A. Lindsay,

Grinding and Polishing Glass.

No. 19,569. Patented Mar. 9, 1858.

Fig: 1.

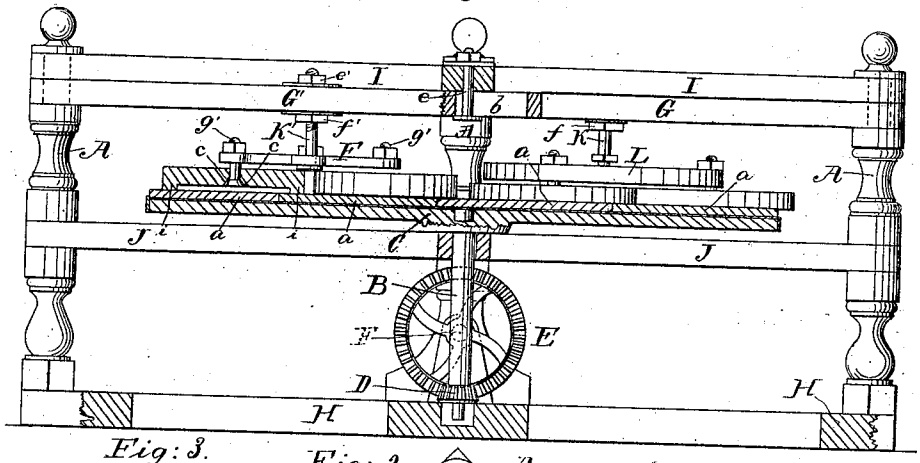


Fig: 3.

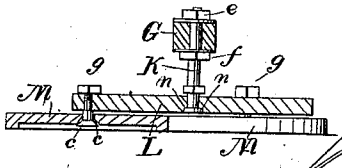


Fig: 2.

Fig: 4.

Fig: 5.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALEXANDER LINDSAY, OF MALONE, NEW YORK.

MACHINERY FOR POLISHING GLASS, &c.

Specification of Letters Patent No. 19,569, dated March 9, 1858.

To all whom it may concern:

Be it known that I, ALEXANDER LINDSAY, of Malone, in the county of Franklin and State of New York, have invented a new and useful Improvement in Machinery for Grinding and Polishing the Surfaces of Glass, Stone, Metal, and other Substances; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, is a central vertical section of a grinding and polishing machine, constructed according to my invention. Fig. 2, is a plan of the same. Fig. 3, is a vertical section of a portion of the same. Figs. 4 and 5, are face views of a grinder and polisher.

Similar letters of reference indicate the same parts in all the figures.

This invention consists in a certain method of producing a compound rotary motion, either of the grinding and polishing surface or surfaces, or of the surface or surfaces being ground or polished, through the agency of friction and a simple rotary motion that is imparted to the opposed surface or surfaces, whereby an almost infinite permutation is produced between the different points in either of the surfaces relatively to the opposed surface or surfaces, and hence the grinding or polishing is enabled to be performed with a high degree of perfection.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, H, I, J, indicate the framing of the machine, of timber or metal, containing bearings for the central upright shaft B, which supports the horizontal table C, which may be of wood or metal upon which the plates, slabs, or other articles to be polished indicated by *a*, *a*, in Fig. 1, are set in a bed of plaster of Paris. The shaft B, is geared by a pair of bevel gears D E, with the horizontal driving shaft F of the machine, which is fitted to suitable bearings in the lower part of the framing and which is to receive rotary motion from any suitable motive agency.

G, is a strong beam of timber or iron arranged to swing horizontally on one of the corner posts A, A, of the framing and containing a longitudinal vertical slot *b*, through which passes a screw bolt *c*, which also passes through a slot *d*, in the top part I, of the framing. The slots *b*, and *d*, permit a considerable swinging motion of the beam G, and the said screw bolt *c*, which is provided with a head and nut, serves to secure the beam in any desired position to the top part I, of the framing.

K, is an upright spindle having a screw thread on its upper part. This spindle passes through the beam G, and is provided with a nut *e*, above and another *f*, below said beam, for the purpose of securing it thereto and adjusting it higher or lower. The lower end of the spindle is made with a strong shoulder all around it, as shown at *n*, *n*, in Fig. 3, to support a circular plate L, which is bored out centrally to fit loosely to the spindle K, so that it may be capable of rotating easily on said spindle as well as of rocking to some extent. The circular plate L, has rigidly secured to it at equal distances apart and at equal distances from its own center, three pins *g*, *g*, *g*, which are constructed with shoulders 6, 6, at the bottom, as shown in Fig. 3, and which constitute axles for three disks M, M, M, which are made wholly of metal or with metal centers and are bored out centrally to fit loosely to the said pins in such a manner as to turn easily on the said pins as well as to rock to some extent. The above disks which are the grinders or polishers rest upon the surface of the material *a*, *a*, to be ground or polished. The whole circular areas of the under sides of these disks may be employed as grinding or polishing surfaces; but I prefer to construct the disks with annular grinding or polishing surfaces, as shown in Fig. 4, and indicated by *h*, *h*, in that figure and Fig. 3, such surfaces projecting below the marginal portions of the disks; or instead of annular surfaces, surfaces like that shown in Fig. 5, indicated by *i*, *i*, or of any other form, may be employed.

The machine may be constructed with one or more sets of grinders or polishers, each set fitted to axles secured in a circular plate L, suspended from a beam K. Instead, however, of employing circular plates L, skeleton frames L^1, like those shown in Figs. 1 and 2, attached to the beam G^1, which is a counterpart of G, and arranged and secured in a similar manner to G, may be employed, such frames consisting each of a hub and arms, the hub being bored out to fit a spindle K^1, secured by nuts e^1, and f^1, in the

beam G^1, and the arms carrying pins g^1, g^1, like those g, g, in the plates L, serving for the axles of grinders or polishers M^1, M^1, like M, M. Each plate L, or frame L^1, may have attached to it any number of grinders or polishers, and the machine may have any number of plates L, or frames L^1, suspended each from a separate beam arranged like G, or G^1.

The grinders or polishers may be composed of, or have their faces composed of, such substances as are commonly used for grinding and polishing surfaces, according to the nature of the substance to be ground or polished, and the nature of the grinding or polishing substance to be used.

The operation of the above described machine is as follows:—Rotary motion being imparted to the driving shaft F, is transmitted by the bevel gearing D E, to the shaft B, and table C, and the plates or slabs or other articles a, a, to be ground or polished and the friction between the surfaces of these latter and the surfaces of the grinders or polishers cause the latter to rotate upon their axles g, g, or g^1, g^1, and also cause the plates or frames L, or L^1, to rotate on the spindles K, K^1, thus imparting to the grinders or polishers the compound rotary motion known as the "sun-and-planet" motion, which motion combined with the rotary motion of table C, causes a more nearly infinite permutation between the grinding or polishing surfaces and those to be ground or polished, than has ever before been produced in any grinding or polishing machinery, and therefore produces a more uniformly smooth or polished surface.

In operating with this machine, any of the known grinding or polishing materials may be used, such as sand, emery, crocus, rouge, and venetian pink, and these may be supplied between the surfaces of the grinders or polishers and the surfaces to be ground or polished, by any known or suitable means. The permutation may be still further increased by substituting plates like L, or frames like L^1, for the grinders or polishers represented, and fitting the said plates or frames with axles like g, g, or g^1, g^1, for the grinders or polishers to rotate upon, by which arrangement a triple rotary motion that may be termed a "sun, planet, and satellite" motion of the grinders or polishers is produced; or the compound motion of the grinders or polishers may be still further increased or multiplied by a further extension of the same principle of arrangement.

My invention is capable of the following modification, to wit, a grinder or polisher may be arranged and operated like the table A, represented, and the articles to be polished may have the arrangement which I have described for the grinders or polishers, by which modification the same relative motions of the grinding or polishing surface and the surface to be ground or polished are obtained. I consider, however, that the arrangement first described and represented in the drawing is the best, more especially for polishing, as by the slight rocking motion that is permitted to the polishers by the looseness of the fitting of the spindles K, K^1, to the plates or frames L, L^1, and of the axles g, g^1, to the polishers, the machine is enabled easily to polish surfaces which are not quite level, as, for instance, the surfaces of what is known as German-plate-glass.

I do not claim producing a simple rotary motion of grinders or polishers or the surfaces to be ground or polished, by the friction produced by the rotation of the opposed surface or surfaces, but

What I claim as my invention, and desire to secure by Letters Patent, is:—

The arrangement of the grinders or polishers substantially as herein specified, whereby they are caused to derive a compound rotary motion such as is herein specified, by the friction produced upon them by the rotary motion of the surface or surfaces to be ground or polished, or what is equivalent, the reverse arrangement by which the surface or surfaces to be ground or polished are caused to derive a similar compound rotary motion by the friction produced by a rotary motion of the grinding or polishing surface.

ALEXANDER LINDSAY.

Witnesses:

ALEXANDER DELONG,

LYMAN A. BROWNELL.