A. E. MAYNARD.

CUTTING OR MARKING MACHINE.

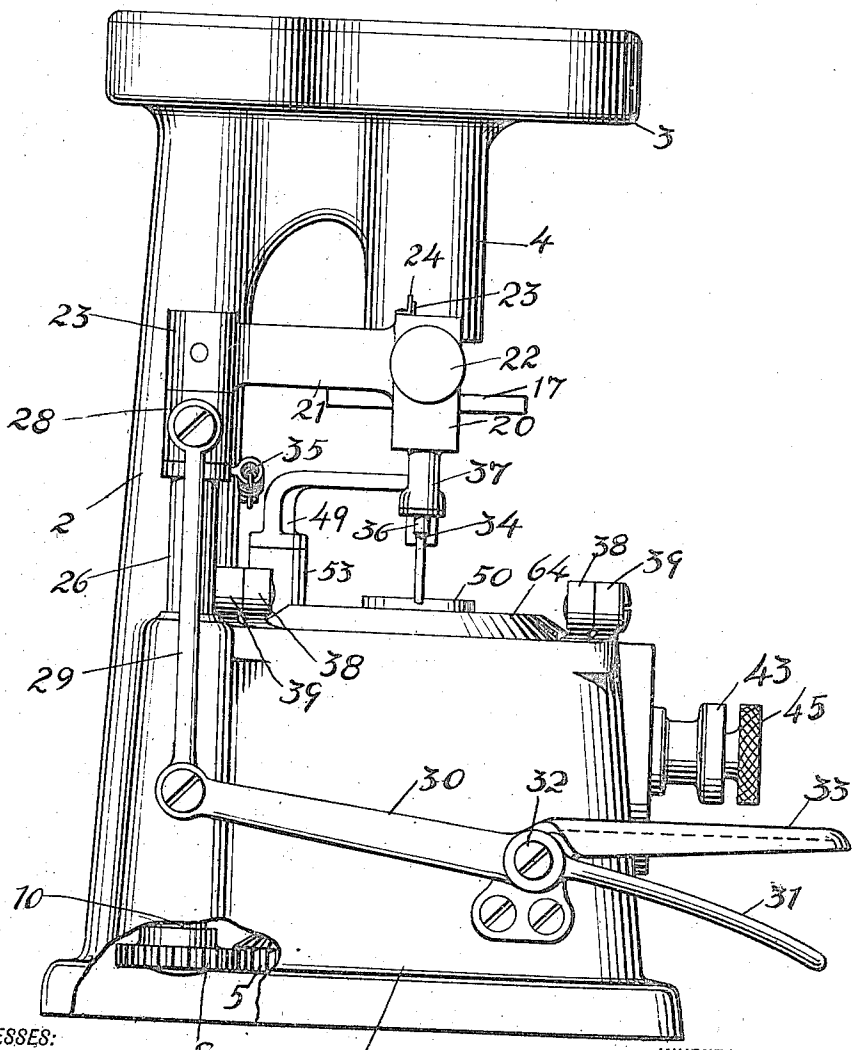
APPLICATION FILED MAY 15, 1916.

1,248,145.

Patented Nov. 27, 1917.

3 SHEETS—SHEET 1.

Fig. I



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3 SHEETS—SHEET 2.

Fig. II

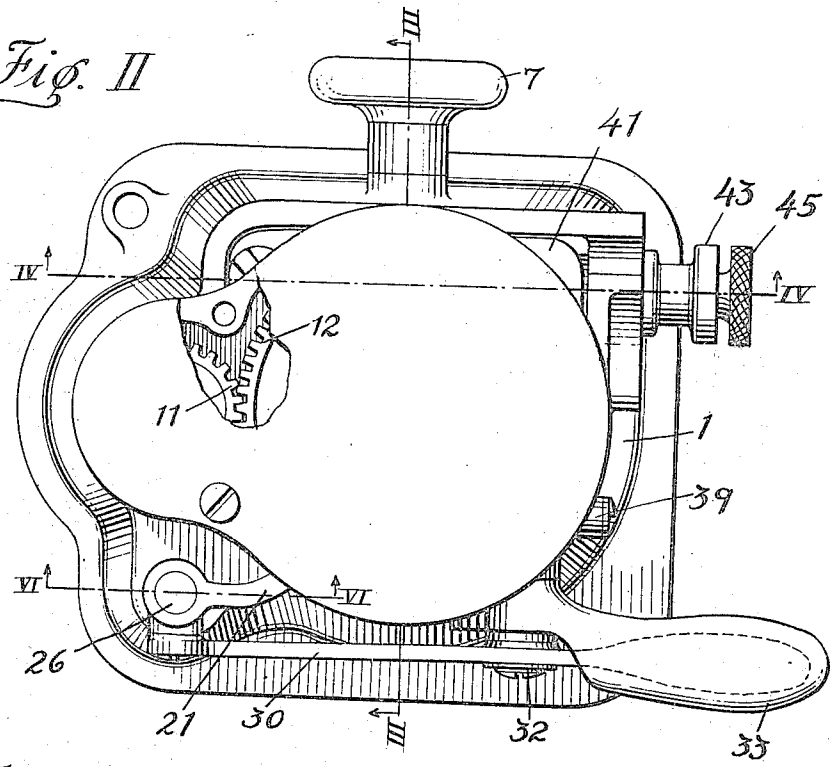
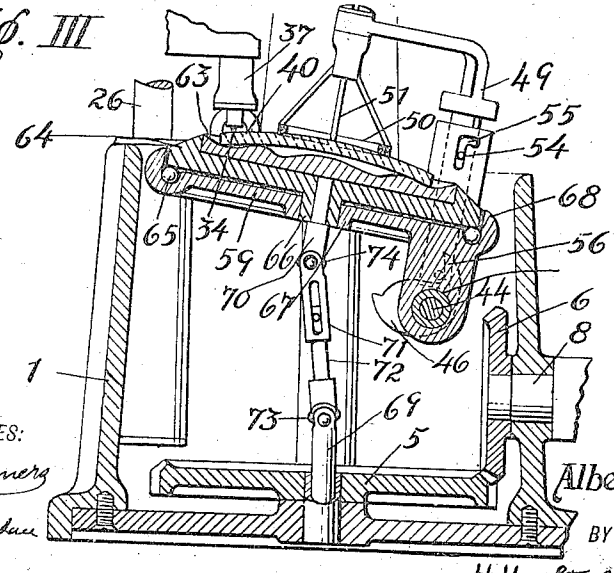


Fig. III



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3 SHEETS—SHEET 3.

FIG. IV

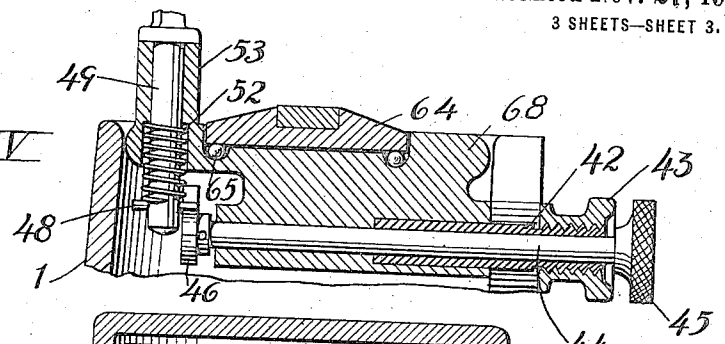
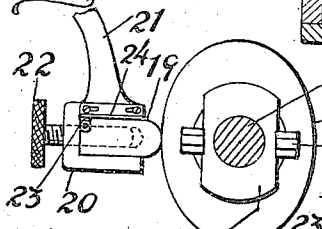


FIG. V



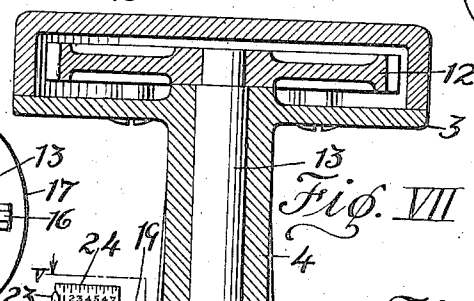


FIG. VII

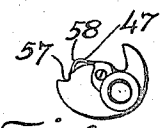


FIG. IX

FIG. VI

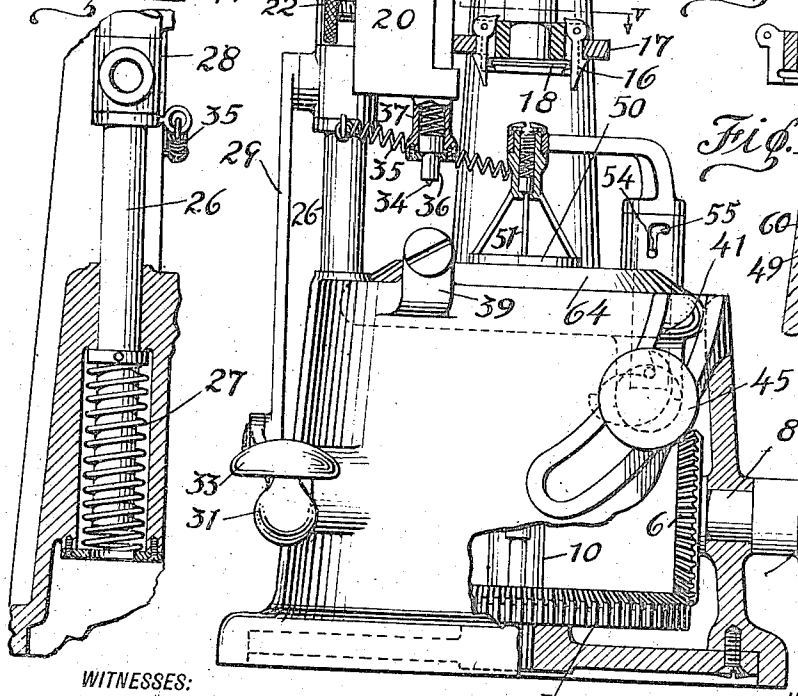


FIG. VIII

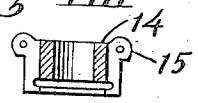
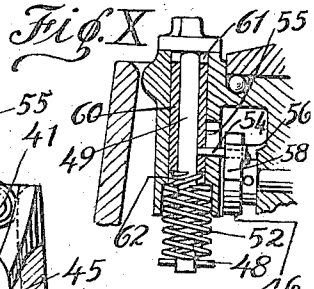


FIG. X



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UNITED STATES PATENT OFFICE.

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CUTTING OR MARKING MACHINE.

1,248,145. Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed May 15, 1916. Serial No. 97,667.

To all whom it may concern:

Be it known that I, ALBERT E. MAYNARD, a citizen of the United States, residing at Southbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Cutting or Marking Machines, of which the following is a specification.

My invention relates to improvements in cutting or marking machines, and has particular reference to an improved marking machine especially adapted for use in the cutting or marking of ophthalmic lenses or similar articles of varying curves on the face to be cut or marked.

One of the leading objects of the present invention is the provision of a simple, durable and accurate machine of this character in which the cutter may at all times be substantially normal to the surface operated upon.

A further object of the invention is the provision of a machine in which the cutter shall be relatively rigidly mounted to prevent chattering or tendency to lateral play, and in which a single cutter of this character may be employed in connection with both plano concave and convex curves.

Another object of the invention resides in the provision of improved means for securing the lens in position on the work table, and for releasing the said securing means and locking them in released position as desired.

A further object of the invention resides in improved means for insuring proper engagement of the pressure of the cutting or marking tool against the article to be operated upon.

Further objects of the invention include the provision of improved driving mechanism for the several parts, improved means for supporting the lens and for interchangeable retaining members associated with the machine, and in general a simplification and improvement in the several parts of a machine of this character.

Figure I represents a side elevation of my complete machine.

Fig. II represents a top plan view thereof slightly broken away.

Fig. III represents a sectional view taken on the line III—III of Fig. II.

Fig. IV represents a sectional view on the line IV—IV of Fig. II.

Fig. V represents a fragmentary detail view of the former and contact shoe as on the line V—V of Fig. VII.

Fig. VI represents a sectional view as on the line VI—VI of Fig. II.

Fig. VII represents a view partially in elevation and partially in section looking at the front of the machine.

Fig. VIII represents a fragmentary view of the former collar removed.

Fig. IX represents a detail view of a modified construction of releasing cam.

Fig. X represents a sectional view of an improved tension and controlling mechanism for the lens clamp.

In the drawings, in which similar characters of reference are employed to denote corresponding parts throughout the several views, the numeral 1 designates the hollow base of my machine, having rising therefrom the standard 2 supporting the upper gear case and frame 3, from which depends the journal sleeve 4. Rotatably mounted within the base is the combined spur and miter gear 5 having the miter portion in mesh with the beveled driving pinion 6 rotated through the hand wheel 7 on the outer end of its spindle 8, while meshing with the spur portion of the gear is the pinion 9 on the lower end of the shafting 10 which is journaled in the standard 2 and bears at its upper end a second pinion 11 of equal size to the pinion 9, this pinion 11 meshing with the gear 12 contained within the casing 3 and having depending therefrom the spindle 13 which is journaled in and projects below the portion 4 of the frame and is provided on its lower end with the collar 14 having the ears 15 to which are pivoted the latch members or dogs 16 serving to engage and retain in position a former or guide shape 17, a split spring ring 18 or the like carried by the collar 14 serving to

swing the members 16 outward into locking position.

This former 17 is engaged by a shoe or contact member 19 mounted in the bracket 20 on the end of the arm 21 and having its position in the bracket controlled by the adjusting screw 22 to move it in or out as desired, a pointer 23 on the shoe coöperating with a scale 24 on the bracket to indicate said adjustment, said scale being secured by suitable screws or fastening devices to the bracket and having slotted fastener receiving apertures to permit of adjustment of the scale to compensate for wear or the like. The arm 21 terminates in a collar-like portion 25 secured on the upper end of the spindle 26 which is journaled in the side of the base 1 for vertical sliding movement, being normally held in raised position as by the spring 27, a second collar 28 being rotatably mounted on the spindle 26 and connected as by the link 29 with the lever 30 terminating in the handle portion 31 and intermediately pivoted as at 32 to the base, pressing of the handle 31 toward the stationary grip member 33 tending to draw the spindle 26 and thus the arm 21 downward to move the cutting or marking point 34 toward the article to be operated upon. A spring 35 connected to the spindle or arm and to the standard 2 serves to swing the arm inward and retain the shoe or contact member 19 in tight engagement with the former 17.

It will be noted that the contact member 19 is of sufficient length to permit considerable up and down sliding movement of the arm 21 with the contact 19 remaining in engagement with the former 17, while it will also be noted that the cutter point 34 is carried by the cutter shank 36 mounted for vertical sliding movement relative to the bracket 20, though preferably being locked against rotation relative thereto, a compression spring 37 being interposed between the base of the bracket and the head of the shank 36 to hold the cutter downward, the spring thus regulating the maximum pressure of the cutter 34 against the lens to be operated upon, regardless of the pressure exerted on the handles 31 and 33.

It will be understood that the foregoing mechanism may be employed in connection with various types of cutters or markers, but has been particularly designed for use in connection with my novel and improved tilting table cutter.

This cutter, as should be most clearly understood by reference to Figs. III and VII, in place of employing a tilting cutting point or the like, as has hitherto been deemed necessary in the art, employs a tiltable table so that the relation of the lens or article to be operated upon to the point of the cutter may be varied as desired. It will be noted, however, by reference to the drawings that this table is pivoted, as by the connection of the ears 38 on the table with the ears 39 on the base 1, in such manner that the axis of pivotance will pass substantially through the point of engagement of the cutting or marking point 34, and surface of the lens 40, as indicated in Fig. III, so that irrespective of the tilting movement of the table the point 34 will at all times engage at relatively the same point above the surface of the table for the same adjustment of the shoe 19 and the same position of the former 17. The advantage attained by this construction is that the table may be tilted as shown in Fig. III to bring the point approximately to a convex surface to insure best cutting thereof. The table may be brought into a level position, as indicated in Fig. VII, as when it is desired to operate on a plano surface, or may be brought into a suitable raised position when desired to operate on a concave surface, in any event the point being normal to the surface operated upon and exactly the same size and shape of lens being produced whether the table is set for the convex or the concave curvature. To suitably support the table in these several adjusted positions any desired mechanism may be employed, that illustrated comprising an arcuate slot 41 formed in the base 1, through which projects the threaded member 42 secured in the table and bearing on its outer end the clamp nut 43, tightening of this clamp nut against the sides of the slot securely locking the table in desired adjusted position.

The member 42 has been shown as hollow and having extending therethrough the shaft or spindle 44 bearing on its outer end the knurled thumb piece or wheel 45, and on its inner end a cam 46 which may be either a plain cam, as indicated in Figs. III and VII, or a cam having a supplemental spring portion 47, as indicated in Fig. IX. This cam, as illustrated in Fig. IV for example, is adapted to engage the pin 48 on the lower end of the lens clamping arm 49, which extends upwardly and inwardly and has rotatably associated therewith the clamp 50 of any desired style, preferably having the yielding center point 51 for facilitating exact positioning of the lens. A spring 52 interposed between the base of the bearing lug 53 on the table and the pin 48 serves to normally hold the arm downward in position to satisfactorily clamp a lens, as is shown in Fig. III. When it is desired to release the lens, however, it is merely necessary to partially rotate the handle 45 and through the spindle 44 the cam 46, when the cam will engage the pin, pressing the

pin and thus the arm upward out of engagement with the lens and continued movement throwing the supplemental or guide pin 54 over into locked position in the L slot 55, reverse movement of the cam causing the projecting lug or finger 56 to release the pin 54 from locked position and move it to a point where it may slide downward and allow the clamp to again engage a lens.

A modification of the cam is indicated in Fig. IX, in which the supplemental spring member 47 is employed, which is forced downward as the cam is rotated to release the clamp, the pin 48 dropping onto the notch 57 of the cam beyond the spring. To release the clamp arm and shift it into operative position it is then merely necessary to reversely rotate the thumb piece 45 and cam, when the spring will first carry the arm over into position where the pin 54 is disengaged from the horizontal portion of the slot, contact of the pin 54 with the side of the slot then preventing further rotative movement, when the force of rotation of the cam will be sufficient to again press downward the spring 47, releasing its presser face 58 from engagement with the pin 48 and continued movement of the cam, allowing the clamp to gradually come downward into engagement with the lens.

In Fig. X has been illustrated a slight modification of the lens clamping member in which the member may not only be moved outward slightly to the extent limited by the engagement of the end of the slot 55 with the pin 54, but may also be swung manually outward as far as may be desired, as for instance when it is desired to get the same entirely out of the road for changing the former 17 or the like. To accomplish this result the bearing 53 preferably depends inwardly from the table 59 and is provided with the L slot 55, through which projects and beyond which extends the pin 54 for direct engagement by the cam. This pin 54, however, in place of being directly engaged with the lower portion 49 of the clamp arm is carried by the sleeve 60, the lens clamp arm having lugs 61 or the like engaged in suitable recesses at the top of the sleeve to form a clutch connecting the parts to move together, the spring 52 bearing against the lower end of the member 53 and against the pin 48 to hold the arm downward and the parts together, if desired a supplemental finer spring 62 being contained within the spring 52 to most securely hold the two parts of the clutch in operative relation.

The releasing operation of the device is exactly as has heretofore been described, with the addition that at any time by manually grasping and upwardly moving the clamp arm 49 the clutch engagement with the upper end of the sleeve may be released on account of the upper movement of the sleeve being limited by the inter-engagement of the pin 54 and slot 55, upon disengagement of the clutch the clamp arm being readily rotated, as desired, as should be apparent by reference to Fig. X.

It will thus be seen that the lens clamp is in any event carried by the tiltable table 49 and moves therewith to all tilted adjusted positions of the table, while the lens clamp proper 50 being rotatably attached to the arm may turn upon rotation of the lens itself beneath the cutter or marker. To facilitate the rotative movement of the lens I preferably provide a suitable lens receiving pad 63 mounted on a rotatable carriage 64, preferably supported on ball or roller bearings 65, carried by the tilting table and having a central stud 66 rotatably engaged in a bearing aperture 67 in the table 59, the carriage likewise having a close fit with the upstanding peripheral rim 68 on the table so that any lateral movement of the carriage is prevented, while free rotation thereof is facilitated.

To suitably rotate the carriage I preferably connect with the gear 5 in the base of the machine and with the stud on the carriage the spindle or shaft connections 69 and 70 respectively, each of which terminates in a universal joint, while connecting the two universal joints are the telescoping shaft members 71 and 72 to compensate for variance in distance between the universal joints 73 and 74 upon different adjustments of the table.

It will thus be noted by reference to Fig. III that this series of connections will serve to positively and accurately rotate the carriage 64 at exactly the same rate of speed as the gear 5 is rotated irrespective of the tilting adjustment of the table, while through the pinions 9 and 11, gear 12, etc., the former 17 is synchronously rotated so that any desired shape as controlled by the former 17 will be inscribed on the lens 40 starting at a given point on the lens as regards a similar point on the former.

From the foregoing description taken in connection with the accompanying drawings, the construction, operation and advantages of my improved cutting or marking machine should be readily apparent, and it will be seen that I have provided an improved machine in which a lens may be readily clamped in position on the tilting table, in which the table may be adjusted to desired position to bring the surface of the lens normal to the axis of the cutter or marker, in which it is then merely necessary to grasp and press together the handles 31 and 33 to bring the cutter down onto engagement with the lens, the pressure being

gaged by the hand grip alone or being automatically controlled on account of the yielding mounting of the cutter, as indicated, and in which rotation of the handle 7 will then through the various gearing and driving connections described synchronously rotate the former and lens to cause the shape of the former to be inscribed on the lens as the lens rotates beneath the cutting or marking point, while upon completion of the cutting or marking operation it is merely necessary to rotate the thumb piece 45 to release the clamp member from the lens when the lens may be quickly and readily withdrawn.

I claim:

1. In a machine of the character described, the combination with a base and a tool mounted thereabove, of a tiltable table for the article to be operated upon, said table being pivoted on said base to swing about an axis passing substantially through the point on the surface of the article to be engaged by the tool, substantially as and for the purpose described.

2. In a lens cutter, the combination with a base, of a tool carrying arm supported thereby, a cutter mounted on the arm, means for vertically and for laterally shifting the cutter, and a table for the lens located beneath the cutter and tiltable about an axis above the surface of the table, whereby tilting of the table serves to vary the angular relation of the surface of the lens to the axis of the cutter without substantially varying the point on the lens mounted on said base and engaged by the cutter, substantially as and for the purpose described.

3. A lens cutting machine including a base, a lens supporting table carried by the base, a rotatable lens carriage mounted on the table, a clamp carried by the table and engaging the lens to secure the same in position, a tool mounted above the table on said base, and means for shifting the tool downward into operative engagement with the lens.

4. A lens cutter for use in the cutting of various types of lenses, including a support and a table mounted on the support for swinging movement about an axis passing substantially through the surface of the lens to be cut, a tool adapted to engage the surface of the lens substantially at the intersection of the axis of the table with said surface, and means for rotating the table to present the several portions of the lens to the tool at the said point of intersection.

5. In a machine of the character described, the combination with a support, a table tiltably mounted on the support and adapted for swinging movement about an axis passing substantially through the surface of the lens to be cut, of a lens carriage rotatably mounted on the table, a spindle disposed above the table and bearing a former, a driving pinion and connections between the drive pinion and the carriage and former to cause the synchronous rotation of the carriage and the former.

6. In a machine of the character described, the combination with a lens supporting table, of an arm carried thereby and projecting thereover, a clamping device carried by the arm, means for resiliently pressing the arm toward the table to cause the clamping device to retain a lens in position thereon, and means for shifting the arm away from the table to release the lens and for partially rotating the arm to withdraw the clamping device from the vicinity of the lens.

7. In a lens cutter, the combination with a base and a standard rising therefrom, of a gear case supported by the standard, a gear in the base and in the gear case, connections between the gears through the standard for causing their synchronous rotation, a tiltable table supported by the base above the first mentioned gear, a rotatable carriage mounted on the table, a yieldable flexible shaft connection between said first mentioned gear and the carriage, a former above the carriage, and connections between the former and the gear in the gear case whereby the former and carriage are synchronously driven through their respective gears, and a tool bearing arm mounted on said standard contacting with and controlled by the former for operating upon an article on the carriage.

8. In a machine of the character described, the combination with a tiltable work support, of a work clamp carried by the table and tiltable therewith, means for retaining the clamp in operative position and a cam for shifting the clamp into inoperative position.

9. The combination with a tiltable work table, of a slidable clamp arm carried by and movable with the table, a rotatable carriage on the table, a rotatable clamp on the arm adapted to move with the carriage, means for yieldingly forcing the arm toward the table to clampingly secure an article between the clamp and carriage.

10. In a machine of the character described, the combination with a tiltable work supporting table having a rotatable work supporting carriage thereon, of a clamp arm mounted for vertical sliding movement above the table and bearing a clamp rotatable with the carriage, means for shifting the arm into inoperative position, and supplemental clutch means adapted to be manually disengaged to permit of free rotation of the clamp arm relative to the table.

11. In a lens cutting machine, the com-

bination with a support, of a lens carrier tiltably and rotatably mounted thereon, a cutting tool, a guide or former for the cutting tool, and means insuring synchronous rotation of the carriage and former irrespective of the tilting adjustment of the carrier.

In testimony whereof I affix my signature in the presence of two witnesses.

ALBERT E. MAYNARD.

Witnesses:
H. K. PARSONS,
JOSEPH J. DEMERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."