Dec. 23, 1930. R. B. JONES 1,785,737

STONE CUTTING AND POLISHING MACHINE

Filed Aug. 26, 1927 2 Sheets-Sheet 1

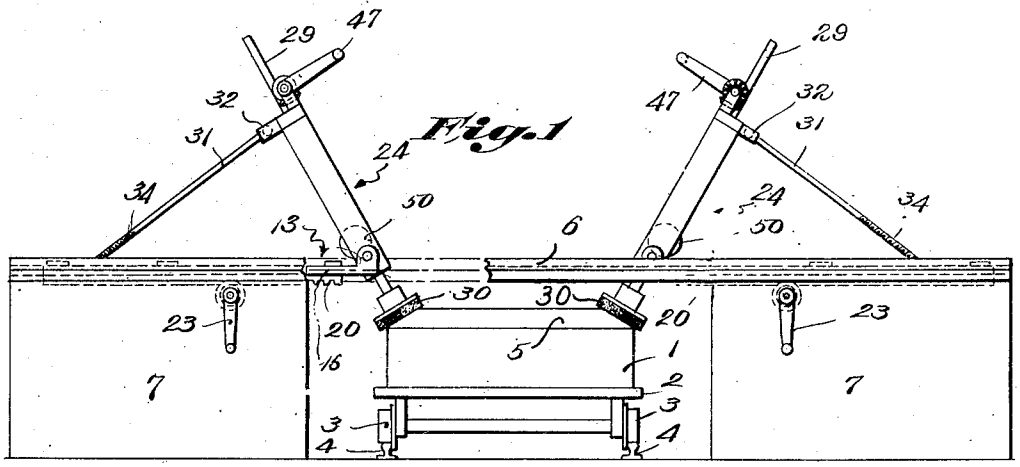


Fig. 1

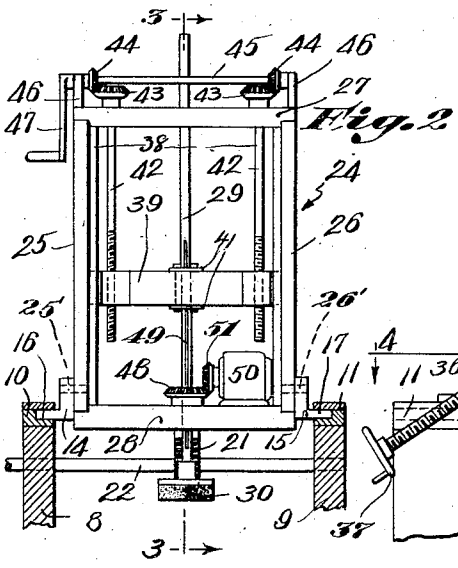


Fig. 2

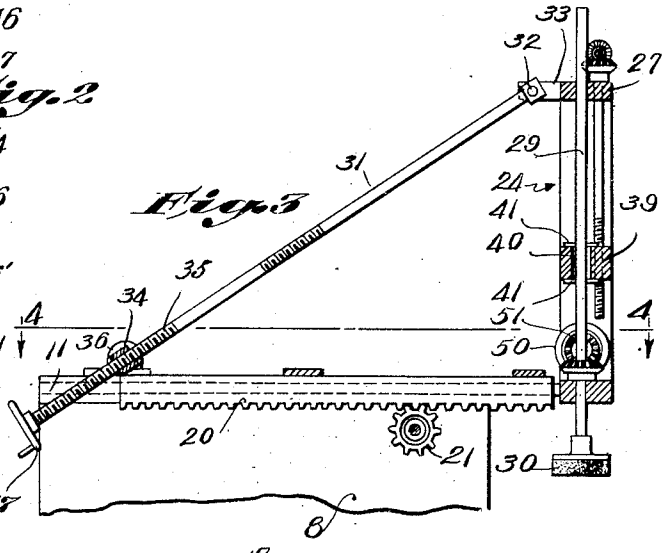


Fig. 3

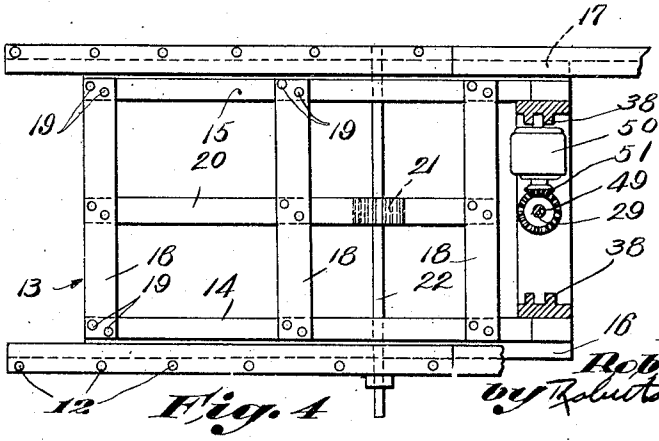


Fig. 4

Inventor
Robert B. Jones
by Roberts Cushman & Woodberry
Att'ys.

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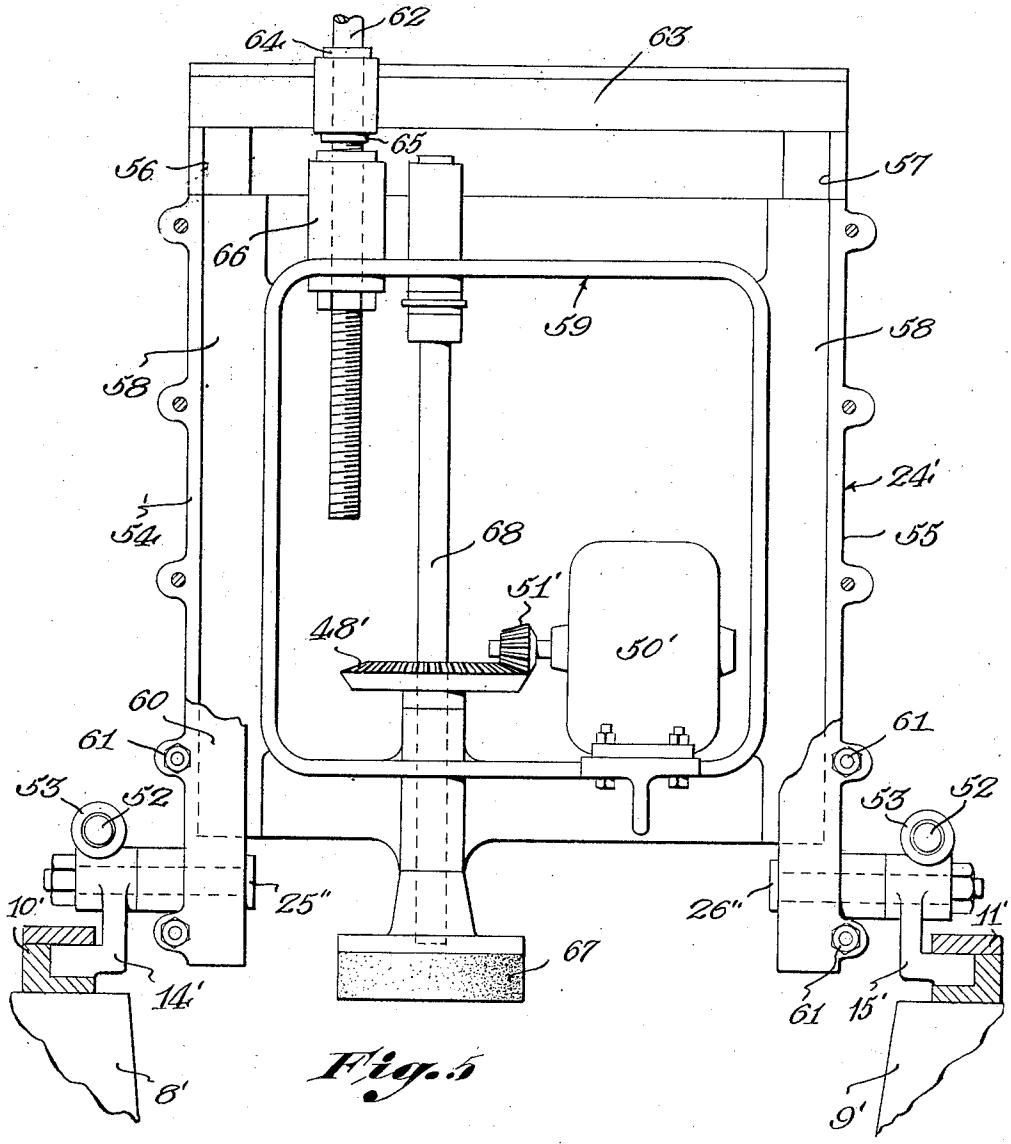


Fig. 5

Inventor
Robert B. Jones
by Roberts Cushman & Woodberry
Atty's.

Patented Dec. 23, 1930 1,785,737

UNITED STATES PATENT OFFICE

ROBERT B. JONES, OF BARRE, VERMONT, ASSIGNOR TO JONES BROTHERS COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE

STONE CUTTING AND POLISHING MACHINE

Application filed August 26, 1927. Serial No. 215,602.

This invention relates to a device for cutting and polishing stone and more particularly to a machine made in two similar units for cutting, polishing and otherwise working upon the bevels or washes of stone blocks such as are ordinarily used as bases for monuments.

Among the objects of the invention are to provide a device capable of operating on two opposite washes of a stone base simultaneously; to provide a device in which a bevel or wash of any desired angle or depth may be formed and operated upon; to provide a device capable of accommodating stone bases of different dimensions within the limits of adjustment thereof; and to provide a machine of the character described in which various abrading devices may interchangeably be used for performing different operations of cutting or polishing and to produce various types of finished surfaces. Other objects of the invention will be specifically pointed out in the subjoined claims and will be apparent from the following specification taken in connection with the accompanying drawings, in which:

Fig. 1 is an elevation of the entire apparatus showing a stone base in operative position;

Fig. 2 is an elevation of one of the units shown in Fig. 1, the axis of the disk being shown perpendicular for clarity;

Fig. 3 is a section on the line 3—3 in Fig. 2;

Fig. 4 is a section on the line 4—4 in Fig. 3, parts 34, 36 and 37 being omitted; and

Fig. 5 is a view similar to Fig. 2 showing a modified form of my invention.

Referring to Fig. 1, the stone base is shown at 1 resting upon a suitable car 2 whose wheels 3 may run upon tracks 4. The car 2 may, if desired, be provided with a suitable turntable, so that when one pair of bevels or washes have been completed, the stone may be turned at right angles and the other pair, one of which is shown at 5, may be operated upon.

The device as here illustrated is made as two similar units, one on either side of the stone, whereby two opposite washes may be operated upon simultaneously. These units are shown connected by suitable strengthening members 6 to increase their rigidity.

Inasmuch as the units are identical, a description of one will suffice for the present purposes. The unit is mounted upon a base 7 which may be in the form of a suitable foundation (not here shown) having thereon a pair of upstanding wall members 8 and 9, at whose tops are horizontally extending guides 10 and 11, which may be constructed of metal or other suitable material, the guides being fastened to the wall members in any desired manner, as for example by nails, screws or rivets indicated at 12 in Fig. 4. In these guides slides a carriage generally indicated at 13, here shown generally rectangular in form and constructed of a pair of longitudinally extending members 14 and 15 having portions 16 and 17 respectively which are received in the guides 10 and 11. The longitudinally extending members are connected by cross pieces 18 either integral with the side members or fastened thereto in any suitable manner as by screws or rivets 19. A rack 20 may be fastened to the cross members 18 to cooperate with a pinion 21 mounted on a shaft 22 which may be provided with a crank 23. Thus it will be seen that turning the crank 23 will traverse the carriage 13 horizontally in the guides 10 and 11.

A frame generally indicated at 24 is mounted by pivots 25′ and 26′ to the forward end of the carriage 13, the pivots being received in suitable brackets upon the carriage. This frame is made up of side members 25 and 26, shown vertical in Figs. 2, 3 and 4, connected by cross members 27 and 28. The cross members are provided with suitable bearings at substantially their center portions to receive a shaft 29 upon the lower end of which the abrading disk 30 is mounted.

Means are provided for adjusting the angular relation of the frame 24 with respect to the carriage 13, these means being here shown in the form of a rod 31 which is swivelly mounted at its upper end 32 to the upper cross piece 27 on the frame in any desired manner, such for example as providing the cross piece 27 with a pair of extended por-

tions 33 having a short shaft (not shown) rotatably mounted between them, which shaft is provided with an aperture through which the rod 31 may pass and means on the rod for preventing longitudinal movement with respect to the shaft, but permitting rotary motion. The lower portion of the rod 31 is threaded as indicated at 34 for cooperation with an internally threaded aperture in a shaft 35 mounted similar to the shaft at the upper end of the rod in projections 36 on the carriage. The lower end of rod 31 may be provided with a hand wheel 37 for the purpose of rotating it and thereby adjusting the angle of the frame 24 with respect to the carriage 13.

The side members 25 and 26 of the frame 24 may be provided with inwardly directed guides 38 in which is mounted for sliding motion a beam 39 having an enlarged central opening 40 through which the shaft 29 passes, this shaft being provided on either side of the beam with suitable rigid members indicated at 41 for preventing axial motion relative thereto, but permitting rotary motion. Means are provided for adjusting the position of the beam 39 in the frame 24, these means here shown as a pair of rods 42, one adjacent to either side of the frame 24, the rods being threaded into the beam 39 and having their upper ends passing through suitable bearings in the cross piece 27 and provided with bevel gears 43 above the cross piece. These bevel gears are engaged by a pair of bevel gears 44 mounted upon a common shaft 45 which is journaled in suitable bearings in extended portions 46 of the cross piece 27, the shaft 45 being provided at one end with a crank 47 by which it may be rotated to rotate the shafts 42 through the gears 43 and 44, and thereby move the beam 39 with respect to the frame 24, thus also adjusting the position of the shaft 29 and the abrading disk 30. Means for rotating the disk may comprise a bevel gear 48 splined to the shaft 29 by providing the shaft with a suitable longitudinal groove 49 and the gear with a tongue fitting therein and an electric motor 50 mounted in the frame and provided with a bevel gear 51 cooperating with gear 48.

It will be obvious that stones of various widths may be operated upon by traversing the carriages 13 of each unit in or out as may be necessary; bevels of various angles may be formed or operated upon by rotating the hand wheel 37 to change the angle of the frame 24 with respect to the carriage 13 thus changing the angle of the plane of the disk 30 which bears upon the wash; and stones of various heights may be accommodated by rotating the crank 47 to raise or lower the disk, this latter adjustment when the frame is in an oblique position requiring also a corresponding variation in the horizontal position of the carriage. It is contemplated that for fast work where quick change of adjustment may be necessary, cranks 23 and 47 and the hand wheel 37 may be operated by suitable power driven means, as for example electric motors, the application of which will be obvious.

Referring to Fig. 5 in which I show a modified form of the grinding disk support. Reference characters 8′, 9′, 10′, 11′, 14′, 15′, 24′, 25″, 26″, 48′, 50′ and 51′ designate corresponding parts to those designated by the reference characters in Figs. 1 to 4 without the prime (′) marks. In Fig. 5 I have shown a modified means for moving the carriage toward and away from the work, this means being a pair of elongate screw 52 which are suitably mounted in the base of the machine to permit rotation without longitudinal motion and are threaded into collars 53 fixed to suitable parts of the carriage, as the brackets 14′ and 15′. Any desired means may be used in connection with these screws for simultaneously rotating them to move the carriage toward or away from the work.

The frame 24′ is pivotally mounted upon the brackets 14′ and 15′ by the pins 25″ and 26″ and comprises side members 54 and 55 having rabbets 56 and 57 therein for the reception of ride ribs 58 of the slidable member 59. Plates 60 are bolted as shown at 61 to the side members 54 and 55 to retain the side ribs 58 in the groves or rabbets. A threaded bolt 62 is mounted in the cross piece 63 of the frame 24′ so as to permit it to be rotated but is prevented from longitudinal movement by collars 64 and 65 fixed thereon either side of the member 63, bolt 62 being threaded into an enlargement 66 in the slidable member 49. Any suitable means may be provided for rotating the bolt 62 such as a hand wheel or any desired power drive.

The grinding disk 67 is suitably fixed to the lower end of a shaft 68 which is journalled in antifriction bearings in the member 59. Suitable means for driving the shaft 68 are provided, comprising a motor 50′ mounted in the member 59 and adapted to drive the shaft through the bevel gears 48′ and 51′.

The form of the machine shown in Fig. 5 operates substantially the same as that shown in Figs. 1 to 4 with the exception that the motor is bodily movable with the rod and grinding disk, thus doing away with the splined connection. This is an advantage as it minimizes the wear of the parts and permits the use of more efficient bearings. In addition, the grinding disk 67 is always closely adjacent to the lower bearing of the support 59 and therefore chattering and wear of the bearings is minimized.

It will be seen, therefore, that I have provided a device including an abrading disk which is capable of universal motion in a vertical plane containing the axis of the disk within the limits of the adjustments, the mo-

tion perpendicular thereto being taken care of by moving the car 2 along the track 4, whereby to bring various portions of the wash to be operated upon into the working zone. In this way and more especially by the use of a truck provided with a turntable, it will be possible to finish the washes on all sides of the stone without moving it, relatively to the truck, which would ordinarily require the use of a derrick.

It is obvious that many variations may be made in the device shown without departing from the spirit of the invention, and I do not wish to be limited, therefore, except by the scope of the appended claims.

I claim:

1. A machine for cutting or polishing washes on stone bases comprising a support, a frame mounted thereon, bearings in the frame, a shaft journaled in the bearings and movable in an axial direction, guides in the frame parallel to the axis of each shaft, a beam sliding in the guides having an aperture therein through which the shaft passes, means on the shaft to prevent its moving axially with respect to the beam, means for varying the position of the beam with respect to the frame, a disk mounted on the end of the shaft having abrading material on its outer face, and means for rotating the shaft effective in all adjusted positions thereof.

2. A machine for cutting or polishing washes on stone bases comprising a support, a carriage horizontally slidable thereon, means for adjusting the position of the carriage with respect to the support, a frame pivotally mounted in the carriage for swinging movement in a vertical plane, means for varying the angular position of the frame with respect to the carriage, bearings in the frame, a shaft in the bearings, a disk mounted on one end of the shaft having its outer face provided with abrasive material, and driving means effective in any adjusted position of the disk.

3. A machine for cutting or polishing washes on stone bases comprising a support, a carriage horizontally slidable thereon, means for adjusting the position of the carriage with respect thereto, a frame mounted on the carriage at an angle thereto, bearings in the frame, a shaft journaled in the bearings and capable of rotary and axial motion therein, a beam slidably received in the frame having an aperture through which the shaft passes, means on the shaft for preventing its moving axially with respect to the beam, means for adjusting the position of the beam with respect to the frame, a wheel splined to the shaft, means mounted in the frame for driving the wheel and shaft, and a disk removably mounted on the end of the shaft having its outer surface provided with abrading material.

4. A machine for cutting or polishing washes on stone bases comprising a support, a frame pivotally mounted on the support for swinging movement in a vertical plane, means for varying angular adjustment of the frame with respect to the support, bearings in the frame, a shaft journaled in the bearings for both rotary and axial motion, a beam slidably mounted in the frame having an aperture through which the shaft passes, means on the shaft for preventing its moving axially with respect to the beam, means for adjusting the position of the beam with respect to the frame, a wheel splined to the shaft, means mounted in the frame for driving the wheel and shaft, and a disk mounted on the end of the shaft having its outer surface provided with abrading material.

5. A machine for cutting or polishing washes on stone bases comprising a support, a carriage horizontally slidable on the support, means for adjusting the position of the carriage with respect to the support, a frame pivotally mounted in the carriage for swinging movement in a vertical plane, means for varying the angular position of the frame with respect to the carriage, bearings in the frame, a shaft journaled in the bearings for both rotary and axial motion, a beam slidably mounted in the frame having an aperture through which the shaft passes, means on the shaft for preventing its moving axially with respect to the beam, means for adjusting the position of the beam with respect to the frame, a wheel splined to the shaft, means mounted in the frame for driving the wheel and shaft, and a disk removably mounted on the lower end of the shaft having its outer surface provided with abrading material.

6. A machine for cutting or polishing washes on stone bases comprising a support, a carriage horizontally slidable on the support, means for adjusting the position of the carriage with respect to the support, a frame pivotally mounted in the carriage, means for varying the angular position of the frame with respect to the carriage, guides in the frame, a member sliding longitudinally of the frame in said guides, a shaft journaled between the guides with its axis parallel thereto, the sliding member having an opening receiving the shaft, means for preventing axial movement of the shaft with respect to said member, an abrading disc on the end of the shaft, means for sliding said member relative to the frame to vary the position of the disc with respect to the frame, and means for rotating the shaft effective in all adjusted positions thereof.

Signed by me at Barre, Vt., this 30th day of June, 1927.

ROBERT B. JONES.