

No. 757,053.

PATENTED APR. 12, 1904.

C. L. RAMEAU.
MACHINE FOR GRINDING LENSES.

APPLICATION FILED SEPT. 3, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 5.

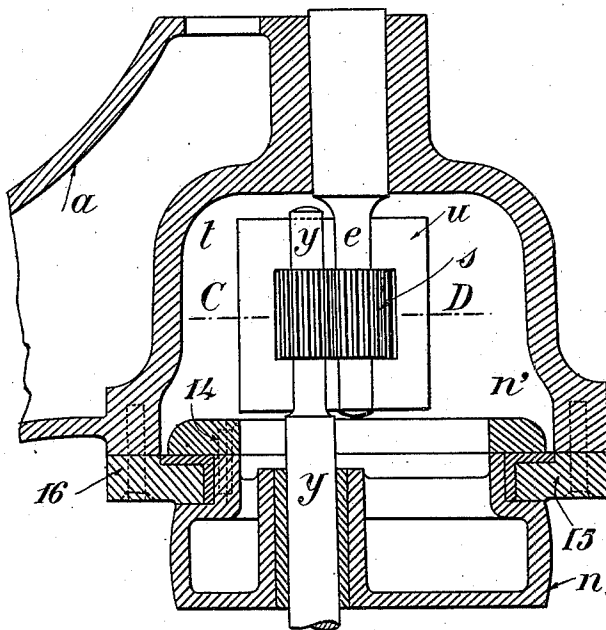


FIG. 1.

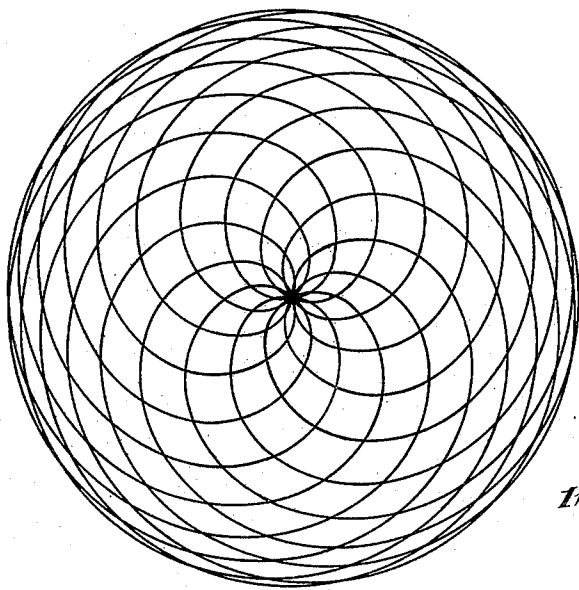
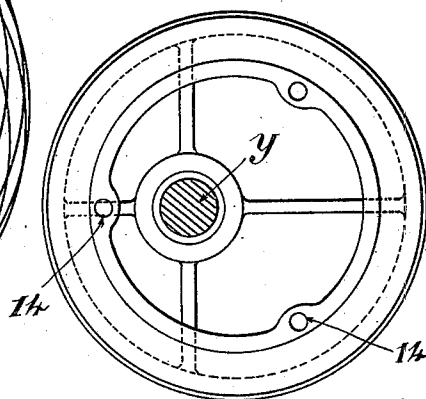


FIG. 6.



WITNESSES

H. M. Kuehne
John A. Percival

INVENTOR

Clairde Louis Rameau

By Richardson & Co.

ATTORNEYS

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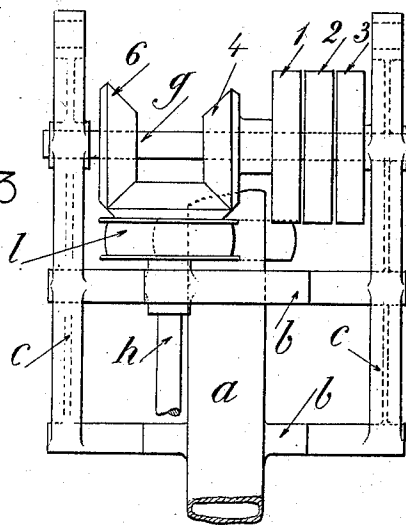
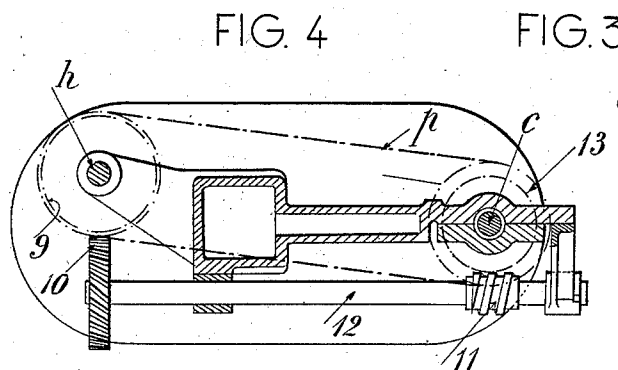
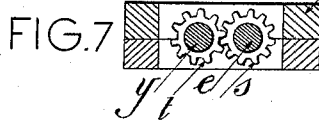
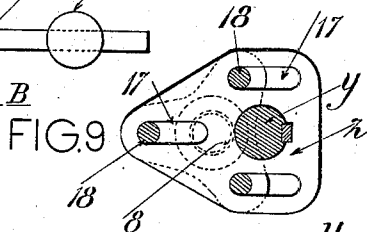
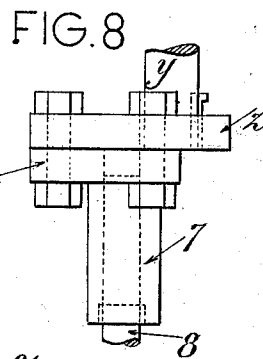
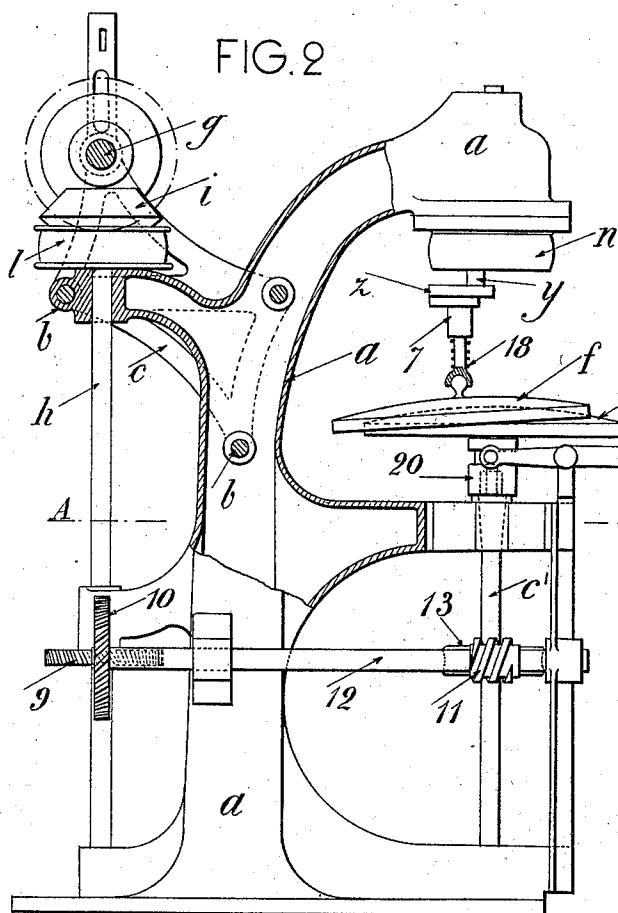
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2 SHEETS—SHEET 2.



WITNESSES

H. M. Kuehne
John A. Perinell

INVENTOR

Claude Louis Rameau
BY *Richardson*

ATTORNEYS

UNITED STATES PATENT OFFICE.

CLAUDE LOUIS RAMEAU, OF PARIS, FRANCE.

MACHINE FOR GRINDING LENSES.

SPECIFICATION forming part of Letters Patent No. 757,053, dated April 12, 1904.

Application filed September 3, 1903. Serial No. 171,848. (No model.)

To all whom it may concern:

Be it known that I, CLAUDE LOUIS RAMEAU, civil engineer, a citizen of the Republic of France, and a resident of No. 110 Rue d'Angoulême, Paris, in the Republic of France, have invented certain new and useful Improvements in Machines for Grinding Lenses; of which the following is a specification.

This invention relates to improvements in machines for grinding lenses by means of two grinding-disks the one of which is subjected to an epicycloidal movement around the geometrical axis of the other disk.

The improvements consist, substantially, in the mechanism which insures the epicycloidal movement of the one disk, such mechanism working with great easiness and of a very simple construction, in the manner of controlling the pressure of the disks, and in the general driving of the machine.

In the annexed drawings, Figure 1 represents a complete and closed elongated epicycloid illustrating the movement which can be imparted to one of the grinding-plates. Fig. 2 is a sectional elevation of the whole machine; Fig. 3, a rear view of part of the machine; Fig. 4, a horizontal section on the line A B of Fig. 2; Fig. 5, a section, on a larger scale, of the means for operating the upper grinding-plate; Fig. 6, a plan view of a cam-disk; Fig. 7, a horizontal section of the box *u* and pinions on the line C D of Fig. 5; and Figs. 8 and 9 are detail views in elevation and plan, respectively, of the lower part of the mechanism for operating the upper plate.

The machine comprises a main frame *a*, which supports the various parts and to bosses *b* of which are bolted two cheeks or brackets *c*, which carry the driving-shaft *g*. To the latter are keyed a beveled pinion 6 and a pulley 3. Two pulleys 1 and 2 are loosely mounted on the said shaft, and fixed to the loose pulley 1 is a beveled pinion 4. A beveled pinion *i*, keyed to the vertical shaft *h*, is in permanent gear with the aforesaid pinions 4 and 6, so that the shaft *h* can be revolved in either direction or stopped by placing the driving-belt on the pulley 1, 2, or 3, as the case may be. The shaft *h* serves to drive a vertical shaft *c'*, to the upper end of which is fixed the lower

grinding-plate *d* and a vertical shaft *y*, adapted to impart to the upper plate *f* an epicycloidal movement in a manner which will be described hereinafter.

The optical surfaces to be treated and the grinding material are placed between the plates *d* and *f*, as usual. The shaft *c'* receives a slow rotatory movement from the shaft *h* by means of the cross-shaft 12 and worm-gear 9 10 11 13. The shaft *y* is driven by the shaft *h* by means of the pulleys *l* and *n* and the belt *p*. The pulley *n* has an upper part *n'*, Fig. 5, connected thereto by means of screws 14 and is guided in its rotatory movement by a ring 15, fixed to the frame by means of screws 16. In this ring the pulley is adapted to slide with slight friction.

The shaft *y* passes freely through an eccentric hub in the pulley *n*, so that during the rotation of the pulley each point of the geometrical axis of the shaft *y* describes a circle round the geometrical axis of the pulley. Keyed to the upper part of the shaft *y* is a pinion *t*, which meshes with another pinion *s*, keyed to a fixed vertical rod *e*, the geometrical axis of which coincides with the geometrical axis of the pulley *n*.

The pinions *s* and *t* are held in permanent engagement with each other by means of a box *u*, surrounding them and formed of two parts connected together.

It is obvious that when the pulley *n* is revolved the pinion *t* will travel on the circumference of the pinion *s*. To the lower end of the shaft *y* is fixed a horizontal plate *z*, with three parallel slots 17, into which engage bolts 18, by means of which a socket or sleeve 7 is fixed to said plate. Into the said sleeve 7 extends the shaft 8, which carries the upper grinding-plate *f*. The said shaft 8 is adapted to slide in the said socket 7, and a helical spring 18 is arranged between the bottom of the socket and a flange or the like at the lower end of the shaft. It will be seen that when the machine is working and the pinion *t* is traveling on the pinion *s* each point on the surface of the plate *f* will describe an epicycloidal curve.

By means of the slots in the plate *z* and the bolts engaging thereinto the shaft 8 can be

made to coincide with the shaft *y* or can be moved out of alinement with the said shaft to a greater or less extent in order to obtain epicycloids of the desired shape. By providing the pinions *s* and *t* each with an unequal number of teeth able to be divided mutually only by the unity each epicycloid described by a given point of the plate-surface will be made to comprise a very large number of loops, as shown in Fig. 1 of the drawings, so that the treatment of the lens is very thorough, each point of the surface of the upper plate passing successively over the different parts of the lower plate and causing the grinding material to be uniformly distributed over the entire surface of the lower plate.

The machine also comprises, finally, a regulating-lever 19, pivoted to the frame and engaging, by means of a fork, the socket 20, upon which the lower grinding-plate *g* *d* is fixed, the said lever being provided with a balance-weight 21, which can be adjusted with regard to its fulcrum. The socket 20 is adapted to be revolved by the shaft *c* by means of a spline, but is slidable on said shaft, so that if the balance-weight on the lever 19 is pushed back the lower plate is lifted. By this means, in conjunction with the spring 18, the pressure of the plates upon the body which is placed between them can be elastically regulated. As indicated in the drawings, the construction of the rear driving mechanism of the machine permits of completely disconnecting the fore part of the machine and of arranging in a restricted space a series of machines side by side driven off one shaft parallel to the row of machines by means of straight parallel belts.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A machine to grind lenses comprising two grinding-disks *d* and *f*, in combination with a vertical shaft *y*, a pulley *n* guided in the frame and adapted to turn around its geometrical axis and provided with an eccentric hub, through which passes freely the shaft *y*, a

pinion *t* keyed on the shaft *y*, a second pinion *s*, fixed on the frame and the geometrical axis of which coincides with that of the pulley *n*, a hoop *u* to maintain always the two pinions in engagement, a disk *z*, fixed to the inferior part of the shaft *y* and provided with the grooves 17, a socket 7 fixed so that it can be regulated on the disk *z* and a shaft 8 sliding in the socket 7 and which carries away with it the disk *f*, substantially as described and for the purpose set forth.

2. A machine for grinding lenses comprising two grinding-disks *d* and *f*, in combination with the means for carrying away the disk in an epicycloidal movement, a lever 19, pivoted on the frame, a socket 20 connected operatively to the disk *d*, a shaft *c* on which the socket 20 may slide, a counterweight 21, adapted to be moved on the lever 19 and a spring 18 which tends to cause the going down of the disk *f*, substantially as described and for the purpose set forth.

3. A machine for grinding lenses comprising two grinding-disks *d* and *f*, the means for giving the disk *f* an epicycloidal movement, a hub to control the pressure of the disks *d* and *f*, one with regard to the other, a horizontal driving-shaft *g*, the conical pinions 6 and 4 and the pulleys 1, 2, 3, disposed on the said shaft, a vertical shaft *h*, receiving the movement of the shaft *g* by the conical pinion *i*, a pulley *l* keyed on the shaft *h* and which carries away with it through a strap the pulley, *n*, crossed by the shaft *y* and a helicoidal wheel 10 which gears with a second wheel 11, keyed on the horizontal shaft 12, provided at the other end with a keyed worm 11 and a helicoidal wheel 13, keyed on the shaft *c*, substantially as described and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CLAUDE LOUIS RAMEAU.

Witnesses:

ANTOINE LAVOIX,

AUGUSTUS E. INGRAM.