T. LUMSDEN.

POWER DRIVEN TOOL GRINDING MACHINE.

APPLICATION FILED APR. 8, 1915.

1,187,753.

Patented June 20, 1916.

2 SHEETS—SHEET 1.

FIG. 3.

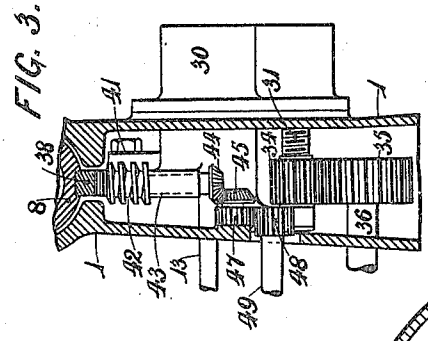


FIG. 1.

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2 SHEETS—SHEET 2.

FIG. 4.

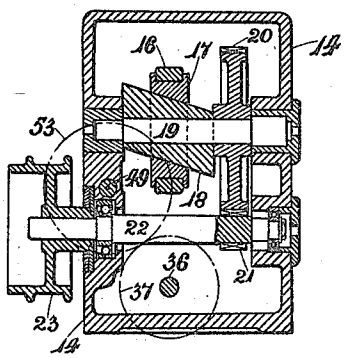


FIG. 5.

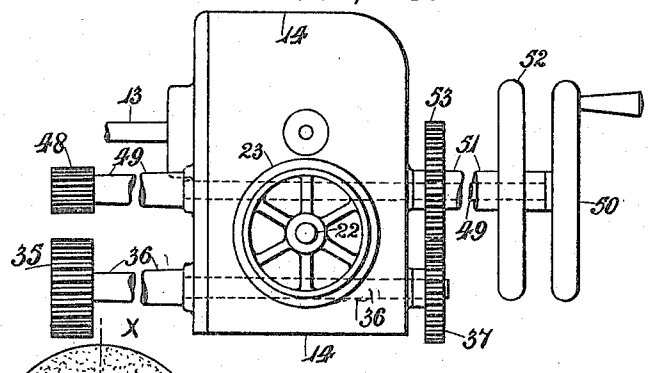
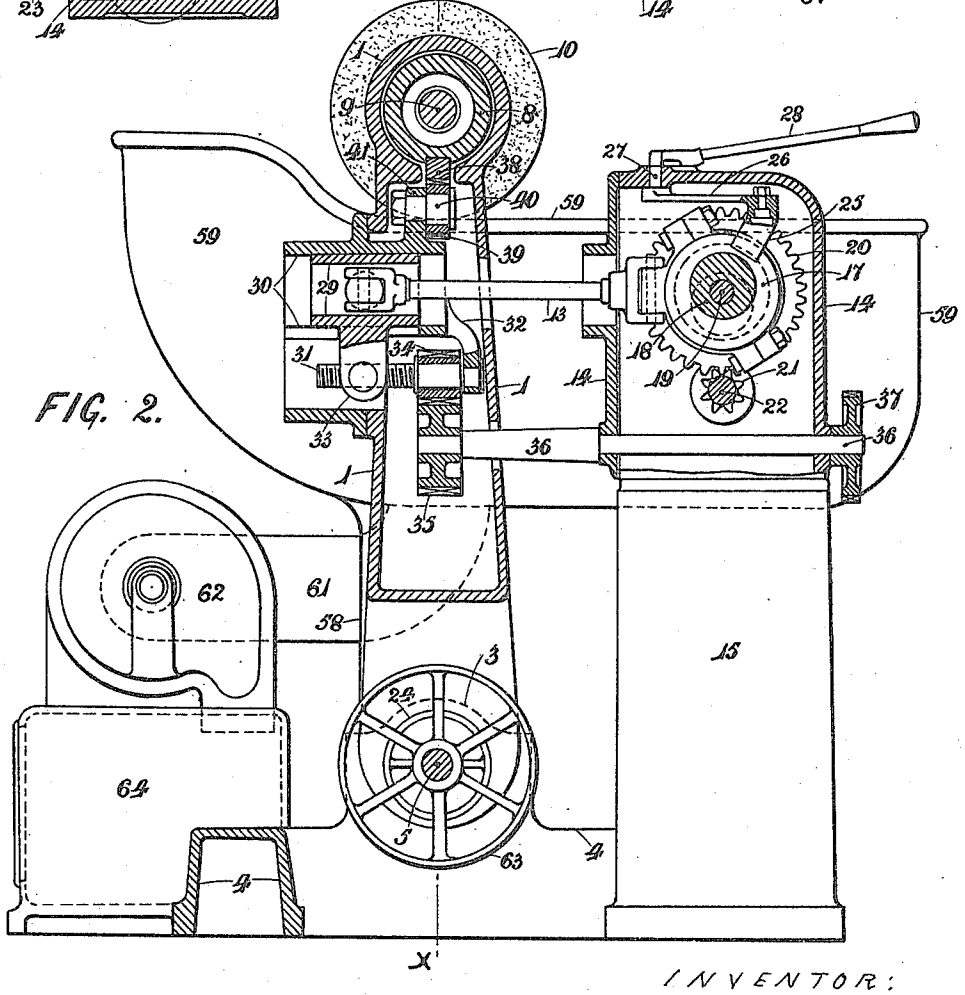


FIG. 2.



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POWER-DRIVEN TOOL-GRINDING MACHINE.

1,187,753. Specification of Letters Patent. Patented June 20, 1916.

Application filed April 8, 1915. Serial No. 19,883.

To all whom it may concern:

Be it known that I, THOMAS LUMSDEN, a subject of the King of Great Britain and Ireland, residing at Gateshead, in the county of Durham, England, have invented new and useful Improvements in Power-Driven Tool-Grinding Machines, of which the following is a specification.

This invention relates to power-driven tool grinding machines of the kind wherein the grinding wheel is carried by a revoluble shaft supported by bearings carried by a frame mounted on and adapted to be oscillated about a driving shaft mounted in bearings on the bed-plate of the machine. In machines of this kind the tool-holder has been angularly adjustable in a carrier angularly adjustable on a turntable mounted on a compound slide so that it can be adjusted in two directions at right angles in a horizontal plane to move the tool to be ground toward or away from or transversely across the grinding wheel. The grinding wheel rotates on its axis and oscillates about the driving shaft which forms the pivot of the frame whereby the shaft of the grinding wheel is carried.

The present invention provides means for adjusting the shaft on which the grinding wheel is mounted in an axial direction relatively to the oscillating frame while the machine is in motion, said means being controlled from a fixed point of the machine, thereby dispensing with the compound slides above referred to and permitting a hollow turntable to be employed with which an exhausting device can be readily connected to remove the dust during dry grinding.

I will fully describe my invention with reference to the accompanying drawings which illustrate one construction of tool-grinding machine embodying my improvements.

In the drawings Figure 1 is a section on the line X—X in Fig. 2, looking to the right; Fig. 2 is a section on the line Y—Y in Fig. 1, looking to the left; Fig. 3 is a part section on the line Z—Z in Fig. 1, looking to the right; Fig. 4 is a section at right angles to Fig. 2 of the gear box hereinafter described; and Fig. 5 is an elevation of same at right angles to Fig. 4.

Referring to the drawings, in the machine therein illustrated an oscillatory frame 1 having hollow trunnions 2, 2 is supported by bearings 3, 3 provided on the bed-plate 4. Carried by the trunnions 2, 2 is a driving shaft 5 having a driving pulley 6 and a loose pulley 7. In bearings at the upper end of the frame 1 is mounted a cylindrical ram 8 which carries a shaft 9 provided at one end with a cup-shaped grinding wheel 10 and at the other end with a pulley 11 whereby said shaft and wheel are driven by a belt from a pulley 12 on the driving shaft 5. The frame 1 is oscillated by a connecting rod 13 which is reciprocated by an eccentric, crank or other convenient means. I prefer to employ for reciprocating the connecting rod 13 variable crank mechanism of the kind illustrated in Figs. 2 and 4 of the drawings herewith. In this mechanism, which is mounted in a gear box 14 carried by a pedestal 15 (Fig. 2), one end of the connecting rod 13 is pivoted to the strap 16 of an eccentric sheave 17 which is mounted on an oblique bush 18 on a shaft 19 provided with a toothed wheel 20 which gears with a pinion 21 on a second shaft 22 provided with a pulley 23 driven by a belt from a pulley 24 on the driving shaft 5. The sheave 17 is adapted to be slidden axially on the oblique bush 18 by means of a claw 25 (Fig. 2) carried by a lever 26 on a spindle 27 which can be turned by a hand-lever 28, so that, by varying the position of said sheave upon the oblique bush 18, the stroke of the connecting rod 13 can be varied. The other end of the connecting rod 13 is pivoted within a piston 29 which can be slidden axially in a cylinder 30 mounted on the frame 1 so that the point of attachment of the connecting rod 13 to the frame 1 can be varied relatively to the center line of the frame to vary the mid-position about which the frame oscillates. The piston 29 is slidden in the cylinder 30 by means of a screw 31 carried by a bracket 32 formed on the cylinder 30 engaging with a nut carried by a lug 33 on the piston 29. The screw 31 is provided with a pinion 34 which engages a toothed wheel 35 on one end of a shaft 36 carried by and passing across the bottom of the gear box 14 and provided with a second toothed wheel 37 at its other end. There is sufficient play between the teeth of the pinion 34 and the toothed wheel 35 to allow of the former sliding in the latter as the frame 1 is oscillated to and fro, the teeth of both wheels being rounded off at the ends or slightly curved to per-

mit of the relative movement while still remaining in engagement.

The ram 8 wherein the shaft 9 of the grinding wheel 10 is mounted, is provided with a rack 38 with which engages a pinion 39 mounted on a spindle 40 carried by a lug 41 on the cylinder 30. The pinion 39 is engaged by a worm 42 (Figs. 1 and 3) on one end of a spindle 43 also supported from the cylinder 30. The other end of the spindle 43 is provided with a bevel wheel 44 gearing with a complementary wheel 45 on a shaft 46 provided with a toothed wheel 47 (Fig. 3) gearing with a pinion 48 (Figs. 1, 3 and 5) on a shaft 49 carried by and passing through the gear box 14 and provided at its outer end with a hand-wheel 50 (Fig. 5). There is sufficient play between the teeth of the wheel 47 and those of the pinion 48 to permit of the former sliding in the latter as the frame 1 oscillates to and fro, the teeth of both wheels being rounded off at the ends or slightly curved to permit of the relative movement while still remaining in engagement. On the shaft 49 is a loose sleeve 51 provided with a hand-wheel 52 and a toothed wheel 53 which gears with the toothed wheel 37 on the shaft 36.

The tool-box 54 (Fig. 1) for receiving the tool to be ground is provided with trunnions 55 supported by brackets 56 on a hollow turntable 57 carried by a pedestal 58 which also carries the usual trough 59. The turntable 57 is provided with a central funnel 60 which opens at its lower end into a pipe 61 which is connected to the inlet of a centrifugal fan 62 (Fig. 2) driven by a belt passing around a pulley 63 on the driving shaft 5. In this way the dust resulting from dry grinding of the tools will be sucked down the funnel 60 by the fan 62 and delivered into a dust box 64. 65 (Fig. 1) is a plug adapted to be inserted in the mouth of the funnel 60 when the machine is used for wet grinding.

It will now be seen that, on rotation of the driving shaft 5, the shaft 9 and grinding wheel 10 will be rotated by the belt passing over the pulleys 12 and 11, and the shaft 19 in the tool box 14 will be rotated by the belt passing over the pulleys 24 and 23, through the shaft 22, pinion 21 and toothed wheel 20, to cause the connecting rod 13 through the variable crank mechanism to oscillate the frame 1 and thus carry the grinding wheel 10 to and fro across the tool to be ground which is carried by the tool box 54. During oscillation the grinding wheel 10 can be moved toward or away from the tool by means of the handwheel 50 through its shaft 49, pinion 48, toothed wheel 47, shaft 46, bevel gearing 45, 44, spindle 43, worm 42, pinion 39 and rack 38. The position of the point of attachment of the connecting rod 13 can be moved relatively to the center line of the frame 1 by sliding the piston 29 in the cylinder 30 by means of the handwheel 52 on the sleeve 51 through the toothed wheels 53 and 37, shaft 36, toothed wheel 35, pinion 34, and screw 31, and thus the mid-position about which the frame 1 and grinding wheel 10 oscillate can be moved transversely across the tool, this motion being equivalent to the transverse motion of the tool across the grinding wheel obtained by a transverse slide. Moreover the stroke of the connecting rod 13 can be varied by sliding the eccentric sheave 17 upon the oblique bush 18 by means of the hand-lever 28, lever 26 and claw 25. The tool-box 54 can be swung around upon the turntable 57 as usual to vary the angle at which the tool is presented to the grinding wheel 10.

What I claim and desire to secure by Letters Patent is:—

1. A power-driven tool grinding machine comprising a bed plate, a main shaft mounted on said bed plate, a frame mounted on said shaft and adapted to be oscillated thereabout, means for oscillating said frame, a shaft in said frame, a grinding wheel on said shaft, means for driving said shaft from the main shaft, and means for adjusting the shaft on which the grinding wheel is mounted in an axial direction relatively to the oscillating frame, said means being controlled from a fixed point of the machine and said means being capable of being operated while the machine is in motion.

2. A power-driven tool grinding machine comprising a bed plate, a main shaft mounted on said bed plate, a frame mounted on said shaft and adapted to be oscillated thereabout, means for oscillating said frame, a shaft in said frame, a grinding wheel on said shaft, means for driving said shaft from the main shaft, means for adjusting the shaft on which the grinding wheel is mounted in an axial direction relatively to the oscillating frame, and means for adjusting in a transverse direction relatively to the tool the mid-position about which the frame and grinding wheel oscillate.

3. A power-driven tool grinding machine comprising a bed plate, a main shaft mounted on said bed plate, a frame mounted on said shaft and adapted to be oscillated thereabout, means for oscillating said frame, a ram in said frame, a shaft mounted in said ram, a grinding wheel on said shaft, means for driving said shaft from the main shaft, means for adjusting the shaft on which the grinding wheel is mounted in an axial direction relatively to the oscillating frame, said means comprising a rack on said ram, a pinion on said column and means for operating said pinion from a fixed point of the machine while the machine is in motion.

4. A power-driven tool grinding machine

comprising a bed plate, a main shaft mounted on said bed plate, a frame mounted on said shaft and adapted to be oscillated thereabout, a connecting rod attached to the oscillating frame, means for adjusting the point of attachment of said connecting rod to the frame, means to operate said connecting rod, a shaft in said frame, a grinding wheel on said shaft, means for driving said shaft from the main shaft, and means for adjusting the shaft on which the grinding wheel is mounted in an axial direction relatively to the oscillating frame, said means being controlled from a fixed point of the machine and said means being capable of being operated while the machine is in motion.

5. A power-driven tool grinding machine comprising a bed plate, a main shaft mounted on said bed plate, a frame mounted on said shaft and adapted to be oscillated thereabout, means for oscillating said frame, a shaft in said frame, a grinding wheel on said shaft, means for driving said shaft from the main shaft, means for adjusting the shaft on which the grinding wheel is mounted in an axial direction relatively to the oscillating frame, said means being controlled from a fixed point of the machine and said means being capable of being operated while the machine is in motion, a hollow turntable, a tool-box mounted on said turntable, and means for exhausting the dust from the grinding wheel and tool through said hollow turntable.

6. Means for fixedly holding an object to be ground, means for rotating, and oscillating a grinding wheel, and further means for oscillating said grinding wheel.

7. Means for fixedly holding an object to be ground, means for rotating, and oscillating a grinding wheel, and further means for oscillating said grinding wheel from a fixed point.

8. Means for fixedly holding an object to be ground, a grinding wheel, a frame for said wheel, means for rotating the grinding wheel, means for oscillating said frame and grinding wheel, means for varying the amount of said oscillation, and means for varying the mid-position about which the said wheel oscillates.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS LUMSDEN.

Witnesses:
HERBERT HOWARD,
HENRY A. HUNTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."