No. 810,426. PATENTED JAN. 23, 1906.

R. L. MORGAN & J. N. HEALD.

# GRINDING MACHINE.

APPLICATION FILED MAY 14, 1904.

2 SHEETS—SHEET 1.

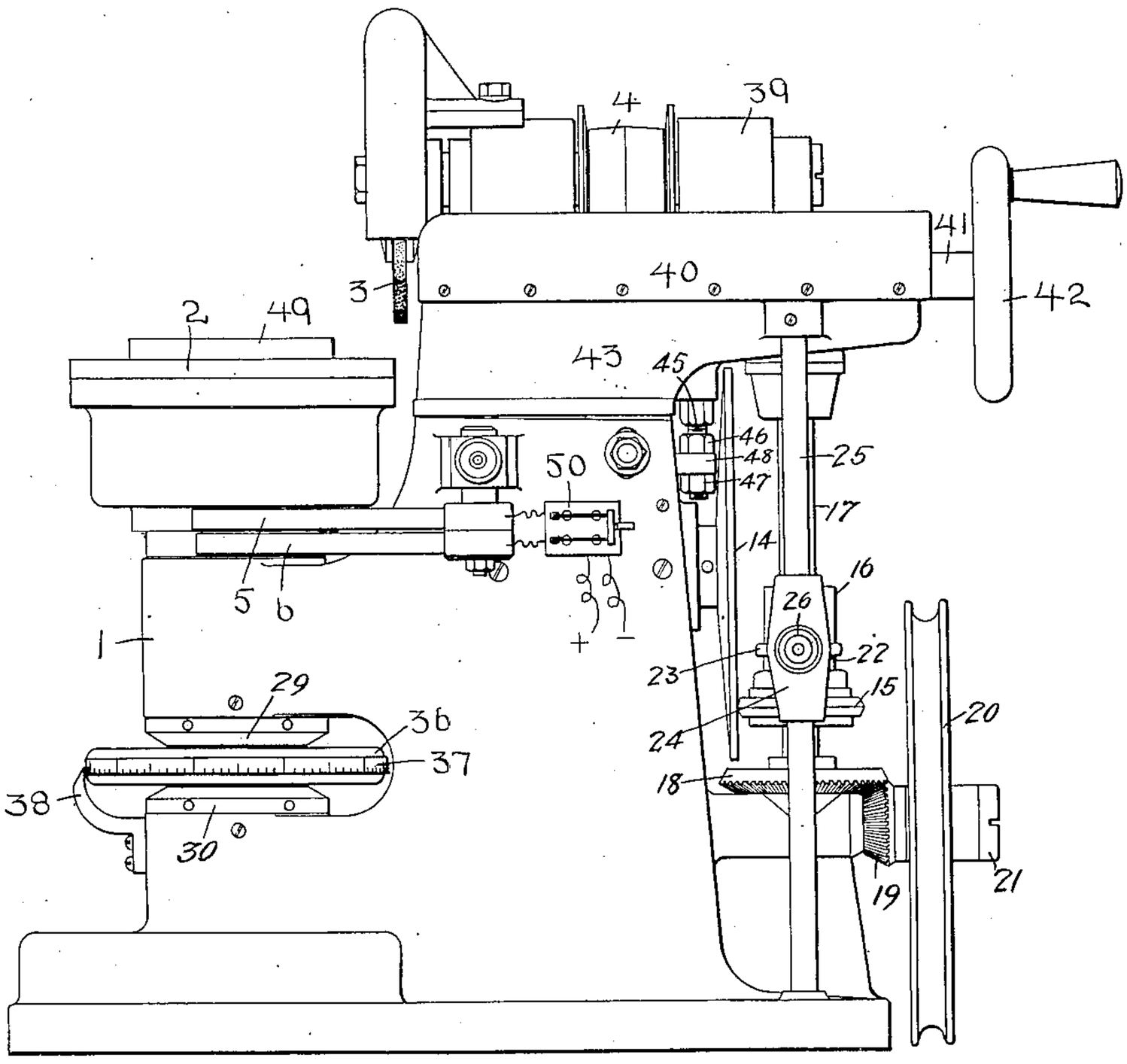


Fig 1

Witnesses
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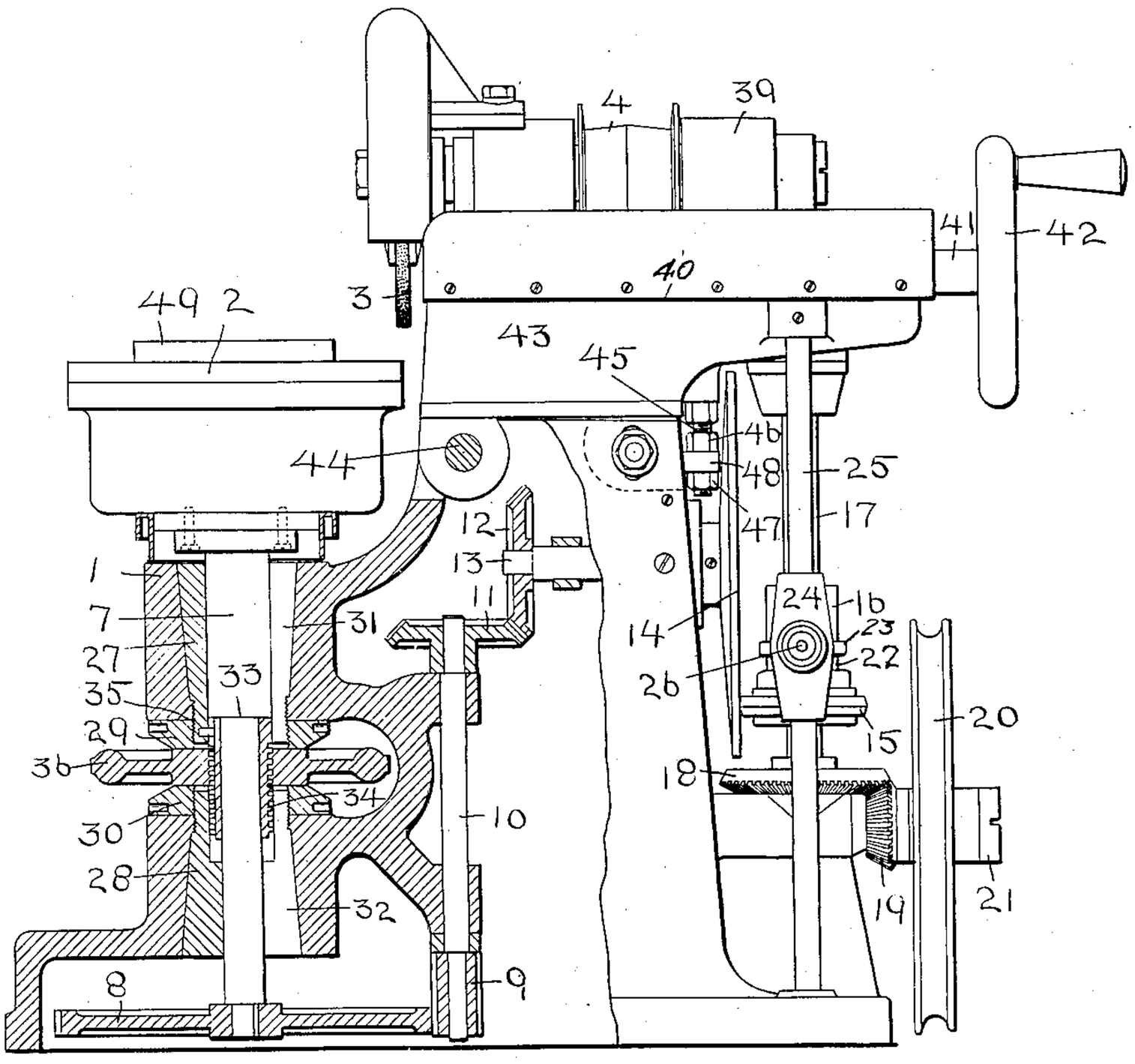


Fig 2

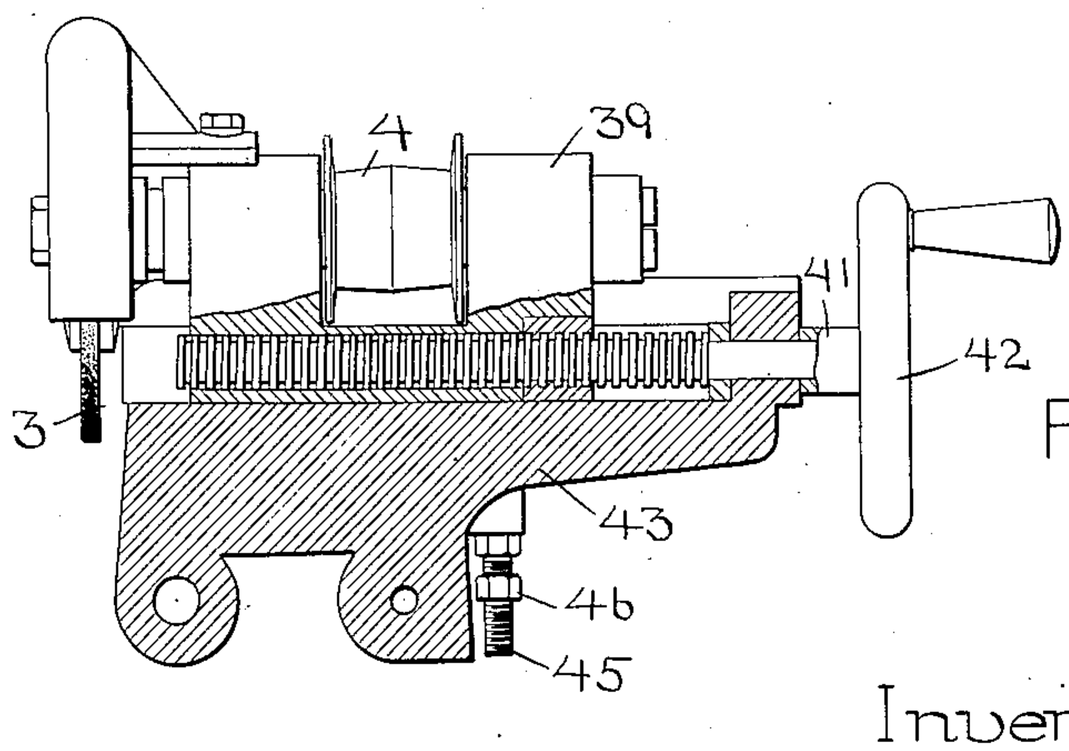


Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## GRINDING-MACHINE.

No. 810,426. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed May 14, 1904. Serial No. 208,007.

*To all whom it may concern:*

Be it known that we, RALPH L. MORGAN and JAMES N. HEALD, citizens of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Grinding-Machines, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a side elevation of a grinding-machine embodying our invention. Fig. 2 is a side elevation of the same with a portion of the frame broken away and with a part of the mechanism shown in sectional view; and Fig. 3 is a detached view of the sliding head which carries the abrading-wheel, a portion being shown in section.

Similar reference-figures refer to similar parts in the different views.

Our invention relates to a machine for surface grinding, and is specially adapted for grinding the sides of piston packing-rings and similar class of work in which it is desirable that both sides of the ground work shall be absolutely parallel; and our invention consists in the construction and arrangement of parts, as hereinafter described, and set forth in the annexed claims.

Referring to the drawings, 1 denotes a stand or frame upon which the operative parts of the mechanism are supported. 2 is a table upon which the work is supported, and 3 is a revolving abrading-wheel held upon a horizontal shaft and driven from any convenient counter-shaft by means of a belt-pulley 4.

The table 2 preferably consists of a magnetic chuck, such as is now in common use for holding work thereon by magnetic attraction, said chuck being energized by blades or brushes 5 6, suitably connected with a dynamo or other source of electricity. As the construction and operation of so-called "magnetic chucks" is well understood by those conversant with this class of machinery, we have not considered it necessary to illustrate or describe its construction in detail.

The work-holding bed 2 is mounted upon the upper end of a rotating shaft 7, which carries at the lower end a spur-gear 8 in mesh with a long-toothed pinion 9 on the lower end of a vertical shaft 10, which is driven by the miter-gears 11 and 12 from a horizontal shaft 13, to one end of which is attached a disk 14 in contact with a friction driving-wheel 15, carried by a sliding collar 16, having a spline connection with a vertical shaft 17, operatively connected by bevel-gears 18 and 19 with a belt-pulley 20, journaled upon a stud 21 and driven by a belt connection from any convenient counter-shaft. The collar 16 is provided with a groove 22, which is engaged by an arm 23 on a collar 24, capable of sliding on the vertical rod 25 and being held in any desired vertical position by a set-screw 26. By the mechanism just described a slow rotary movement is imparted to the work-holding bed 2 from the pulley 20, and the speed of the work-holding bed is varied by vertically adjusting the friction driving-wheel 15 on the shaft 17.

The vertical shaft 7 on which the work-holding bed 2 is supported is journaled at its upper and lower ends in two sleeves 27 28, which are provided with tapering outside surfaces and are held in oppositely-tapered bearings in the frame 1 of the machine. The lower end of the sleeve 27 and the upper end of the sleeve 28 are screw-threaded and carry nuts 29 and 30, bearing against the frame of the machine, and provided with spanner-holes or other means to effect their rotation to enable the conical sleeves to be driven into their conical bearings. The sleeves 27 and 28 are cut apart at 31 32, so that the longitudinal movement of the sleeves as they are driven into their bearings by the nuts 29 and 30 will compress the sleeves against the shaft 7 and take up the wear in the journal-bearing of the shaft. The lower end of the shaft 7 is reduced in diameter, forming a shoulder 33 and inclosing the reduced portion of the shaft, and bearing against the shoulder 33 is a screw-threaded sleeve 34, having a spline connection 35 with the upper conical sleeve 27 and being contained in the recessed ends of the sleeves 27 and 28 and capable of a longitudinal movement therein as actuated by an adjusting-nut 36, which is held from longitudinal movement between the nuts 29 and 30. The periphery of the nut 36 is graduated, as shown at 37, Fig. 1, to enable the rotary movement of the nut to be determined by an index-finger 38, attached to the frame of the machine. By the rotation of the nut 36

the screw-threaded sleeve 34 may be crowded against the shoulder 33 to elevate the work-holding bed 2 and raise the work toward the abrading-wheel 3. The abrading-wheel 3 is journaled in a head 39 capable of a sliding movement along ways 40 as actuated by an adjusting-screw 41, provided with a hand-wheel 42. The ways 40 are supported on a block 43, pivoted at one end upon a stud 44 to the frame 1 of the machine and capable of being tilted on its pivotal stud 44 by means of an adjusting-screw 45 and check-nuts 46 and 47 on opposite sides of a bracket 48, projecting from the side of the frame 1.

The adjusting device comprises the screw 45 and nuts 46 and 47, enabling the block 43 to be tilted on the stud 44 to bring the ways 40, along which the head 39 moves, parallel with the face of the work-holding bed 2.

The operation of our improved grinding-machine is as follows: The work 49 to be ground is laid upon the work-holding bed 2, which forms part of an electrical magnet which may be energized through the brushes 5 and 6 by means of a switch 50, causing the work to be firmly held against the surface of the bed 2. A slow rotary movement is imparted to the bed 2 by the belt-pulley 20 and intermediate mechanism to rotate the work 49, and the abrading-wheel rapidly driven by the belt-pulley 4 is traversed across the surface of the work by means of the screw 41 and hand-wheel 42, the block 43 having been adjusted by the nuts 46 and 47 to bring the path of the revolving abrading-wheel 3 parallel with the surface of the work-holding bed 2. The work-holding bed 2 is vertically adjusted by the nut 36 and screw-threaded sleeve 34 to bring the upper surface of the work 49 into contact with the surface of the abrading-wheel 3, and as the work is worn away by the action of the wheel the work-holding bed 2 is raised until the upper surface of the work is finished. The switch 50 is then thrown out and the work 49 turned over to enable its opposite side to be similarly ground, thereby bringing the opposite sides of the work exactly parallel.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a grinding-machine, the combination with a supporting-frame, of a revolving spindle journaled in said frame, a grinding-wheel carried by said spindle, means for traversing said wheel in a line coincident with its axis of rotation, a rotating spindle journaled in said frame, a work-holding bed supported on the end of said rotating spindle, and means for adjusting the plane of the axis of said grinding-wheel spindle relatively to the plane of the axis of said work-supporting spindle.

2. In a grinding-machine, the combination with a revolving grinding-wheel, of a spindle journaled in bearings at right angles to the axis of said grinding-wheel, means for rotating said spindle, a screw-threaded sleeve inclosing said spindle, a rotating hub engaging said sleeve and held from longitudinal movement, whereby said spindle is moved in a line coincident with its axis.

3. In a grinding-machine, the combination with a revolving grinding-wheel, of a spindle journaled at an angle to the axis of said grinding-wheel, a work-holding bed mounted on the upper end of said spindle, a gear attached to the lower end of said spindle, a pinion having teeth longer than the teeth of said gear, and intermediate mechanism between the driving power and said pinion.

Dated this 6th day of April, 1904.

RALPH L. MORGAN.
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Witnesses:
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