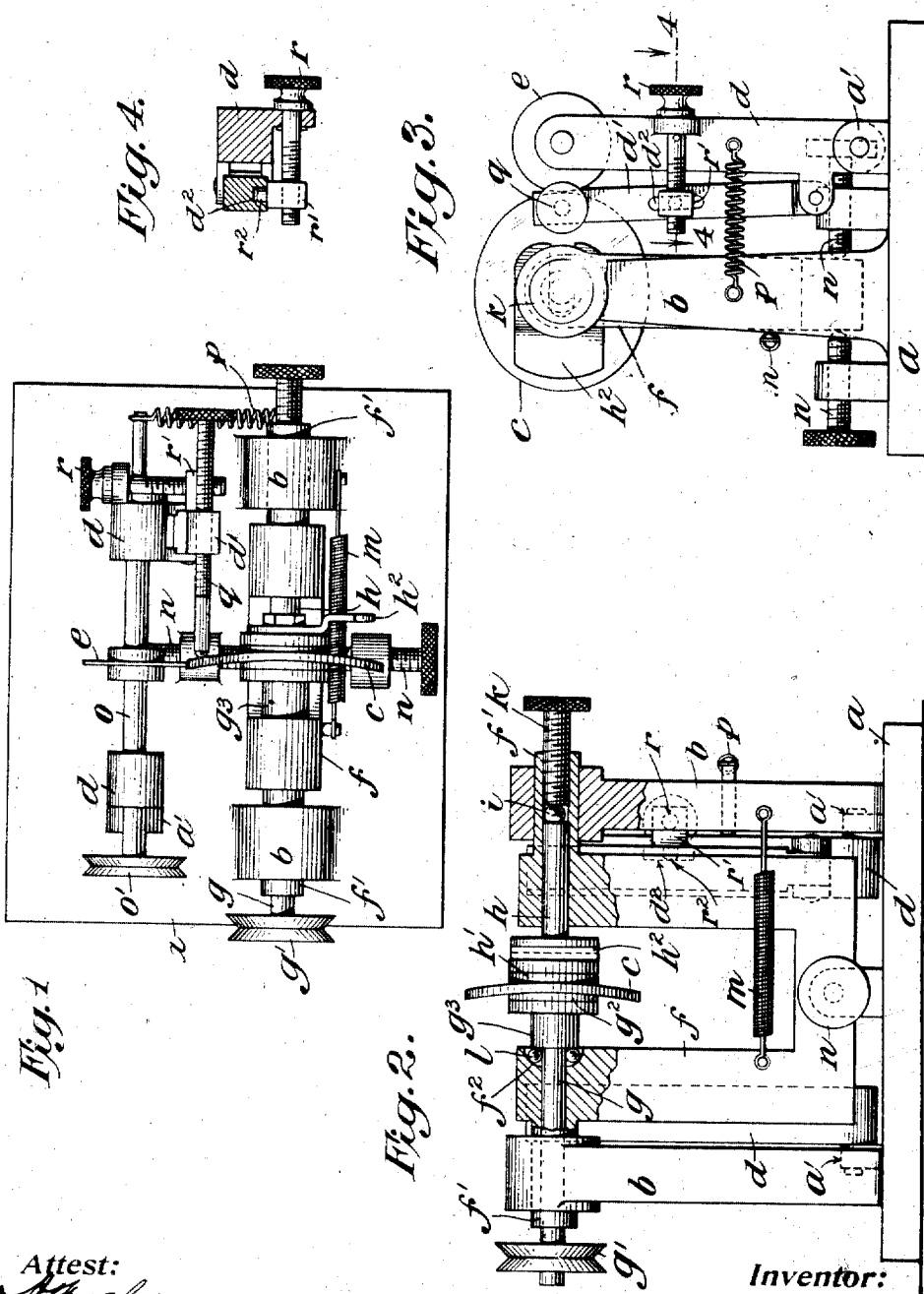


1,226,329.

Patented May 15, 1917.

3 SHEETS—SHEET 1.



Attest:
[Signature]

by

Inventor:
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1,226,329.

Patented May 15, 1917.
3 SHEETS—SHEET 2.

Fig. 5.

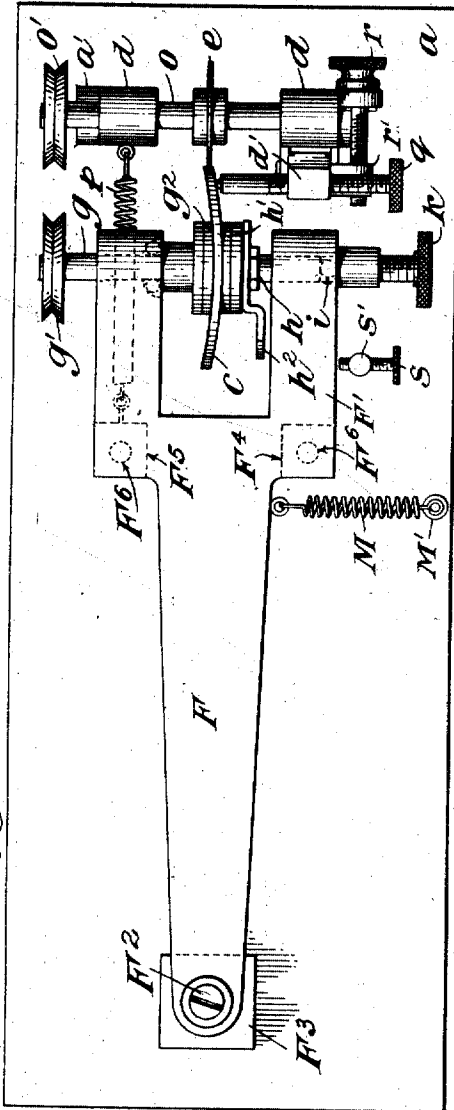
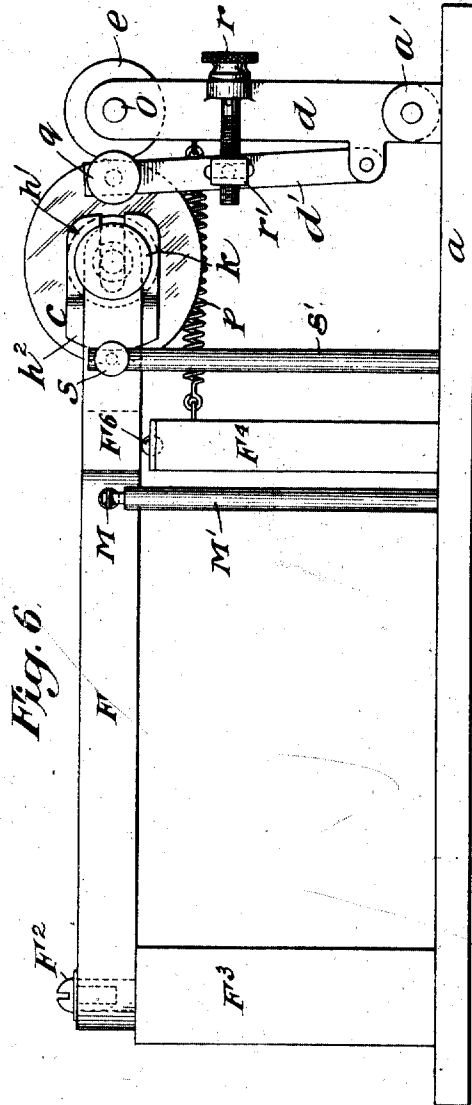


Fig. 6.



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W. McJannet

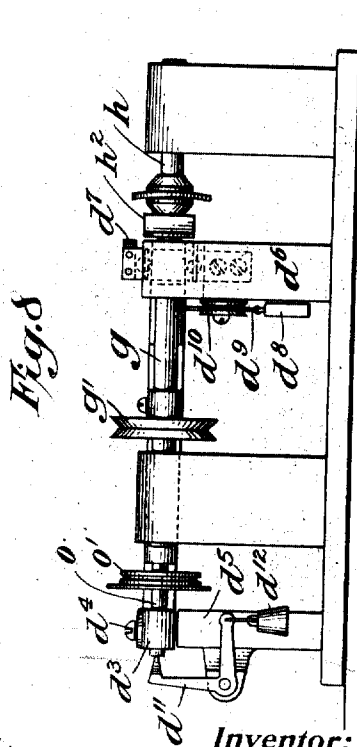
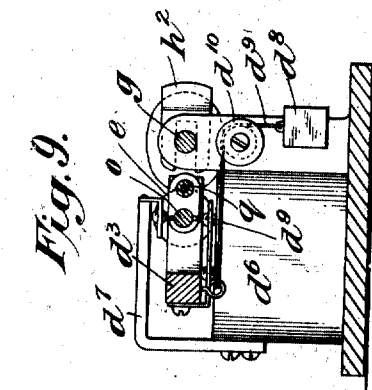
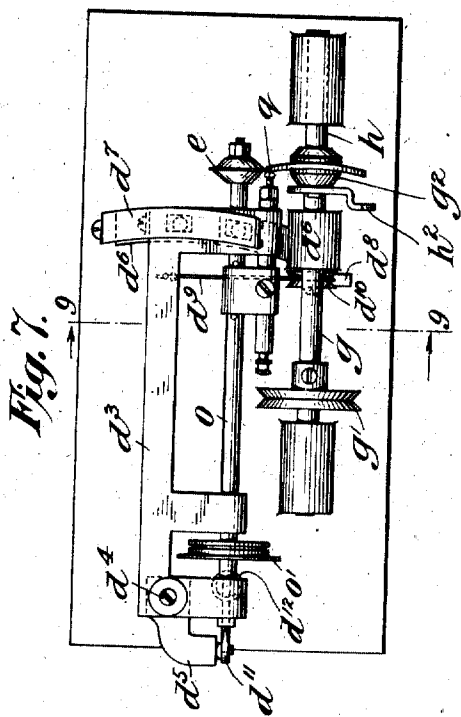
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1,226,329.

M. HANSEN.
MACHINE FOR GROOVING LENSES.
APPLICATION FILED SEPT. 27, 1916.

Patented May 15, 1917.
3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

MARINIUS HANSEN, OF BROOKLYN, NEW YORK.

MACHINE FOR GROOVING LENSES.

1,226,329.

Specification of Letters Patent.

Patented May 15, 1917.

Application filed September 27, 1916. Serial No. 122,334.

To all whom it may concern:

Be it known that I, MARINIUS HANSEN, a subject of the King of Norway, and a resident of the borough of Brooklyn, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Machines for Grooving Lenses, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

In United States Patent No. 1,145,194, issued to the present applicant on July 6, 1915, there is shown and described a machine for grooving the edges of lenses in which the cutter is guided yieldingly along the edge of the lens and held at a fixed distance from the faces thereof by adjustable means cooperating with the supporting frame for the cutter. By that patent it was intended to cover, broadly, any devices for maintaining automatically the desired relationship between the cutter and the edge of the lens. The present invention is concerned with a modified structure in which the same desired relationship between the cutter and the edge of the lens is maintained automatically by adjustable means cooperating with the supporting frame of the lens. A further object of the invention is to provide devices cooperating with the supporting frame of the cutter to press the edge of the cutter yieldingly into engagement with the edge of the lens to be grooved. Still another object is to provide, in association with the elements heretofore noted, suitable manually adjustable means for setting the parts in the desired initial relationship and changing this relationship as may be necessary from time to time. Three illustrative embodiments of the improved devices for accomplishing the desired results in the general manner described are shown in the accompanying drawings, in which—

Figure 1 is a view in plan of a machine embodying the invention.

Fig. 2 is a view in elevation of the machine shown in Fig. 1, parts being broken away to show in detail the driving shaft for the lens.

Fig. 3 is a view in end elevation of the machine shown in Figs. 1 and 2.

Fig. 4 is a fragmentary detail view in section of one of the manual adjustments for the guiding devices, taken along the plane indicated by the line 4—4 of Fig. 3 and looking in the direction of the arrow.

Fig. 5 is a view in plan of a machine of somewhat modified form but embodying the invention intended to be covered by this application.

Fig. 6 is a view in side elevation of the machine shown in Fig. 5.

Figs. 7, 8 and 9 are respectively a top view, a side elevation and a section on the plane indicated by the line 9—9 of Fig. 7, of still another form of the machine.

The improved machine has a base *a* on which are supported fixed standards *b* in which bear the supporting and driving devices for the lens *c*, as will appear hereinafter, and swinging standards *d* in which bear the supporting and driving elements for the rotary cutter *e*. As shown in Figs. 1 and 2, there is supported in the standards *b* a generally U-shaped supporting frame or yoke *f* on which are formed trunnions *f'* which may be journaled in the said standards in such manner as to permit free lateral movement of the frame *f* bodily between the standards. In these trunnions *f'* are supported the sections *g*, *h*, of the driving shaft for the lens, and on one of these sections *g* may be carried a suitable drive pulley *g'*, for the purpose of imparting rotation to the lens. The end of the other shaft section *h* may bear against a suitable bearing indicated as a ball *i*, and this bearing may be backed up by an adjustable set screw *k* for the purpose of moving the shaft section *h* axially within the trunnions of the supporting frame. The proximate ends of the shaft sections *g*, *h*, may carry suitable frictional disks *g''*, *h''*, respectively, between which the lens *c* may be clamped readily by setting up on the thumb screw *k* as will be evident. Axial movement of the shaft section *g* in its supporting trunnion *f'* is prevented by means of a bearing shown as balls *l* interposed between an annular shoulder *g'''* and a grooved race *f''* in the yoke *f*. From the description thus far given, it will be evident that rotative movement may be imparted to the lens *c* through the pulley *g'* in the usual manner, the supporting and operating elements for the lens being all mounted in fixed relation with one another in the frame *f*. Lateral movement of this frame will not affect the relative disposition of the supporting or operating devices for the lens, nor will such lateral movement affect, in any way, the operation of any of such parts. Normally, the supporting frame

f is pulled toward one side or the other, as by means of a suitable spring m anchored to the frame and to one of the supporting standards b . In all lateral movement of the frame it is guided by any suitable devices shown herein as adjustable set screws n , opposed to one another and carried fixedly on the base a , the ends of these screws nearly bearing on opposite faces of the frame so as to prevent a swinging movement thereof but, at the same time, permit a guided lateral movement between such ends.

The rotating cutter e , which may be of any suitable character, is shown as supported on a drive shaft o to which rotative movement may be imparted through a pulley o' . This cutter may be secured on said shaft detachably in any approved manner, but since this invention is not concerned with the particular devices for so supporting the cutter, no details have been illustrated. The standards d in which the supporting shaft o for the cutter is journaled are pivoted adjacent their lower ends to suitable lugs a' carried with the base plate a , this pivotal support permitting free swinging movement of the drive shaft o with the cutter toward and away from the lens c . Normally the edge of the cutter is pressed against the edge of the lens by means of a suitable spring p interposed operatively between one of the swinging standards d and the fixed standard b on the base plate. It is this spring which maintains the edge of the cutter constantly in yielding engagement with the edge of the lens and insures the uniform cutting of the groove along the edge regardless of the particular contour of the lens. Aside from this yielding engagement of the cutter with the edge of the lens it will be understood that it is of equal importance to have the edge of the cutter maintained constantly at a fixed distance from the faces of the lens, so that neither the cross-sectional nor peripheral contour of the lens can affect the grooving operation. It has been explained that the support f for the lens c and its driving elements is slidable laterally in the fixed bearings b therefor under the influence of the spring m . By limiting the sliding movement of this support in one direction through the engagement of the face of the lens or some associated element movable in unison therewith, it will be evident that the lateral movement of the support can be made proportional to the changing cross-sectional contour of the lens and the cutter thereby maintained at a fixed distance from the faces. In the illustrated embodiment, there has been shown an adjustable abutment, such as a set screw q mounted so that its end will engage one face of the lens and thereby limit the movement of the lens in one direction under the influence of the spring m . By adjusting the screw q it will

be evident that the relation of the cutter e to the faces of the lens may be changed as desired. Ordinarily, the adjustment will probably be so as to center the cutter with relation to the edge of the lens. The adjusting screw q may be mounted conveniently in a swinging supporting arm d' which may be pivoted to the swinging supporting standards d for the cutter e and its driving elements. It may be desirable to change the distance between the edge of the lens and the bearing point of the end of the adjustable abutment q and for this purpose means have been provided to swing the screw q laterally with its arm d' . Such means comprise a set screw r carried on one of the supporting standards d and having its threaded shank engaged with a trunnion block r' , the trunnion r'' on which rests in a slot d'' in one face of the supporting arm d' for the screw q . By manipulation of the screw r the supporting arm d' may be swung to or fro to swing the bearing end of the screw q nearer to or farther away from the periphery of the lens to be grooved.

In operation the lens c is clamped in position between the frictional disks g^2 , h' , and its relation to the cutter e adjusted by means of the set screws r and q so that the cutter will be in proper relation to the faces of the lens. Rotative movement is then imparted to both the lens and the cutter through their drive pulleys g' , o' . During the grooving operation the cutter will be maintained at a fixed distance from the faces of the lens by means of the spring m which constantly forces the supporting frame f to the right, as viewed in Fig. 2, and thereby holds one face of the lens in constant engagement with the bearing end of the set screw q . The cutter e is also pressed constantly against the edge of the lens yieldingly by the spring p , which serves to swing the supporting standards d for the cutter in toward the fixed standards b for the lens. The supporting yoke f for the lens is guided in its lateral movement between the abutments n , herein shown as set screws. In the present case, the invention resides in the provision of devices for moving the lens laterally to maintain its faces in fixed relation to the cutter at all times and in pressing the cutter yieldingly against the edge of the lens by means of the spring p in engagement with the swinging standards for the cutter. In the machine shown in the patent hereinbefore identified the cutter is moved laterally under spring pressure to provide for the automatic maintenance of the desired relation between the edge of the cutter and the faces of the lens while the supporting frame for the lens is pressed yieldingly toward the cutter by means of a spring.

If the lens to be grooved is very thin there is danger that the edge of the lens may be

chipped in applying the strap or, it might be, the usual spectacle frame, if it is grooved at that end. For the purpose, therefore, of avoiding the grooving of the lens at any particular part there are provided means for separating the lens and the cutter at such part so as to prevent the action of the cutter on the lens. Such means may conveniently consist of a cam plate h^2 , preferably slotted so as to be adjustable and mounted on the shaft h , adjacent to the disk h' , and so positioned as to strike the screw g at each rotation of the shaft and separate the cutter and lens for a portion of the rotation of the latter.

In Figs. 5 and 6 there is shown a somewhat modified construction well adapted to perform the functions described in connection with the embodiment hereinbefore described and in which the principle of the present invention is retained for the desired automatic and manual adjustments. In this construction, the lens c is supported as before between two frictional disks g^2 , h' , on the ends of short shaft sections g , h , one of which, g , there is fixed a drive pulley g' and at the end of the other of which is provided an end bearing i against which bears the set screw k . The driving elements described are supported in a horizontally disposed frame F at one end of which is a yoke F' through the arms of which extend the said short shaft sections, while at the other end of which is a pivot pin F^2 about which the frame is permitted to have a free swinging movement in a horizontal plane. For the support of the frame F there may be provided, in addition to the main standard F^1 in which the pivot pin F^2 bears, other bearing posts F^3 , F^4 , upon which rest suitable antifriction bearings F^5 , as clearly shown. Other means for supporting the frame F by antifriction devices and in such manner that it may swing laterally with little retardance, may be provided without departing from the spirit of the invention. Normally, the frame F is moved in one direction yieldingly by means of a spring M , one end of which is engaged with the frame 50 and the other end of which is secured to a fixed post M' . The movement of the frame under the influence of the spring M is limited, however, by means of an adjustable set screw s carried on a fixed post s' , the provision of this limiting abutment being merely for convenience as during the time that the machine is inoperative. The cutter e is supported in exactly the manner described with relation to Figs. 1-4 and its swinging standards d carry, as before, a swinging support d' for a set screw g , against the end of which bears one face of the lens c . The position of the bearing end of this screw g with relation to the edge of the lens c may be adjusted manually in the

manner hereinbefore described, as through the set screw r and trunnion block r' . The edge of the cutter e is pressed yieldingly against the edge of the lens to be grooved by means of the spring p interposed conveniently between one of the swinging standards d for the cutter and one of the bearing posts F^5 for the swinging frame F .

In this form of the invention the principle of adjustment, both automatic and manual, described in connection with the machine shown in Figs. 1-4, is retained in full, and the desired relationship between the cutter and the edge of the lens is preserved, as before, through lateral movement of the lens with relation to the cutter and through the yielding engagement of the cutter with the edge of the lens as under the influence of the spring p on the swinging standards d . When the frame F is swung laterally under the influence of the spring M only the engagement of one face of the lens c with the bearing end of the set screw g will limit this movement and since the stress of the spring M is constant, this engagement will be preserved throughout the cutting operation and the cutter maintained automatically at the desired distance from the faces of the lens.

In Figs. 7, 8 and 9 is shown a machine which resembles the machine of the Patent No. 1,145,194, in that the cutter is movable laterally to conform to the edge of the lens, but embodies also some of the features of the present invention and illustrates obvious substitutes for some of the devices employed. In this machine, the shaft sections g , h are mounted in fixed bearings, and the shaft g , which is immovable longitudinally, carries the driving pulley g' , the friction disk g^2 and the cam plate h^2 , for effecting separation of the lens and the cutter at any desired point. The shaft o , which carries the driving pulley o' , the cutter e and the adjustable abutment screw g , which cooperates with the face of the lens and with which the cam plate h^2 cooperates, is mounted both to rotate and to have longitudinal movement in a horizontally swinging frame d^2 which is pivoted at d^4 , on a suitable standard d^5 , and rests, near the cutter, upon a standard d^6 provided with a guide arm d^7 . A weight d^8 is connected by a cord d^9 to the arm or frame d^2 and passes over a guide pulley d^{10} , this arrangement being a substitute for the spring p as a means to press the cutter yieldingly toward the edge of the lens. The weight acts with a more uniform pressure than the spring, can be more accurately adjusted, and is less liable to injury and deterioration. In like manner the pressure which holds the abutment screw g against the face of the lens may be furnished by a weight. As clearly shown in Figs. 7 and 8, a bell crank lever d^{11} , pivoted on the standard d^5 , has one arm bearing against the end

of the shaft *o* and the other arm provided with a weight *d*¹².

As noted hereinbefore, the desired grooving operation may be carried on in a machine in which the details of construction of the various elements and their relative disposition are changed somewhat, the three embodiments shown herein being intended merely as illustrative of the somewhat different principle of adjustment shown in this case from that shown specifically in the patent referred to. While that patent covers, broadly, the automatic maintenance of the desired relation between the edge of the cutter and the edge and faces of the lens, it does not disclose specifically means of the character herein shown for performing the desired functions. Accordingly, it is the province of this application to cover in a somewhat limited manner devices, operable on the principle herein emphasized, for maintaining the stated relation between the lens and the cutter. Reference is to be had to the appended claims for a clear definition of the scope of the invention.

I claim as my invention:

1. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, a fixed abutment to limit the movement of the lens in one direction with relation to the face of the cutter and means cooperating with the frame for automatically maintaining the lens in the position determined by the abutment.

2. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, a fixed abutment to limit the movement of the lens in one direction with relation to the face of the cutter, and a spring cooperating with the frame for holding the frame yieldingly in the said position determined by the abutment.

3. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, a fixed abutment to limit the movement of the lens in one direction with relation to the face of the cutter, means cooperating with the frame for holding the frame yieldingly in the said position determined by the abutment and means to hold the edge of the cutter and the edge of the lens in yielding operative engagement.

4. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, an adjustable arm in fixed relation to the cutter and having an abutment to engage the face of the lens to position the cutting edge with respect thereto and means in operative engagement with the frame to move the same laterally and hold the face of the lens yieldingly against the abutment.

5. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, an adjustable arm in fixed relation to the cutter and having an abutment to engage the face of the lens to position the cutting edge with respect thereto, means in operative engagement with the frame to move the same laterally and hold the face of the lens yieldingly against the arm, and means to adjust the said arm to vary the point of bearing of the abutment against the face of the lens.

6. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, an adjustable arm in fixed relation to the cutter and having an abutment to engage the face of the lens to position the cutting edge with respect thereto, means in operative engagement with the frame to move the same laterally and hold the face of the lens yieldingly against the abutment, and means to hold the edge of the cutter and the edge of the lens in yielding operative engagement.

7. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, a swinging supporting frame for the cutter, an adjustable screw carried with the swinging frame of the cutter and engaging the face of the lens to position the cutting edge with respect thereto and means in operative engagement with the frame to move the same laterally and hold the face of the lens yieldingly against the end of the screw.

8. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, a rotary cutter, an arm pivotally carried on the frame of the cutter, an adjustable screw carried in said arm and adapted to engage the face of the lens to position the cutting edge with respect thereto, means in operative engagement with the frame for the lens to move the same laterally and hold the face of the lens yieldingly against the end of the screw and a separate adjusting screw carried with the frame of the cutter and engaging the supporting arm for the first named screw to vary the point of bearing of the screw against the face of the lens.

9. A machine for grooving lenses comprising a movable supporting frame in which the lens is rotatably mounted, supporting standards in which the frame is journaled, a driving shaft for the lens carried in the frame and comprising two sections, an adjusting screw bearing against the end of one of said sections to adjust the shaft in the frame, a rotary cutter, a fixed abutment to limit the movement of the lens in one direction with relation to the face of

the cutter, and means coöperating with the frame for holding the frame yieldingly in the position determined by the abutment, the driving shaft for the lens being movable with the frame in its supporting standards.

10. In a machine for grooving lenses, a cutter, a U-shaped supporting frame for the lens having laterally extending trunnions, standards in which said trunnions are journaled, a sectional drive shaft for the lens journaled adjustably in the trunnions and means to move the frame laterally in its standards with the drive shaft to adjust it with relation to the cutter.

11. A machine for grooving lenses comprising means for supporting and rotating the lens, means for supporting and rotating the cutter, one of said supporting means being movable with respect to the other to permit the cutter to bear against the edge of the lens, and a cam plate mounted to rotate with the lens and to coöperate with the cutter supporting means to separate the cutter and the lens at a determined point in the edge of the latter.

This specification signed this 20th day of Sept., A. D. 1916.

MARINIUS HANSEN.