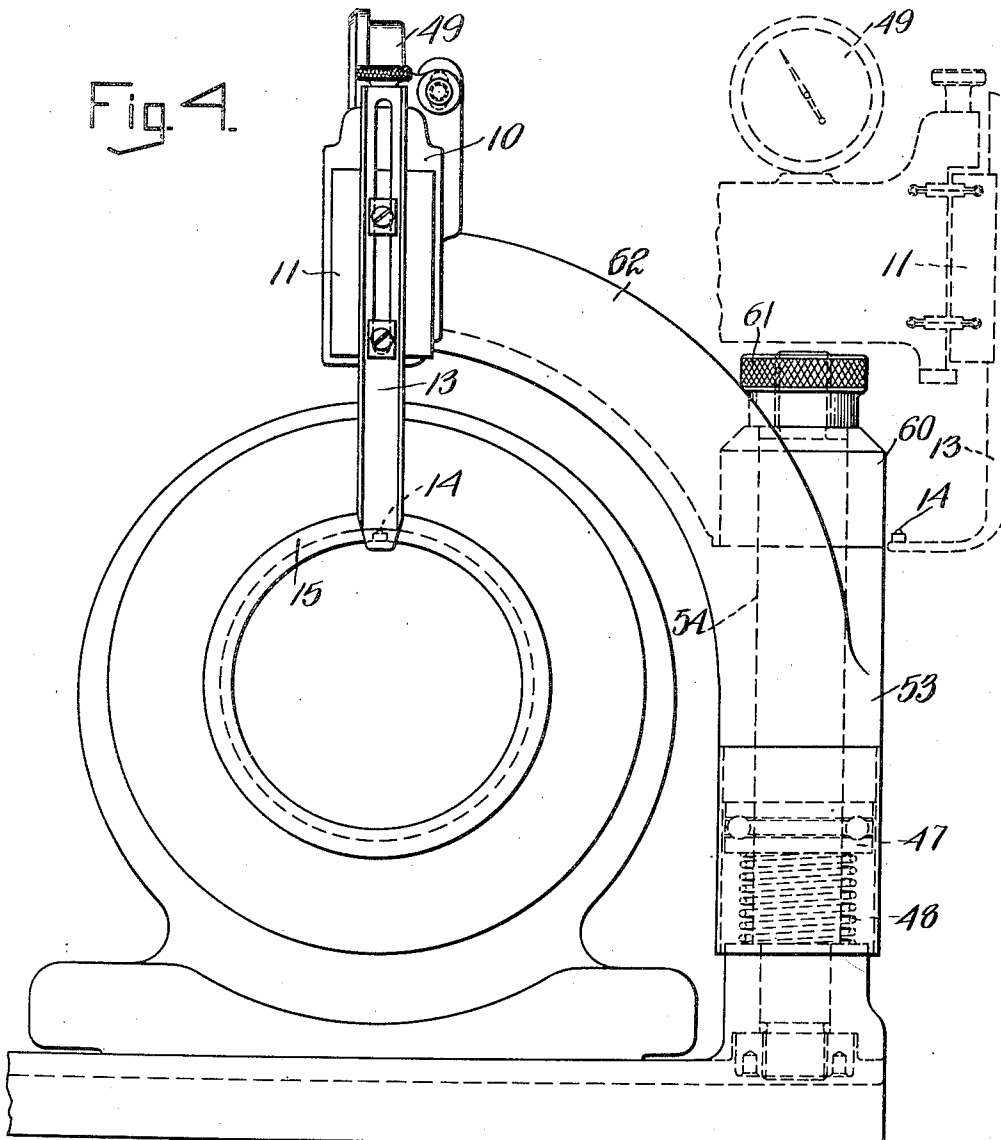
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Fig. 4.



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1,982,161

SIZING DEVICE FOR GRINDING MACHINES

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Application November 30, 1931, Serial No. 578,101

6 Claims. (Cl. 51-165)

This invention relates to sizing devices for grinding machines and particularly for internal grinding machines.

An object of the invention is to provide a device of this kind which will be sensitive and hence highly accurate in sizing the work in abrading or similar operations.

A further object is to provide a sizing device having electrical control or other control means for operating certain mechanism on the grinding machine when the work has been reduced substantially to finished size and to operate further mechanism when the work has been ground to finished size and polished.

A further object is to provide a sizing device having means for adjusting the amount of stock left on the work to be removed during finishing grinding.

A further object is to provide a sensitive sizing device, having a mechanical electrical multiplying system, which is relatively unaffected by dirt, water, or rough handling.

A still further object is to provide a sizing device so mounted on the machine with which it is to be used as to be easily swung out of operative position.

Further objects and advantages will become more apparent as the description proceeds.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a view in side elevation of the sizing device,

Figure 2, a detail of a connection between a contacting arm on the device and the support to which it is attached,

Figure 3, a diagrammatic view of the control circuits and operating motors or solenoids controlled thereby, and

Figure 4, an end view looking from the right in Figure 1.

In the drawings numeral 10 indicates a frame or supporting means which may be attached in any suitable way to an arm 62 swingably mounted on the grinding machine. A block 11 is attached to the frame by means of four resilient bars or straps 12 and to the block 11 is attached an arm 13 which is bent at its lower end and carries a hard contact element 14 which is adapted to engage the interior of the work 15. The block 11 at its upper end has a pin 16 secured in it on the upper end of which pin is a knurled knob 18. A spring 17 is seated within an opening in a portion of the frame 10 and bears against the inner end of the knob 18 and tends to hold the block 11 in

its uppermost position. In order to swing the feeler arm out of engagement with the work the operator presses down on the knob 18 against the tension of a spring 17.

The block 11 has a projection extending into the frame 10 and to this projection is attached a magnifying lever 19. The means for attaching the lever 19 to the block 11 consists of blocks 20 and 21. The block 21 is secured to the side of the block 11 and the lever 19 is secured to block 20. Blocks 20 and 21 are secured together by means of resilient straps 22 and 23. The rear end of the block 20 is engaged by a screw 24 which is secured in the frame 10 and locked in position by a nut 25. A spring 26 engages the end of the block 20 in opposition to the screw 24. A bearing pin 27 is secured on the block 20 to provide hard engaging surface with the end of the screw 24. The free end of the lever 19 carries a disk 28 which is positioned in a liquid filled cup 29 which is secured to the frame 10 by screw 30. This arrangement provides means for dampening rapid vibrations of the lever. The lever 19 also carries a drum or spool 31 of bakelite or other insulating material, the surface of which is always in contact with the bent ends of resilient fingers 32 and 33. Finger 32 carries a contact point 34 and finger 33 a contact point 35 which points are positioned adjacent and engageable with contact points 36 and 37 on arms 38 and 39 respectively. The finger 33 and arm 39 are secured to block 40 mounted on an arm 51 pivoted at 52 and urged in a clockwise direction by a spring 42. The block 40 is engageable by a screw 41 by means of which it may be adjusted vertically and locked by means of a nut 43. Bar 38, finger 32, bar 39 and finger 33 are connected respectively by means of wires 44, 45, and 46. The wire 45 connects to finger 32 and bar 39 through a resilient strap or bar 64, the resiliency of which permits the necessary adjustment of block 40. The arm 62 is attached to or made integral with sleeve 53, which is rotatably carried on a post 54 and urged upward by spring 48, through a thrust bearing 47. This sleeve 53 is positioned vertically by the lower face of a sleeve 60, which is adjustable on the post through a knurled nut 61. By means of this construction, the device may be swung around to the dotted line position shown in Fig. 4 and may be adjusted vertically by means of nut 61 to change the finished size of the piece being ground.

In Figure 3 is shown diagrammatically the operation of the device and particularly the circuits and the means operated by the circuits as shown. In operation when the work has been reduced

approximately to its finished size contact element 14 being in engagement with the surface of the work being ground may move upward allowing the lever 19 to swing clockwise. The first result of this upward movement will be to bring contacts 35 and 37 together. This will close circuit from battery 57 through wires 46 and 45 and motors or solenoids 55 and 56. These solenoids may control operation of certain mechanism on the grinding machine such as means for stopping feeding of the grinding wheel toward the work and slowing down oscillation or rotation of the work. When the work has been reduced to finished size contacts 34 and 36 will be brought together to close circuit from battery 57 through wires 44 and 45 and energize solenoids 58 and 59. These solenoids may control means for stopping further grinding operation and withdraw the grinding wheel from the work or perform any other operations which are necessary at the conclusion of grinding a piece of work. By means of screw 41 the timing between closing of contacts 35 and 37 and contacts 34 and 36 may be regulated so as to leave a predetermined amount of stock on the work to be removed during finished grinding.

A gauge 49 having a dial to indicate the size of the work may be mounted on the frame in any suitable way.

Mechanical and electrical elements are mounted independently so that there are no electrical connections on the multiplying arm 19 or other moving parts. The arm is mounted in such a way with respect to the contacts that a continuous movement of said arm in one direction causes first one circuit to be closed, then after a short interval, which may be varied by the operator, the other circuit is completed.

It is essential that my device be dust and dirt proof either by enclosing all working parts or by making use of a type of construction which would not be affected by dust or dirt. Such a construction is provided in spring supports 12 and spring hinges 22 and 23; also, there is no wear in these parts which would affect the accuracy of the device. The electrical elements are sufficiently enclosed to guard against dust and dirt.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the invention and therefore I do not limit myself to what is shown in the drawings and described in the specification, but only as indicated by the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a grinding machine, a sizing device comprising work engaging means, a multiplying lever operable by said work engaging means, a pair of contacts biased to closed position but normally

held open by said lever, said contacts being in circuit with means for controlling operation of some mechanisms on the machine, a second pair of contacts normally biased to open position and in circuit with electrically operated mechanism on the machine, movement of said lever in response to reduction in work causing said first contacts to close, and further movement closing said second contacts.

2. In a machine tool, a work sizing device comprising work engaging means, a multiplying lever operated by said work engaging means, a pair of contacts biased toward closed position during operation of the machine tool on which the sizing device is mounted, a pair of normally open contacts, electric circuits controlled by said contacts, means operated by said lever when in normal position for holding said first named contacts in open position, and means responsive to movement of said lever for closing said normally opened circuit.

3. A sizing device comprising work engaging means, a support for said means, a multiplying lever pivotally mounted on the said support, a pair of electrical contacts, one of which is biased to closed position and the other of which is biased to open position, and means operable to permit one of said contacts to move to closed position and to force the other contact to closed position when the work engaging means has moved to a position representing a predetermined size of the work.

4. A sizing device comprising work engaging means, a support for the work engaging means, a multiplying lever resiliently mounted on said support, movement of the work engaging means in one direction being multiplied by said lever, but having no effect on said multiplying lever when moved in the other direction.

5. A sizing device comprising work engaging means, a support for the work engaging means, a lever mounted on said support, electrical contacts mounted independently of said lever but adapted to be actuated thereby, means whereby movement of the work engaging means in one direction is multiplied to actuate said contacts, and means to render said multiplying means inoperative when said work engaging means moves in the opposite direction.

6. A sizing device comprising work engaging means, a support for the work engaging means, a multiplying lever pivotally mounted on said support, a plurality of electric contacts adapted to be made and broken by said multiplying lever, pivoting of said multiplying lever being permitted only in one direction of movement of the said work engaging means.

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