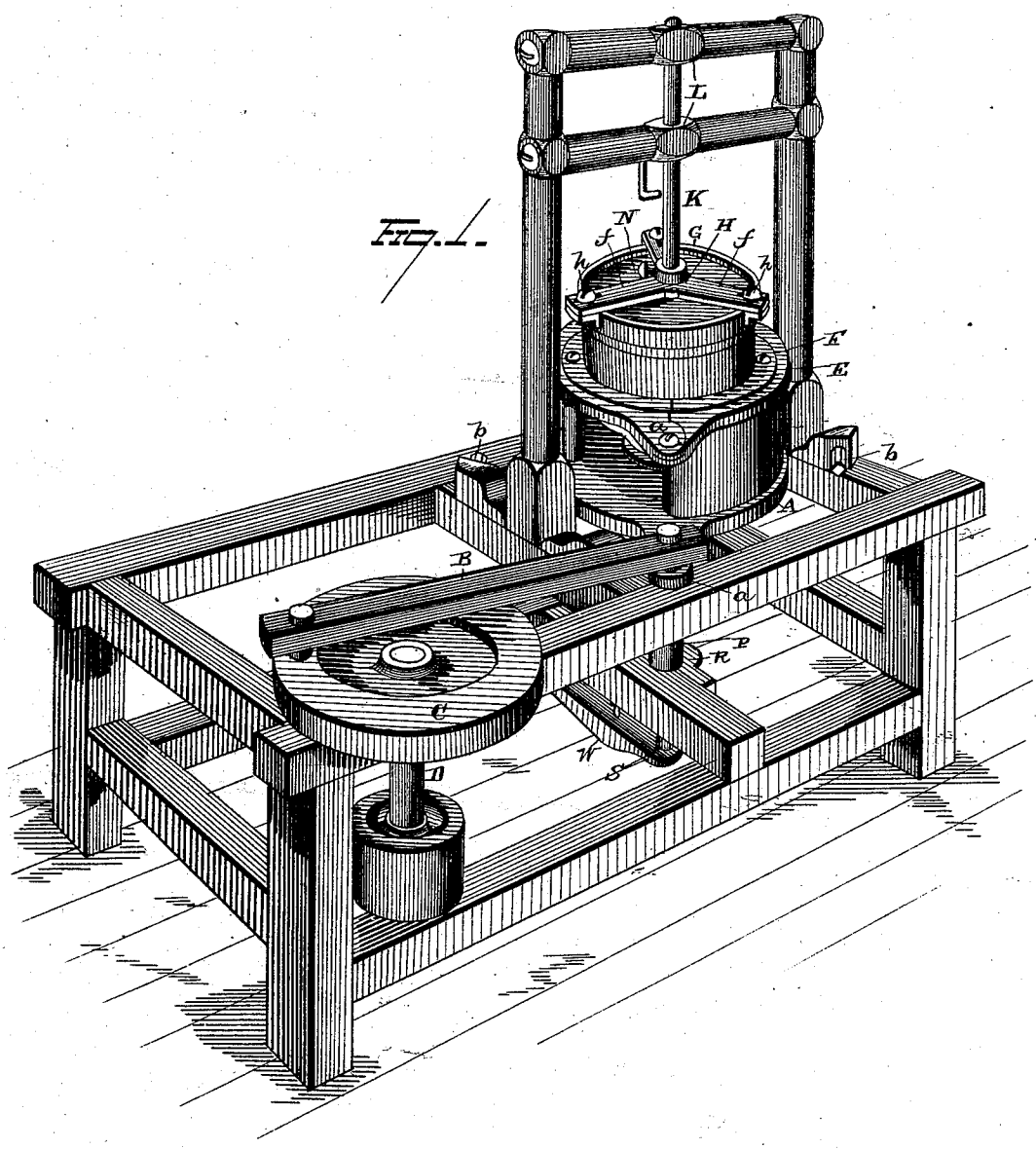
2 Sheets—Sheet 1.

W. W. LAKE & M. E. WELLER.

Machine for Grinding Glass, &c

No. 225,619. Patented Mar. 16, 1880.

Fig. 1.



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2 Sheets—Sheet 2

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Fig. 2.

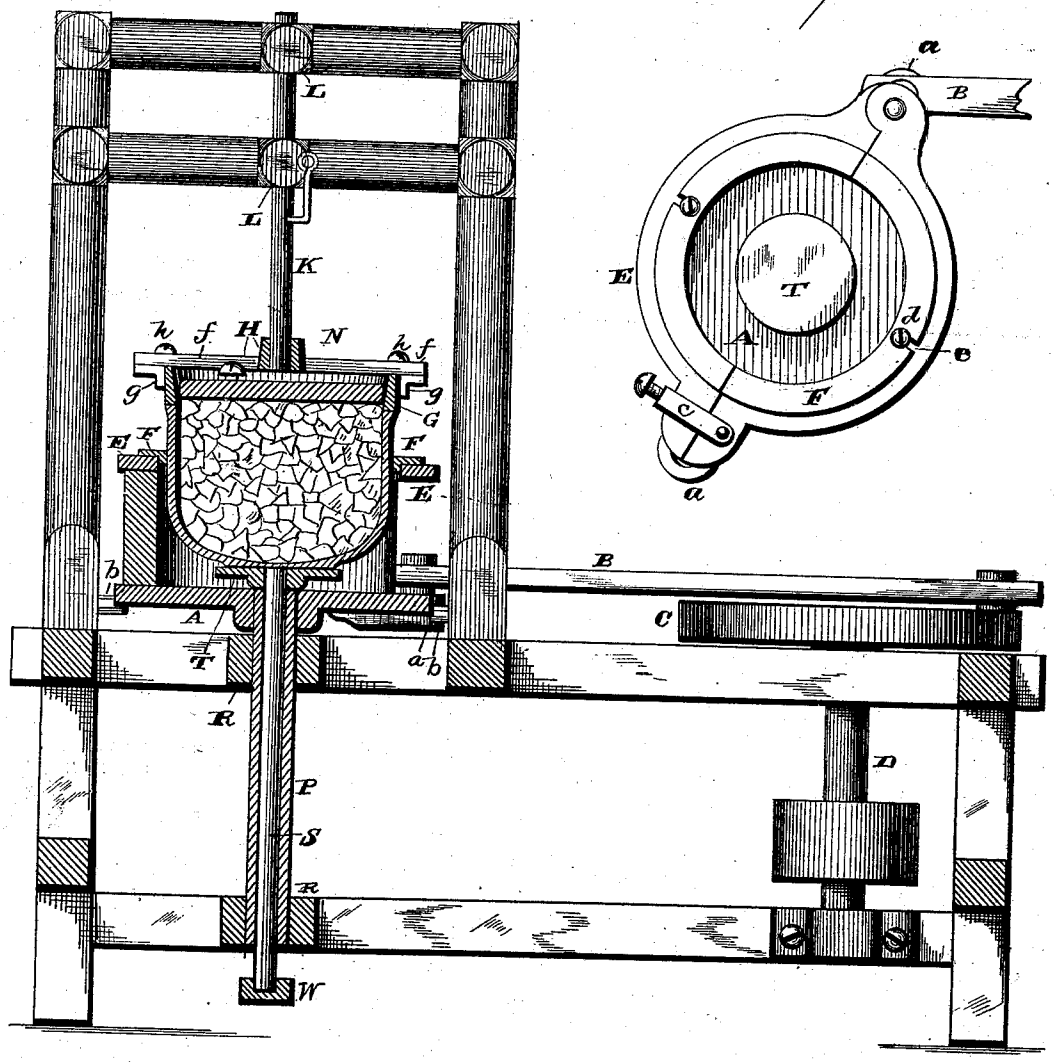


Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM W. LAKE AND MARVIN E. WELLER, OF FORT PLAIN, NEW YORK; SAID LAKE ASSIGNOR OF ONE-HALF OF HIS RIGHT TO FRANK P. WEMPLE, OF SAME PLACE.

MACHINE FOR GRINDING GLASS, &c.

SPECIFICATION forming part of Letters Patent No. 225,619, dated March 16, 1880.

Application filed February 9, 1880.

To all whom it may concern:

Be it known that we, WILLIAM W. LAKE and MARVIN E. WELLER, of Fort Plain, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Grinding and Polishing; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates more particularly to grinding and polishing hollow ware.

Heretofore, among the various processes employed for this purpose, the ware has been held in upright position and partially filled with a grinding substance, said substance being then moved about within the hollow ware while the latter is held stationary; also, tubular metallic articles have been moved in constant rotary direction while a grinding substance is discharged against their interior, said substance thereby collecting in the lower portion of the horizontal tubes, and necessarily exerting a greater or less polishing action upon the inner surfaces of the rotating tubes.

The object of our invention is to provide an improved method of grinding and polishing, which has as its prominent feature the reverse or alternating rotation of the hollow ware while filled with a grinding substance. This reversing rotation of the hollow ware tends to cause the grinding mass, by reason of its inertia, to remain stationary therein, this tendency varying in degree with the rate of movement of the hollow ware. The ware is therefore subjected to a grinding and polishing process, which is effective and thorough, the work being quickly performed and the action being proportionately severe with the rapidity of the reversing rotation of the hollow ware. The mechanical means employed are adapted to brace and support the hollow ware while subjected to this treatment. By means of an independent ring placed on the upper edge of the hollow ware the grinding substance can be introduced into the latter above its top, thereby causing the extreme end portion of the hollow ware to be acted upon by the stationary grinding mass.

The invention consists, first, in a process of filling hollow ware with a grinding substance, and then reciprocating the ware in rotary movement; second, in the combination, with a rotary table adapted to support the hollow ware, of mechanism which reciprocates said table; third, in the combination, with a rotary table adapted to support the hollow ware and mechanism for reciprocating it, of an elastic stop which receives the impact of said table at the termination of its movement in one line of direction; fourth, in the combination, with a rotary table adapted to support the hollow ware, said table being provided with one or more lateral projections, of mechanism which reciprocates the table, and elastic stops located, respectively, on opposite sides of each projection in position to receive the impact thereof; fifth, in the combination, with a rotary table and mechanism for reciprocating it, of a clamp connected to said table and adapted to secure the hollow ware; sixth, in the combination, with a rotary table and mechanism for reciprocating it, of a two-part clamp connected to the table and adapted to embrace the hollow ware, the two parts of said clamp being hinged together at one side and provided with a fastening device at the opposite side; seventh, in the combination, with a rotary table provided with a clamp which embraces the hollow ware, of an independent ring fitted on the clamp and adapted to directly support the ware; eighth, in the combination, with a rotary table provided with a clamp, of a two-part ring fitted on the latter and directly supporting the hollow ware, said ring being provided with slot or slots, and said clamp being provided with screw or headed projections, so that rings with different inside diameters can be quickly changed thereon to fit different sizes of ware; ninth, in the combination, with a rotary table provided with an adjustable clamp for maintaining different sizes of hollow ware in position, of a vertically-adjustable support adapted to hold said ware in position while being clamped; tenth, in the combination, with a ro-

tary table provided with a tubular shaft extending downward through suitable bearings, of an internal rod, a plate secured to the upper extremity of the latter, and a lever connected to lower extremity of the same; eleventh, in the combination, with a rotary table and mechanism for reciprocating it, of the hollow ware filled with a grinding substance, and a ring on the upper edge of said ware; twelfth, in the combination, with a rotary table, mechanism for reciprocating it, and the hollow ware filled with a grinding substance, of a ring resting on the upper edge of the ware and a plate fitted therein; thirteenth, in the combination, with a rotary table, mechanism for reciprocating it, and the hollow ware filled with a grinding substance, of a ring resting on the upper edge of the ware, and a vertically-adjustable holder adapted to maintain said ring in position; fourteenth, in the combination, with a ring adapted to rest on the upper edge of the hollow ware, of a vertically-adjustable holder having radial arms, the extremities of the latter being provided with depending lugs and means for adjusting them to or from the center of said ring-holder.

Referring to the drawings, Figure 1 is a view, in perspective, of a machine embodying the invention and representing a piece of hollow ware in position thereon. Fig. 2 is a vertical transverse section passing through the hollow ware. Fig. 3 is a detail view of that portion of the machine which embraces and supports the hollow ware in position.

A rotary table, A, adapted to support the hollow ware, is connected with a pitman, B, whose opposite extremity is connected to a balance-wheel, C, the latter being mounted on vertical shaft D, adapted to be actuated in continuous rotary movement by any suitable means.

The length of stroke of the pitman is such as to cause the rotary table to be moved only partly about its vertical axis, and hence it is actuated in a reverse or alternating rotary movement.

The bed of the table is provided with two lateral projections, *a*, respectively, on opposite sides thereof, each projection being adapted to strike against two elastic stops, *b*, secured to the frame of the machine, and located, respectively, on opposite sides of said projection. Against these stops the table has impact at the termination of its movement in each curved line of direction, the two projections simultaneously striking their appropriate stops as the pitman reaches the end of each stroke. A twofold purpose is thereby attained. The elastic stops serve as recoil-motors, to urge the table in the opposite direction to that in which it is traveling when it comes in contact with the stops, and the pitman is relieved of strain, which otherwise would fall thereon. The upper portion of the table is provided with a two-part clamp, E, one part thereof being secured in stationary position on the table, the other portion being free to move in a horizontal direction. The meeting ends of the two parts of the clamp on one side of the table are hinged together. The meeting ends on the opposite side of the table are provided with a fastening device, *c*. A two-part ring, F, is loosely fitted on the clamp by means of set-screws or headed projections *d* and slots *e*, the lower portion of the screws or headed projections being held in suitable holes in the clamp, and the upper portion fitting in said slots in the rings. By this arrangement rings with different inside diameters can be quickly changed on said clamp to fit closely different sizes of hollow ware.

The clamp, with its ring, serves not only to maintain the hollow ware firmly in position, but they also brace and support it, so that there is no tendency to break the hollow ware while it is being subjected to the quick reversing movement.

In order to completely fill the hollow ware with grinding substance, so as to grind the extreme end portion of said ware, it is provided with a ring, G, which rests on its upper edge. A holder, H, is connected to a rod, K, adapted to have sliding movement in vertical bearings L. This holder is formed with radial arms *f*, from the extremities of which depend lugs *g*, which embrace ring G. These lugs are adapted by slot-and-set-screw device *h* to be adjusted to or from the center of the holder, so as to fit different sizes of rings, corresponding to the diameter of the hollow ware. Within this ring, and resting on the grinding mass M, is placed a plate, N. This plate may be heavy or weighted, so as to cause the grinding mass to act the more severely upon the interior surface of the hollow ware. It further serves to prevent any portion of the grinding substance from escaping from the hollow ware; and it also prevents a great proportion of the dust generated within the hollow ware from arising therefrom.

To the bed of the rotary table is secured a tubular shaft, P, which extends downward through suitable bearings R. It serves as the axis of the table, and maintains the latter in true position. Through this shaft passes a rod, S, the upper extremity of which is provided with a plate, T, and the lower extremity with a foot-lever, W. By vertically adjusting this plate the hollow ware is supported thereon while the clamp and its connecting-ring are being fitted about said ware, as different sizes of the latter may be placed on the machine; also, in removing the finished hollow ware the latter is raised by said plate, so as to permit it to be readily taken from the clamp by the operator.

To operate the machine, the vertically-adjustable holder H is raised and maintained in such position by any suitable means. The clamp is opened, and the hollow ware is placed therein. The plate T is raised, so that the ware rests thereon, and the latter is suitably adjusted within the clamp and its connecting-ring. The ring G is then fitted on top of the

hollow ware, and holder H is lowered so as to embrace it. Then the hollow ware is filled with any suitable grinding substance. Holder H is again raised, to permit plate N to be placed in position on the grinding substance. It is then lowered, and the machine is started.

It is apparent that quite a number of these machines may be attended to in operation by a single person, and the labor connected with such attention is slight.

The grinding material is cheap, and it is saved by sifting, so as to be used in many successive operations, thereby effecting its entire utilization.

The mechanical parts of the invention are simple, and adapted to accomplish their respective functions quickly and readily.

In the foregoing description we have set forth the specific mechanism employed by us; but we do not restrict ourselves to such detail construction, inasmuch as substitutions, changes, and omissions of parts may be made therein, provided the essential features of invention set forth in the following claims are employed.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A process of grinding and polishing hollow ware, consisting in filling said ware with a grinding substance and reciprocating the ware in rotary movement, so as to cause the grinding mass to tend to remain stationary within the moving ware, substantially as set forth.

2. In a grinding and polishing machine, the combination, with a rotary table adapted to support the hollow ware, of mechanism which reciprocates said table, substantially as set forth.

3. In a grinding and polishing machine, the combination, with a rotary table adapted to support the hollow-ware and mechanism for reciprocating it, of an elastic stop which receives the impact of said table at the termination of its movement in one line of direction, substantially as set forth.

4. In a grinding and polishing machine, the combination, with a rotary table adapted to support the hollow ware, said table being provided with one or more lateral projections, of mechanism which reciprocates the table, and elastic stops located, respectively, on opposite sides of each projection in position to receive the impact thereof, substantially as set froth.

5. In a grinding and polishing machine, the combination, with a rotary table and mechanism for reciprocating it, of a clamp connected to said table and adapted to secure the hollow ware thereon, substantially as set forth.

6. In a grinding and polishing machine, the combination, with a rotary table and mechanism for reciprocating it, of a two-part clamp connected to the table and adapted to embrace the hollow ware, the two parts of said clamp being hinged together at one side, and provided with a fastening device at the opposite side, substantially as set forth.

7. In a grinding and polishing machine, the combination, with a rotary table provided with a clamp which embraces the hollow ware, of an independent ring fitted on the clamp and adapted to directly support the ware, substantially as set forth.

8. In a grinding and polishing machine, the combination, with a rotary table provided with a clamp, of a two-part ring fitted on the latter and directly supporting the hollow ware, said ring being provided with slot or slots and screw or headed connection with the clamp, so as to allow of the ring being changed thereon, substantially as set forth.

9. In a grinding and polishing machine, the combination, with a rotary table provided with an adjustable clamp for maintaining different sizes of hollow ware in position, of a vertically-adjustable support adapted to hold said ware in position while being clamped, substantially as set forth.

10. In a grinding and polishing machine, the combination, with a rotary table provided with a tubular shaft extending downward through suitable bearings, of an internal rod, a plate secured to the upper extremity of the latter, and a lever connected to the lower extremity of the same, substantially as set forth.

11. In a grinding and polishing machine, the combination, with a rotary table and mechanism for reciprocating it, of the hollow ware filled with a grinding substance, and a ring fitted on the upper edge of said ware, substantially as set forth.

12. In a grinding and polishing machine, the combination, with a rotary table, mechanism for reciprocating it, and the hollow ware filled with a grinding substance, of a ring resting on the upper edge of the ware and a plate fitted therein, substantially as set forth.

13. In a grinding and polishing machine, the combination, with a rotary table, mechanism for reciprocating it, and the hollow ware filled with a grinding substance, of a ring resting on the upper edge of the ware, and a vertically-adjustable holder adapted to maintain said ring in position, substantially as set forth.

14. In a grinding and polishing machine, the combination, with a ring adapted to rest on the upper edge of the hollow ware, of a vertically-adjustable holder having radial arms, the extremities of the latter being provided with depending lugs and means for adjusting them to or from the center of said ring-holder, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands and seals this 2d day of February, 1880.

WILLIAM W. LAKE. [L. S.]
MARVIN E. WELLER. [L. S.]

Witnesses:
ALEX. MURRAY,
GEORGE SNYDER.