Sept. 25, 1951 R. H. DAVIS 2,569,291

MACHINE FOR GRINDING AND POLISHING BLOCKS OF STONE

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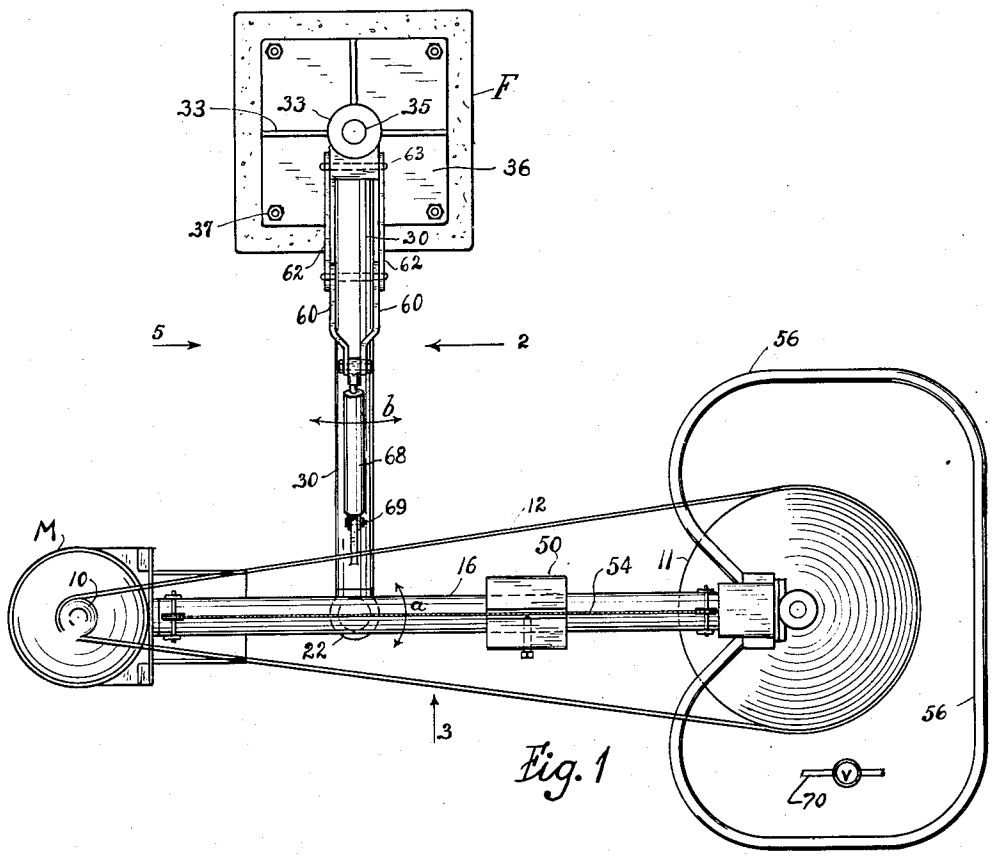


Fig. 1

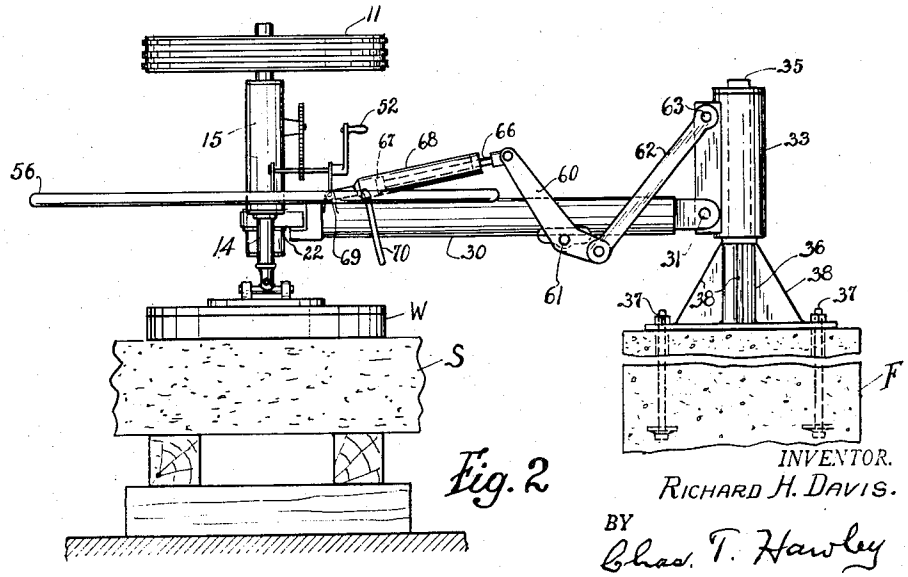


Fig. 2

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Fig. 3

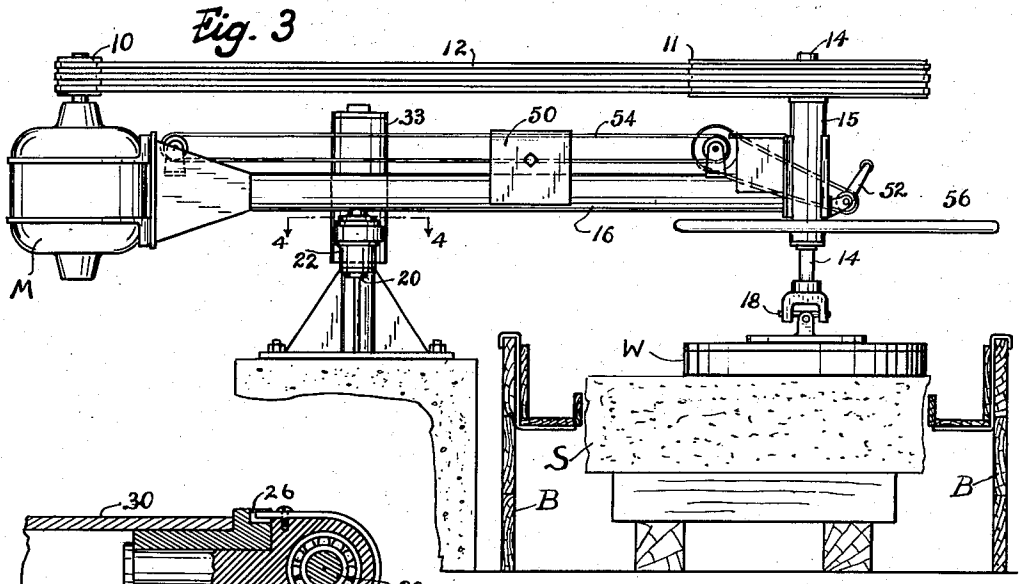


Fig. 4

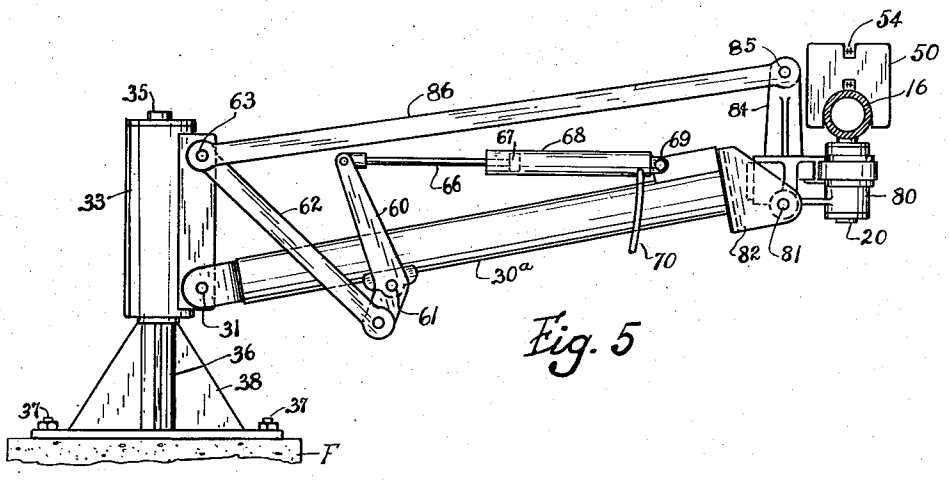


Fig. 5

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MACHINE FOR GRINDING AND POLISHING BLOCKS OF STONE

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2 Claims. (Cl. 51—126)

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This invention relates to machines for grinding and polishing blocks of stone as commonly used for architectural or memorial purposes. In such machines, a grinding and polishing wheel is rotated about a vertical axis as it rests freely upon the surface to be finished, and an abrasive or polishing material is fed between the wheel and the work during the finishing operation. The wheel must be so mounted that it can be moved about freely over the surface to be finished.

It is the general object of my present invention to improve the construction of such machines as heretofore known, to the intent that more convenient and satisfactory operation may be attained.

To the accomplishment of this general object, I provide improved means for raising and lowering the wheel and motor assembly relative to the work, together with an improved construction by which the downward pressure of the wheel on the work may be conveniently varied to meet operating conditions.

I also provide improved means for maintaining the wheel parallel to the work surface over a substantial range in elevation.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a plan view of my improved grinding and polishing machine;

Fig. 2 is a front elevation thereof, looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is a side elevation, looking in the direction of the arrow 3 in Fig. 1;

Fig. 4 is a detail sectional plan view, taken along the line 4—4 in Fig. 3; and

Fig. 5 is a rear elevation, looking in the direction of the arrow 5 in Fig. 1 but showing a modified construction.

Referring to Figs. 1 to 4, I have shown my improved machine in association with a block of stone S supported on any suitable foundation in a bin B.

The grinding and polishing wheel W rests upon the horizontal upper surface of the block of stone S and is continuously rotated by a motor M through pulleys 10 and 11 and a multiple belt 12. The pulley 11 is mounted at the upper end of an upright shaft 14, rotatable in a bearing 15 which is secured to one end of a heavy tubular member 16. The motor M is rigidly mounted at the opposite end of the member 16.

The wheel W is connected to the upright shaft 14 through a swivel device 18 which permits the wheel to adapt itself to the surface of the work.

The tubular member 16 has a short shaft or

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stud 20 (Fig. 3) fixed to the under side thereof and at an intermediate point in its length. The shaft 20 is mounted in anti-friction bearings 21 in a bearing block 22 (Fig. 4), having a gudgeon 24 swiveled in a bearing 25 in the free end of a tubular supporting arm 30. Angular movement of the gudgeon 24 is limited by stop surfaces 26.

The right-hand end of the arm 30 as viewed in Fig. 2 is pivoted at 31 to a sleeve 33 which is rotatably mounted on an upright stud 35 which is fixed to a stand or bracket 36 which is rigidly secured as by bolts 37 to a foundation block or post F. The stand 36 may be braced by flanges 38.

With this construction, the arm 16 may swing freely on its stud or shaft 20, as indicated by the double arrow *a* in Fig. 1, and the arm 30 may also swing freely on its fixed upright shaft 35, as indicated by the double arrow *b* in Fig. 1. The tubular member 16 also has limited angular movement about the axis of the gudgeon 24.

A weight 50 (Fig. 3) is slidably mounted on the tubular member 16 and may be shifted axially of said member by a handle 52 which is connected to move the weight back and forth by means of a cord or cable 54. By thus shifting the weight 50, any desired downward pressure of the wheel W on the stone S may be conveniently attained by the operator without moving from his working position. A hand rail 56 is associated with the grinding shaft bearing 15 and may be conveniently used in moving the wheel back and forth.

Special provision is made for raising and lowering the motor and wheel assembly by swinging the supporting arm 30 upward or downward.

For such purposes, a double bell crank 60 is pivoted at 61 to the under side of the member 30. The short arm of the bell crank 60 is connected by links 62 to a pivot stud 63 on the upper part of the sleeve 33, and the long arm of the bell crank 60 is connected to a rod 66 which is associated with a piston 67 slidable inside of a cylinder 68 having a pivotal connection 69 to the arm 30.

When air or water pressure is applied through the pipe 70, the piston 67 will be moved outward or to the right in Fig. 2 and the supporting arm 30 will be caused to swing upward about its pivot 31, thus raising the wheel W from the stone S. Any suitable control valve V (Fig. 1) may be conveniently positioned adjacent the operator's station.

If a machine is to be successively used on pieces of work of substantially different thickness, it is desirable to provide for maintaining the short shaft 20 in vertical position, regardless of the angular position of the supporting arm 30. This result may be attained by using the construction

shown in Fig. 5, in which the bearing block 80 for the upright shaft 20 is pivoted at 81 to a member 82 which is fixed at the outer end of a supporting arm 30*a*.

The bearing block 80 has an upwardly extending arm 84, connected at 85 to a link 86 which in turn is pivoted on the stud 63 on the sleeve 33 to which the link 62 is also connected. The pivot points 31, 63, 85 and 81 (Fig. 5) define a parallelogram, which insures that the shaft 20 will remain vertical in every operating position of the supporting arm 30*a*.

The somewhat simpler construction shown in Fig. 4 is found satisfactory where the upper surface of the stone S does not vary substantially in elevation, so that the parts always assume substantially the position indicated in Fig. 2 when the machine is in operation.

A grinding and polishing machine constructed as herein shown and described may be very conveniently operated and has been found reliable and satisfactory in use. The provision of the cylinder 68 and associated parts permits the wheel to be raised from the work or lowered thereon by simple operation of the valve V, and the pressure of the wheel on the work is quickly and easily adjusted by shifting the weight 50 on the tubular member 16.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. In a grinding and polishing machine, a fixed upright post, a bearing sleeve rotatable on said post, a radial supporting arm pivoted to said sleeve to swing vertically thereon, a fluid-operated cylinder-and-piston combination pivoted to said supporting arm, means to supply operating fluid to said cylinder, a bell crank pivoted on said supporting arm, a link connecting the short depending arm of said bell crank to the top of said bearing sleeve, said bell crank also having a long and upwardly-extending arm connected to said cylinder-and-piston combination, whereby outward movement of said piston in said cylinder will effect upward swinging movement of said supporting arm, a cross bar pivoted intermediate its ends to the free end of said supporting arm and having limited angular movement only on said arm, a work-engaging wheel mounted at one end of said cross bar, a motor mounted at the other end of said cross bar, and driving connections between said motor and wheel.

2. The combination in a grinding and polishing machine as set forth in claim 1, in which a bearing block is mounted on a transverse pivot at the free end of said supporting arm and is itself provided with an upright arm, and in which a link connects the upper end of said upright arm to a point at the upper end of the bearing sleeve and thereby maintains the axis of the bearing opening in said block substantially vertical as said supporting arm is swung upward and downward, and in which a transversely-projecting stud on said cross bar extends downwardly and is pivoted in said bearing block to swing transversely about said substantially vertical axis.

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