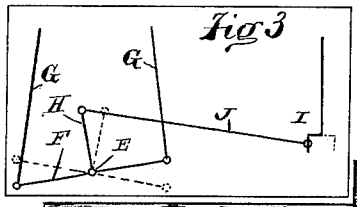
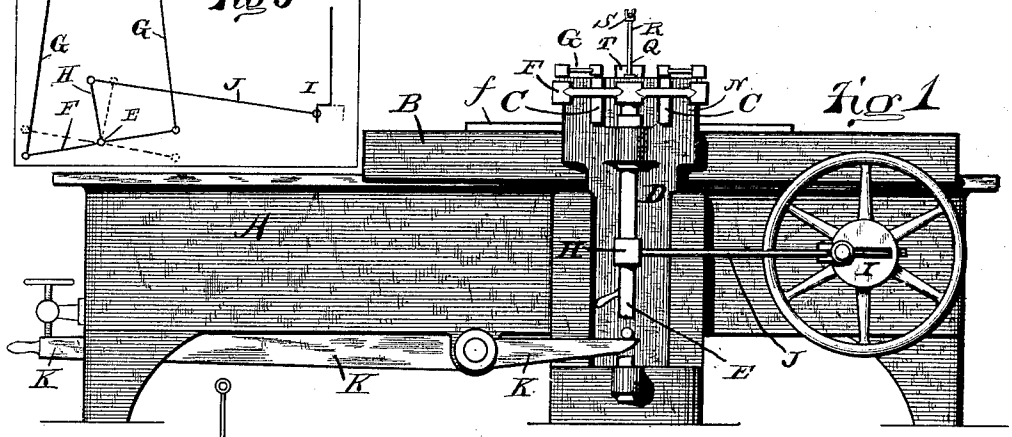
(No Model.)

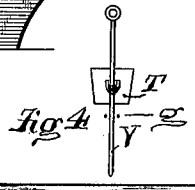
C. N. MORRIS.

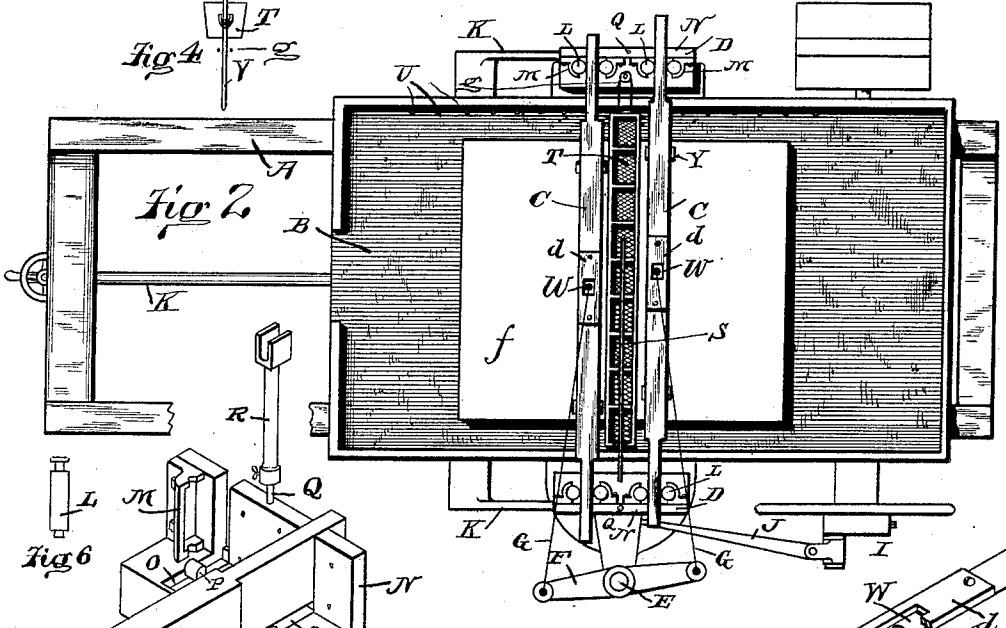
MACHINE FOR SURFACING LITHOGRAPHIC STONES.

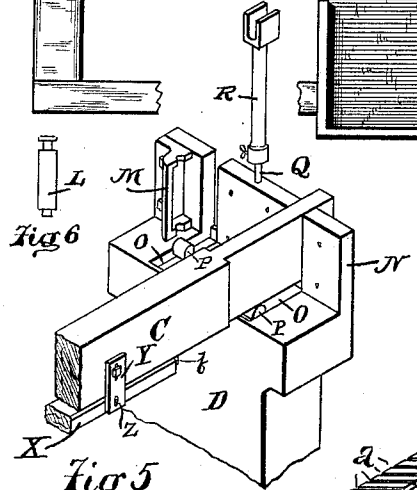
No. 336,583. Patented Feb. 23, 1886.

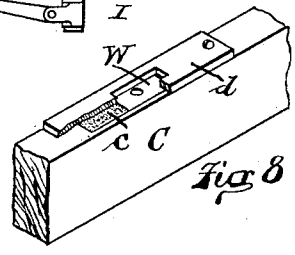


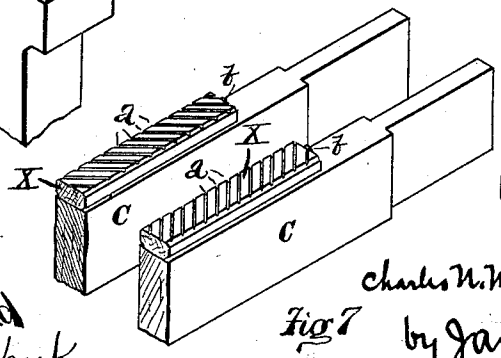


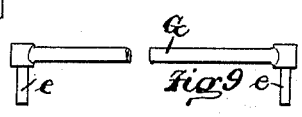












Witnesses:
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Fig 7

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UNITED STATES PATENT OFFICE.

CHARLES N. MORRIS, OF CINCINNATI, OHIO.

MACHINE FOR SURFACING LITHOGRAPHIC STONES.

SPECIFICATION forming part of Letters Patent No. 336,583, dated February 23, 1886.

Application filed November 17, 1884. Serial No. 148,154. (No model.)

To all whom it may concern:

Be it known that I, CHARLES N. MORRIS, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Machines for Surfacing Lithographic Stones, &c., of which the following is a specification.

This invention pertains to machinery for surfacing lithographic stones, printing-plates, and the like, and it will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying my improvements; Fig. 2, a plan of the same, the links G being represented by merely rudimentary lines; Fig. 3, a diagram illustrating the motion-work for actuating the grinders; Fig. 4, an end view of the sand-box; Fig. 5, an enlarged perspective view of one of the bearers and some of its near parts; Fig. 6, an elevation of one of the side rollers; Fig. 7, a perspective view of one end of the pair of bars shown upside down; Fig. 8, a perspective view at the center of one of the bars, and Fig. 9, a side elevation, enlarged, of one of the links G.

In the drawings, A represents the bed of the machine; B, a table fitted to reciprocate thereon and carry the stone to be dressed; C, a pair of parallel bars reciprocating across the machine over the stone; D, a pair of bearers for the bars, disposed at the sides of the machine and fitted to adjust vertically; E, a vertical rock-shaft journaled in one of the bearers; F, a double-ended rocker-arm at the top of this shaft; G, links engaging this rocker-arm and the centers of the bars; H, a lever secured to the rock-shaft; I, a crank upon one end of a revolving shaft journaled across the machine; J, a connecting-rod coupling the crank with the lever H; K, a lever system for adjusting the vertical height of the bearers; L, rollers supported by the bearers against the sides of the bars; M, bearings for these rollers; N, vertical flanges at the top of the bearers, against which the bearings M are secured; O, channels in the horizontal faces of the bearers underneath the bars; P, rollers free to traverse these channels; Q, standards projecting upward from the bearers; R, sockets adjustable vertically upon these standards and having journal-bearings at their tops; S, a rod, shown partially only in Fig. 2, lying in said journal-bearings; T, a long sand-box having a sieve-bottom and suspended between the bars from the rod S; U, a series of pins projecting horizontally from the table of the machine; V, hangers by which the sand-box is suspended from its rod, prolonged downward, so as to engage the pins U as the table reciprocates; W, bearing-blocks for the links seated in recesses in the upper surface of the bars; X, the grinders secured beneath the bars; Y, clamps at the sides of the bars for securing the grinders; Z, pins projecting outward from the sides of the grinders into engagement with slots in the clamps; *a*, diagonal grooves in one face of each of the grinders; *b*, pins projecting from the lower face of the bars and engaging the ends of the grinders; *c*, springs, as of rubber, in the top recesses of the bars at the ends of the blocks W; *d*, slotted plates over said recesses to retain the blocks and springs; *e*, journals projecting downward from the body of the links G, and adapted to engage the blocks at the center of the bars and eyes in the ends of the rocker-arm; *f*, a stone to be surfaced, and *g* a spring engaged by the sand-box hangers.

The platen is caused to slowly reciprocate upon the bed by any suitable mechanism—such, for instance, as is common in metal-planing machines—and thereby carry the stone backward and forward under the bars. The crank I is to be actuated by one of the shafts of the mechanism employed for reciprocating the platen, and it is to be adjustable for length of stroke. The crank I should revolve rapidly, and its effect, as will be readily understood by inspecting Fig. 3, will be to reciprocate the two bars simultaneously, but in opposite directions. The grinders attached beneath these bars surface the stone or plate, water and abrading material being supplied as needed. Sand or other abrading material is placed in the sand-box T. The box is oscillated and agitated in an obvious manner by the striking of the pins U against the hangers V, whereby the sand is delivered upon the stone. A more or less number of pins may be removed, so as to lessen the agitation and the rate of sand-delivery. The sand-box is divided by transverse partitions, which serve to prevent the movement of the sand toward one end of the

box, and which also serve as alternative box ends adapted to the width of the stone in hand. To stop the flow of the sand, one of the sockets R is elevated and secured at the proper height to prevent the pins engaging the hangers.

The links G are retained in place by gravity, and they can be readily lifted from their positions when the bars are to be removed. The springs at each end of the blocks, through which the links reciprocate the bars, serve to endow the transmission with elasticity and to prevent violent shocks at the ends of the reciprocations.

The grinders are of material varying with the character of the work to be done. In addition to the metals, I make use of grinders molded of abrading material, as of corundum. The grooves in one face of the grinders are disposed diagonally and in opposite directions, as seen in Fig. 7. Their office is to distribute the supplied or loosened grit and prevent glazing of the grinders and the accumulation of grit in spots. The grinders are grooved upon one face and plain upon the other face. The grinders are of comparatively narrow faces, being about two inches in width, and their action differs from the action of plate-like grinders. The reciprocations of the bars are transmitted to the grinders by the pins *b*, for which many equivalents may be found. The clamps Y do not hold the grinders rigidly to the bars, unless so desired, the slots in the clamps permitting the grinders to rise and fall independent of the bars, whereby, in case the bars are supported at their ends, the grinders are operating under a weight due to their own gravity alone. By raising the clamps the grinders can be fixed with relation to the bars, and the grinding thus effected under the pressure due to the combined gravity of bars and grinders. The grinders can be attached to the bars so as to operate with either their grooved or plain faces. The bars are supported on the anti-friction rollers P, and the surfaces which these rollers engage are true planes subjected to roller action only, whereby their integrity can be well maintained and an ease of motion produced.

By means of the levers K the bearers are so adjusted that the bars will not be supported by the rollers. Under these conditions the entire weight of bars and grinders is imposed upon the stone, and the grinding is effected with considerable rapidity. The bearers are, however, delicately adjusted in such manner that the bars will come into contact with the rollers P as soon as the stone may have been brought to a true surface. When this occurs the grinding continues, but free from the influence of the weight of the bars. The grinders will continue to be influenced by gravity if adjusted for that purpose; but if the grinders are clamped firmly up against the bars the grinding will be finished in a peculiarly-delicate manner, uninfluenced by the gravity of any of the parts. Under these circumstances the final touches, be they grinding or graining, may be given.

It is necessary, in surfacing a stone by means of any form of grinder, that the grinder should move entirely off the edge of the stone, otherwise there will be either a ridge or depression produced at the edge of the stone. If the grinder be a mere plate resting its entire weight upon the stone, the surfacing will be evenly done until the plate has traveled half its width off the stone. The plate will then tip slightly, the edge of the stone acting as a fulcrum, and the balance of the travel and grinding will be effected with a tipped plate. The wider the plate the greater the amount of grinding which will be done with a tipped plate, and the greater the amount of corner convexity given to the stone.

It is desirable that the stone be dressed to a true surface clear to its edge, and for that reason I substitute for a plate-grinder the exceedingly narrow strip-like grinders described, and I also provide against the tipping of the grinders as they pass over the edge of the stone. The bars are of considerable depth, and they are guided in slots in the vertical flanges of the bearers. So long as the sliding-fit in the slot is in good condition no tipping can take place; but I provide against wear by making the fit adjustable, and I arm the fixed bearing-surfaces with the rolls L. The rolls not only relieve the motion of much friction, but they thereby enable me to operate under closer fits than would be possible without them. By means of this system of construction the bars are incapable of tipping, and they continue their regular work over the stone and past its edges.

The grinders are chamfered somewhat, in order that during the preliminary heavy work they may ride up onto the edge of the stone readily. Fair results may be produced by substituting flat surfaces for the rollers and fitting them to adjust up to their work in a similar manner, and even the slot-fits, without any taking-up arrangement, will be found satisfactory under some conditions, not calling for very true surfaces at the corners. For many kinds of work the bars themselves may form the grinders, and when thus used the operating-face of the bar may be plain or grooved, as desired. The spring *g* straddles the sand-box hanger, and serves to resist the action of the pins U in oscillating the sand-box, and to set up elastic vibratory motions of the sand-box.

I claim as my invention—

1. The combination of a table fitted to carry and reciprocate a stone face uppermost, and a grinder consisting of a long flat strip of corundum diagonally grooved on its face and fitted to reciprocate longitudinally across the upwardly-presenting face of the reciprocating stone.

2. In a machine of the character specified, a grinder formed of a long strip of corundum

having one of its faces diagonally grooved and its other face plain, and a reciprocating bar disposed above and carrying said grinder, combined substantially as and for the purpose set forth.

3. In a machine of the character specified, the combination of a pair of parallel grinding-strips provided with facial grooves arranged diagonally in opposite directions.

4. In a machine of the character specified, the combination of a table for supporting and reciprocating a stone or plate to be surfaced, a pair of narrow grinders disposed parallel to each other above the table in a direction transverse to the table motion, and a rocker-arm or equivalent means for reciprocating the two grinders simultaneously in opposite directions, and grinding-supports for the grinders for determining their horizontal plane of motion independent of the surface of the stone on which they act.

5. In a machine of the character specified, the combination, with rocker-arm F, links G, and bars C, of blocks W and springs *c*.

6. In a machine of the character specified, the combination of rocker-arm F, having link-eyes at its ends, bars C, having holes to receive link-journals, and the links G, having downwardly-projecting journals *e*.

7. In a machine of the character specified, the combination of bearers D, having channels O, the reciprocating bars C, and the rollers P, free to traverse said channels.

8. In a machine of the character specified, the combination of the bearers D, having vertical slots at their tops, and the bars C, set edgewise vertically into and fitted to reciprocate in said slots.

9. In a machine of the character specified, the combination of the bearers D, the bars C, set edgewise over the same, and the bearings M, secured to the bearers and provided with rollers or other bearing-surfaces to be adjusted against the side faces of the bars.

10. In a machine of the character specified, the combination of the bars C, clamps Y, and grinders X, having side pins, Z.

11. In a machine of the character specified, the combination of the bearers D, bars C, crank I, connecting-rod J, lever H, rock-shaft E, rocker-arm F, and links G.

12. In a machine of the character specified, the sand-box T, having flat horizontal sieve-bottom and transverse partitions.

13. In a machine of the character specified, the combination of rod S, sand-box T, pins U, hanger V, standards Q, and vertical adjustable bearing-socket R.

14. In a machine of the character specified, the grinders X, having chamfered edges.

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Witnesses:
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