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MACHINE FOR GRINDING LENSES.  
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998,101.

Patented July 18, 1911.

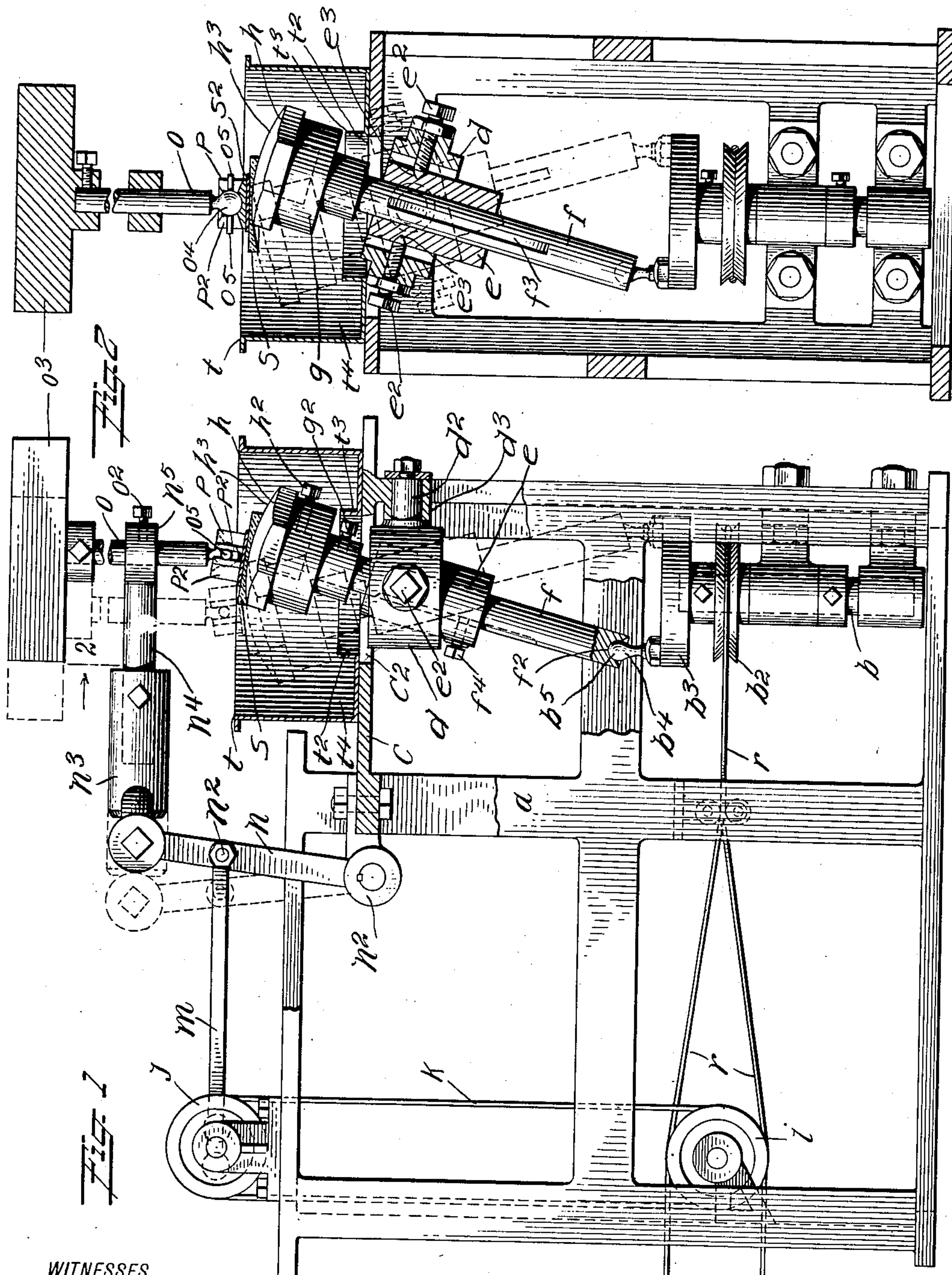


FIG. 1

WITNESSES  
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# UNITED STATES PATENT OFFICE.

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## MACHINE FOR GRINDING LENSES.

998,101.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed October 24, 1910. Serial No. 588,581.

*To all whom it may concern:*

Be it known that I, MAX A. LAABS, a subject of the Emperor of Germany, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Grinding Lenses, of which the following is a specification, such as will enable those skilled in the art to which it ap-  
10 pertains to make and use the same.

This invention relates to machines for grinding lenses, and particularly for grinding what are known as toric lenses, and the object thereof is to provide an improved  
15 machine of this class which is simple in construction and effective in operation, and which may be easily and conveniently manipulated, and with this and other objects in view the invention consists in a machine  
20 of the class and for the purpose specified constructed and operated as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a side view of my improved  
30 lens grinding machine, part of the construction being in section, and;—Fig. 2 a sectional view at right angles to that shown in Fig. 1.

In the practice of my invention I provide  
35 a suitable frame *a* in the bottom and one side portion of which is mounted a vertically arranged shaft *b* provided with a drive wheel or pulley *b*<sup>2</sup>, and having a circular head *b*<sup>3</sup>, the upper side of which is provided with  
40 an eccentric pin *b*<sup>4</sup> having a rounded head *b*<sup>5</sup>.

In the top portion of the frame *a* is a horizontal plate *c* which forms a part of said frame and in which is a large opening  
45 *c*<sup>2</sup>, below which and in vertical line with the shaft *b* is a gyrating shaft *f* supported by a universal coupling constructed in the following manner. A ring or band *d* is provided at one side with a journal *d*<sup>2</sup> which passes  
50 through a suitable bearing *d*<sup>3</sup> formed in or otherwise connected with the frame *a*, and supported in the ring or band *d* and axially thereof is a sleeve *e* which is of less transverse dimensions than said ring or band.  
55 The sleeve *e* is supported by oppositely arranged screws, bolts or similar devices *e*<sup>2</sup>

which are passed through the opposite sides of said ring or band *d*, and the inner ends of which are pointed and fit in corresponding recesses *e*<sup>3</sup> in the opposite sides of said  
60 sleeve.

The shaft *f* passes vertically through the sleeve *e* and the lower end thereof is provided with a socket *f*<sup>2</sup>, in which the head *b*<sup>5</sup> of the pin *b*<sup>4</sup> fits, and said shaft is provided  
65 in one side with a longitudinal groove *f*<sup>3</sup>, and a set screw *f*<sup>4</sup> is passed through one side of the sleeve *e*, and the inner end of said screw enters said recess, and by means of this construction the shaft *f* may be vertically  
70 adjusted to any desired position in the sleeve *e*. The upper end of the shaft *f* is provided with a main head *g* which is preferably formed separately and secured thereto by a set screw *g*<sup>2</sup>, and connected with  
75 the main head *g* is a supplemental head *h* which is formed separately of and secured to the main head *g* by a set screw *h*<sup>2</sup>. The supplemental head *h* forms the grinder proper, and the top surface *h*<sup>3</sup> thereof is  
80 convex in cross section, and the degree of convexity will be controlled by the character of the lens to be ground. In the bottom side portion of the frame *a* opposite the  
85 drive wheel or pulley *b*<sup>2</sup> is mounted another drive wheel or pulley *i* and on or in the top portion of said frame, over the drive wheel or pulley *i*, is another drive wheel or pulley  
90 *j*, and these drive wheels or pulleys are connected by a belt or similar device *k*.

Eccentrically connected with the drive wheel or pulley *j* is a rod *m*, which is pivotally connected with a vertically arranged arm *n* pivoted at *n*<sup>2</sup>, and with the top of which is loosely connected a sleeve *n*<sup>3</sup> in  
95 which is secured a horizontal rod *n*<sup>4</sup>, said sleeve and rod *n*<sup>4</sup> forming an arm having a head *n*<sup>5</sup> through which is passed a vertical shaft *o* which may be adjusted in the head  
100 *n*<sup>5</sup> by means of a set screw *o*<sup>2</sup>, and the shaft *o* is provided at its upper end with a detachable weight *o*<sup>3</sup>.

The shaft *o* is provided at its lower end with a spherical head *o*<sup>4</sup> which fits in and oscillates in a corresponding recess in the  
105 lens holder *p*. The lens holder *p* consists of a block in the opposite sides of which are vertically arranged grooves or recesses *p*<sup>2</sup>, and the head *o*<sup>4</sup> of the shaft *o* is provided with radial pins *o*<sup>5</sup> which fit in said recesses,  
110 and in practice the lens *s* to be ground is connected with the lens holder *p* by means



of wax  $s^2$ , and said lens rests on the grinding or supplemental head  $h$  of the shaft  $f$ .

The shaft  $b$  may be driven by a belt  $r$  which also operates the drive wheel or pulley  $i$  and  
 5 said belt may be driven by any suitable power apparatus, and at the same time the wheel or pulley  $j$  is driven by the pulley  $k$ , and the rod  $m$  is oscillated horizontally. This operation of the rod  $m$  oscillates the arm  $n$   
 10 in a vertical plane, and the rod  $m$  operates the arm  $n^3-n^4$  horizontally, and as hereinbefore described the connection of the said arm  $n^3-n^4$  with the arm  $n$  is such that said arm  $n^3-n^4$  is also capable of vertical move-  
 15 ment.

In the above described operation both the upper and lower ends of the shaft  $f$  are given a gyrating and circular movement by means of the eccentric pin  $b^4$  on  
 20 the head  $b^3$  of the shaft  $b$ , and the lens  $s$  which rests on the head  $h$  of said shaft will be ground as will be readily understood. The lens  $s$  has no support independent of the head  $h$  of the shaft  $f$ , the only opera-  
 25 tion, in this respect of the lens holder  $p$  and the shaft  $o$  being to hold said lens in position on the head  $h$ , and it will be understood that the weight of the arm  $n^3-n^4$ , the shaft  $o$  and the weight  $o^2$  detachably  
 30 connected with said shaft, all operate to hold the lens  $s$  in contact with the grinding head  $h$  and a heavier or lighter weight  $o^2$  may be employed if desired. Placed on the plate  $c$  is a casing  $t$  open at the top and  
 35 having a large central opening  $t^2$  in the bottom thereof around which is a flange or rim  $t^3$ , and this forms an annular chamber  $t^4$  in the casing  $t$ , which is designed to receive the grindings, dust or other substances  
 40 produced in the operation of the machine as the grinding head of the shaft  $f$  rotates in said casing  $t$ .

My invention is not limited to any particular means for rotating the shaft  $f$  or  
 45 operating the arm  $n^3-n^4$ , and any suitable apparatus for giving said arm  $n^3-n^4$  an oscillating and vertical movement may be employed.

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

1. In a machine of the class described, a vertically arranged main shaft provided with a horizontal head having an eccentric  
 55 pin, a vertically arranged gyrating grinding shaft supported over said main shaft by a universal coupling, and the lower end of which is provided with a socket in which said pin fits, said gyrating grinding shaft  
 60 being provided with a convex grinding head, a horizontally oscillating and vertically movable arm arranged over said gyrating grinding shaft and provided with a vertically arranged member, and a lens  
 65 holder loosely connected with said member

and adapted to hold a lens on the grinding head of said grinding shaft.

2. In a lens grinding machine, a vertically arranged gyrating shaft provided with a detachable convex grinding head, 70 means for operating said shaft, a horizontally oscillating and vertically movable arm arranged over the grinding head of said shaft and provided with a vertically adjustable member, and a lens holding device 75 adapted to be loosely connected with said member and to bear on the grinding head of said shaft.

3. In a lens grinding machine, a vertically arranged gyrating shaft supported in 80 a universal coupling and provided with a detachable convex grinding head, means for operating said shaft, a horizontally oscillating and vertically movable arm arranged over the grinding head of said shaft and 85 provided with a vertically adjustable member, and a lens holding device adapted to be loosely connected with said member and to bear on the grinding head of said shaft, said shaft being vertically adjustable and 90 said member being provided with a detachable weight.

4. In a machine of the class described, a main vertically arranged shaft provided with a horizontal head having an eccentric 95 pin, a vertically arranged gyrating shaft mounted over said main shaft and in a universal coupling and in the lower end of which is a socket in which said pin fits, the upper end of said gyrating shaft being 100 provided with a detachable grinding head, a horizontally and vertically movable member arranged over the grinding head of the gyrating shaft, and a lens holder device loosely connected with said member and 105 adapted to hold a lens on said grinding head.

5. In a machine of the class described, a main vertically arranged shaft provided with a horizontal head having an eccentric 110 pin, a vertically arranged gyrating shaft mounted over said main shaft and in a universal coupling and in the lower end of which is a socket in which said pin fits, the upper end of said gyrating shaft being pro- 115 vided with a detachable grinding head, a horizontally and vertically movable member arranged over the grinding head of the gyrating shaft, and a lens holder device loosely connected with said member and 120 adapted to hold a lens on said grinding head, the upper end portion of said gyrating shaft and grinding head thereof being also inclosed by a casing open at the top 125 and in which is an annular chamber.

6. In a lens grinding machine, a vertically arranged gyrating shaft supported in a universal coupling and provided with a convex grinding head, means for operating 130 said shaft, a horizontally oscillating and



vertically movable arm arranged over the grinding head of said shaft and provided with a vertically adjustable member, and a lens holding device adapted to be loosely  
5 connected with said member and to bear on the grinding head of said shaft.

In testimony that I claim the foregoing

as my invention I have signed my name in presence of the subscribing witnesses this 22nd day of October 1910.

MAX A. LAABS.

Witnesses:

C. E. MULREANY,

G. L. MAXHEIMER.