(No Model.)

2 Sheets—Sheet 1.

J. E. GERMAIN.

MACHINE FOR GRINDING EDGES OF OPTICAL GLASSES.

No. 550,787. Patented Dec. 3, 1895.

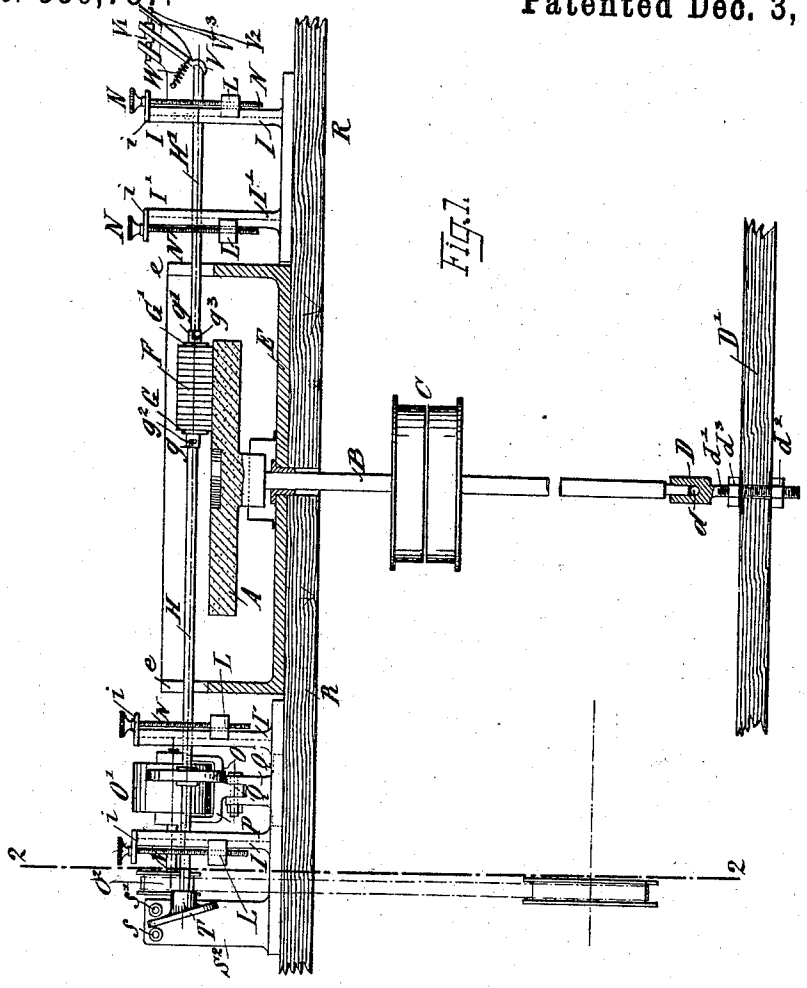

Fig. 1.

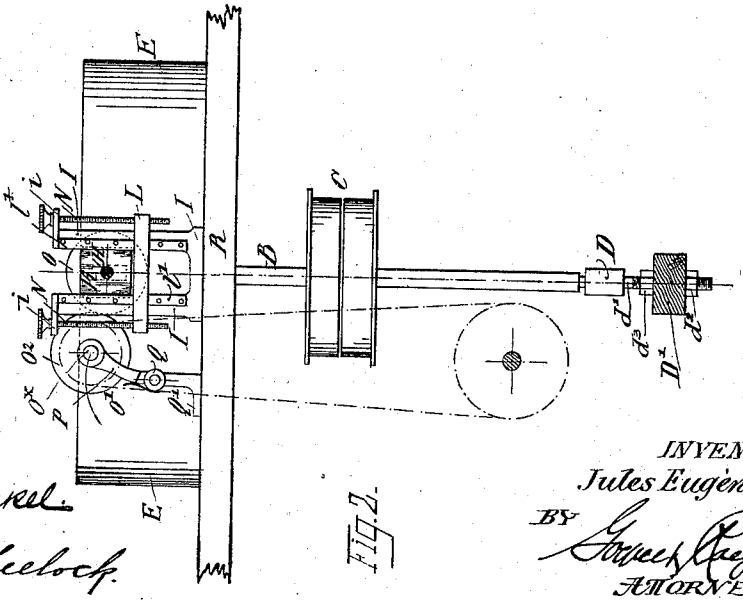

Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

J. E. GERMAIN.

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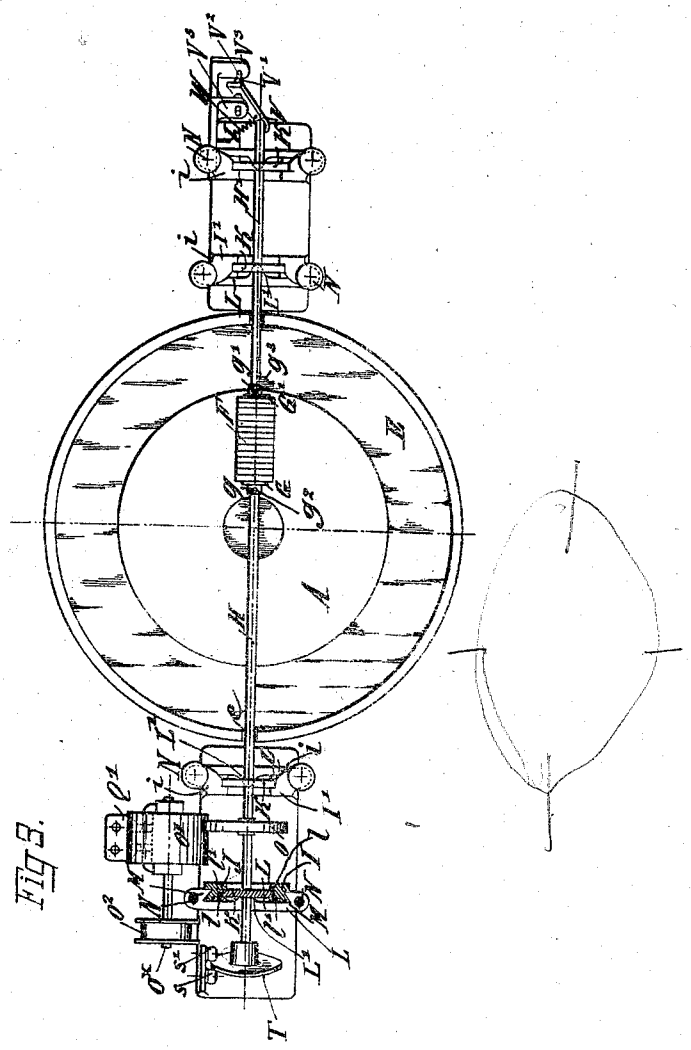

Fig 3.

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UNITED STATES PATENT OFFICE.

JULES EUGÈNE GERMAIN, OF PARIS, FRANCE, ASSIGNOR TO LA SOCIÉTÉ PARISIENNE DE VERRERIE OPTIQUE, OF SAME PLACE.

MACHINE FOR GRINDING EDGES OF OPTICAL GLASSES.

SPECIFICATION forming part of Letters Patent No. 550,787, dated December 3, 1895.

Application filed April 18, 1895. Serial No. 546,233. (No model.)

To all whom it may concern:

Be it known that I, JULES EUGÈNE GERMAIN, a citizen of the Republic of France, residing at Paris, in the Republic of France, have invented certain new and useful Improvements in Machines for Grinding the Edges of Optical Glasses, of which the following is a specification.

This invention has reference to an improved machine for grinding the edges of optical lenses, by which the grinding operation is not accomplished by hand, as heretofore, but by an entirely mechanical operation, so that hand manipulation is to a great extent dispensed with. The blanks leave the glass-factory square and have the general dimensions required for the optical glasses which have to be manufactured. The square blanks of glass thus obtained are first transformed by means of pinchers, so as to break off the corners and change them into round shape. The edges of the blanks are not regular, but can be quickly ground off by means of a machine which forms the subject of the present invention. For giving their circumferences an exact round form the glass-blanks are first placed one on top of the other, so as to form together a cylinder of glass, and it is in this shape that the round blanks are subjected to the action of the machine, which is shown in the accompanying drawings, in which—

Figure 1 is a sectional front elevation of the machine. Fig. 2 is a vertical transverse section of the same on line 2 2, Fig. 1; Fig. 3, a plan showing a portion in horizontal section.

Similar letters of reference indicate corresponding parts.

The machine is composed, essentially, of a grinding-disk A, which is attached to the upper end of a vertical shaft B, on which are mounted the motion-transmitting pulleys C. The shaft B rests at its lower end in a step-bearing D, which is provided with an interior antifriction-ball d, on which the shaft is supported. The height of the step-bearing D is adjusted by means of a set-screw d', which passes through a support D′ and jam-nuts d^2 d^3, so as to permit the raising or lowering of the horizontal disk A. The grinding-disk is rotated in a box E, which contains suitable grinding-powder, such as is usually employed in the grinding of glass-blanks. The ends of the cylinder F, which is formed by putting together the round blanks, are firmly clamped by two metallic clamping-heads G G′, which are provided with sockets g g'. The socket g is fitted on the end of a horizontal shaft H and connected thereto by means of a bayonet-joint g^2, while the socket g' is fitted on and connected in a similar manner by a bayonet-joint g^3 to the end of a horizontal shaft H′, which is aligned with the shaft H. The shaft H passes through recesses e of the box E and is supported by two bearing-plates K, which are guided in ways l at each side of the recesses of upright guide-frames I I′, said bearing-plates being provided with a central opening for the shaft H. Two retaining-strips l' l' hold the plate K in vertical position in the guide-frames I I′. Below each plate K is arranged a transverse stop-piece L, which can be shifted along the outer faces of the vertical guide-frames I I′, said plate being permitted to rest on a central stop L′ of the piece L. The transverse stop-pieces L are each provided at the ends with inturned projections M, which engage the correspondingly-grooved outer edges of the vertical guide-frames I I′. The transverse stop-pieces L are each further provided with a threaded hole in each end, which receive screws N, which are supported at their upper ends in horizontal lugs i, in which they can be rotated. By turning the heads of the screws N in one or the opposite directions the transverse stop-pieces L can be raised or lowered along the vertical guide-frames I I′, so as to properly adjust the stops.

The shaft H′ is mounted in corresponding bearing-plates K and guide-frames I′ I at the diametrically-opposite side of the disk A, so that the glass cylinder F is held in place on the grinding-disk A by the plates K, which plates are supported at a certain height above the supporting-table R, and which descend until the glass cylinder F rests on the grinding-disk A. The other mountings for the shaft H′ are the same as those described for the shaft H and receive the same reference characters.

By the frictional action of the grinding-disk A on the circumference of the glass cylinder F, which friction is obtained by means

which will be hereinafter described, the plates K gradually descend at the same time, so as to produce the equal grinding off of all irregular projections on the circumference of the glass cylinder F. The plates K are permitted to descend until they touch the stops of the transverse stop-pieces L, which are adjusted to the proper height. By this disposition of the parts it is possible to give the glass cylinder F the exact diameter required.

Between the guide-frames I and I′ and on the shaft H is arranged a friction-disk O, which serves to impart the required rotary movement to the shafts H H′. The friction-disk O is in contact with a second wider disk or drum O′, that is mounted on an auxiliary shaft $O^{\times}$, to which rotary motion is imparted by a pulley O^{2}. The shaft $O^{\times}$ of the friction-drum O′ can be moved at will away from the disk O, as indicated by the arrow, Fig. 2, as the forked support P of the shaft $O^{\times}$ is connected by a hinge Q with an angular bracket Q′, which is attached to the table R of the machine. For imparting rotary motion to the shafts H and H′ all that is necessary is to bring the drum O′ in contact with the disk O, while for arresting the motion of the shafts H and H′ the drum O′ is moved out of contact with the disk O. At the outermost end of the shaft H is mounted an inclined disk T, which moves between two fixed antifriction-rollers S S′, that are mounted on an upright support S^{2} on the table R. By the rotary contact of the inclined disk T with the antifriction-rollers S S′ a longitudinally-reciprocating motion is imparted to the shafts H H′ and thereby to the glass cylinder F, while they are simultaneously rotated on their axes by the friction-drum O′.

For securing a regular reciprocating motion to the shaft H′ the latter is subjected at its outermost end to the action of a finger V, the lower end of which is pressed against the same by means of a helical spring W, so that thereby the inclined disk T is constantly kept in contact with the antifriction-roller S. The finger V is provided at its upper end with a sleeve V′, that is placed on a horizontal shaft V^{2}, which is supported in inclined bearings V^{3}, as shown clearly in Figs. 1 and 3, so that the shaft H′ can be shifted outwardly when the finger is swung to one side.

The machine is operated as follows: After the glass cylinder is placed in the position described the machine is set in motion, so that the circumference of the cylinder F forms frictional contact with the grinding-disk A, which is rotated at uniform speed, whereby all the portions of the disk are brought successively in contact with the glass cylinder to produce thereby the uniform grinding off of the entire circumference of the latter. The glass cylinder receives a rotary motion simultaneously with the longitudinal reciprocating motion imparted by the disk T and rollers S S′, so that in connection with the rotary motion of the grinding-disk the uniform grinding off of the circumference of the glass cylinder is produced until the same assumes gradually a perfectly cylindrical form.

It is obvious that it is necessary to continuously supply a fine moistened grinding material, such as emery, between the cylinder F and the disk A. When the cylinder F is ground down to the required diameter, the shafts H and H′ are moved away from each other, so that the cylinder can be removed and the individual glass disks separated from each other.

By the means described the edges of the glasses to be used for optical instruments are ground into an exactly circular form, regardless of the diameter and thickness of the glass-blanks operated upon.

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

1. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding-disk, two aligned shafts provided at their adjacent ends with means for clamping the blanks to be ground, means for rotating said shafts, and means for simultaneously imparting a longitudinal reciprocating motion to the shafts, substantially as set forth.

2. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding-disk, means for holding a glass-cylinder in position upon the surface of the grinding-disk, means for imparting rotary motion to said cylinder, and means for simultaneously imparting a longitudinal reciprocating motion to said cylinder, substantially as set forth.

3. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding-disk, two shafts arranged in line with each other and provided with means at their adjacent ends for clamping the blanks to be ground, guide-frames, sliding-plates guided in said frames and provided with openings for receiving the shafts, means for limiting the downward motion of said plates, and means for rotating the shafts, substantially as set forth.

4. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding disk, two shafts arranged in line with each other and provided with means at their adjacent ends for clamping the glass-disks to be ground, guide-frames, sliding-plates guided in said frames and provided with openings for receiving said shafts, stops arranged under the plates and adapted to limit the downward movement of the same, means for adjusting the position of said stops, and means for rotating said shafts, substantially as set forth.

5. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding-disk, two shafts arranged in line with each other and provided with means at their adjacent ends for clamping the disks to be ground, between them, upright guide-

frames, sliding-plates guided in said frames, transverse bars guided along the frames and provided with stops extending under the plates, for limiting the downward movement of the same, adjusting-screws for raising or lowering said transverse bars, and means for rotating said shafts, substantially as set forth.

6. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding-disk, aligned shafts provided at their adjacent ends with means for clamping the glass-disks to be ground, between them, means for supporting said shafts, means for rotating the same, and means for imparting simultaneously a reciprocating longitudinal motion to the shafts, consisting of a bracket provided with a pair of anti-friction rollers and a disk fixed to one of said shafts in inclined position and extending between said sleeves, substantially as set forth.

7. In a machine for grinding the edges of optical glasses, the combination of a rotary grinding-disk, aligned shafts provided with means at their adjacent ends for clamping the glass-disks to be ground between them, means for supporting said shafts, means for rotating the same, a disk fixed in inclined position to one of said shafts, means wherewith said disk engages so as to impart a simultaneously longitudinal reciprocating motion to said shafts, and means for causing the other of said shafts to follow the reciprocating movement, consisting of a spring-actuating finger engaging the same, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JULES EUGÈNE GERMAIN.

Witnesses:
CLYDE SHROPSHIRE,
JOSEPH LACOSTE.