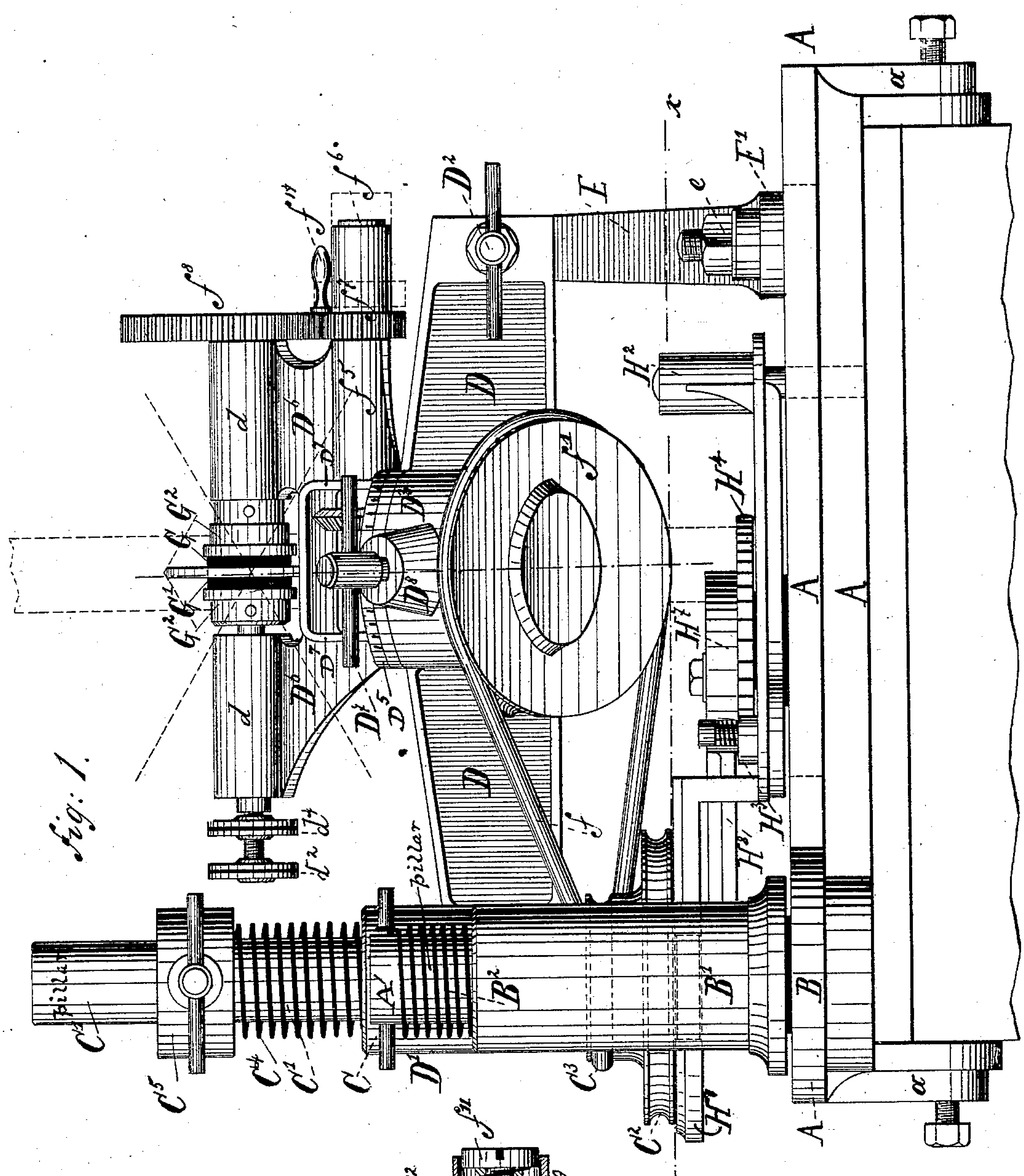
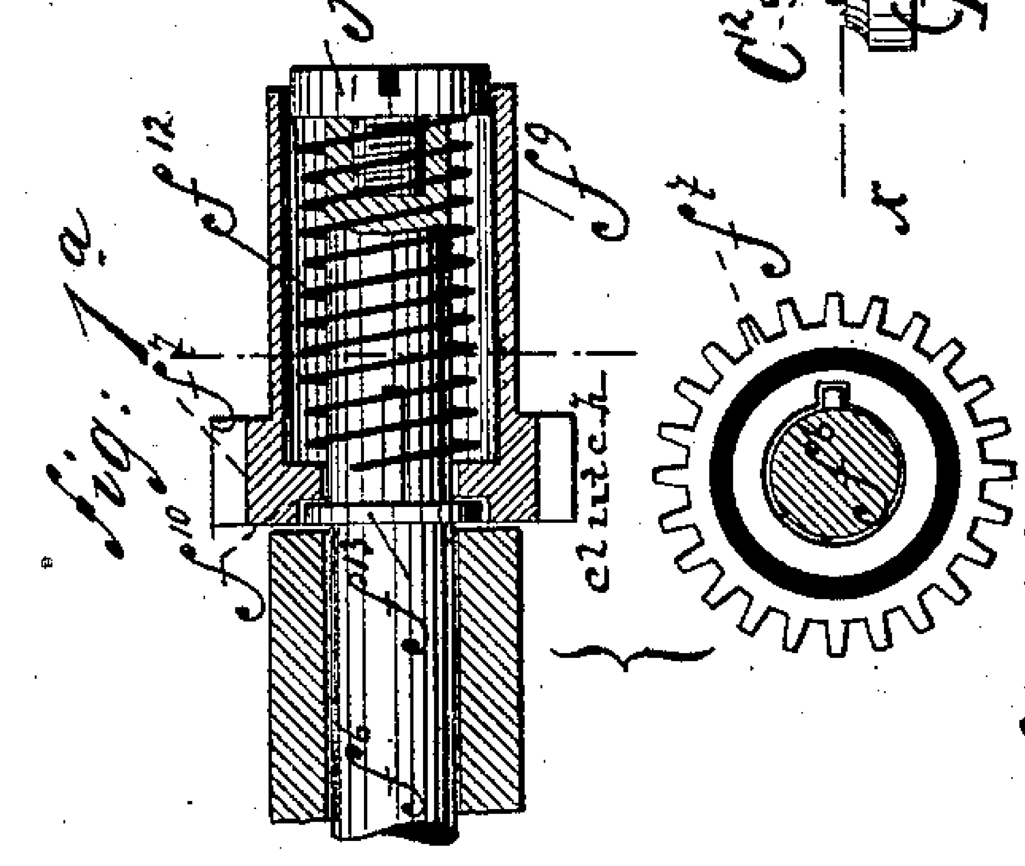
(No Model.) 4 Sheets—Sheet 1.

C. E. DRESSLER.

MACHINE FOR GRINDING THE RIMS OF LENSES.

No. 302,386. Patented July 22, 1884.





WITNESSES:

A. Schehl.

Sidney Mann

INVENTOR

Charles E. Dressler

BY

Goepel & Raegener

ATTORNEYS.

N. PETERS. Photo-Lithographer. Washington, D. C.

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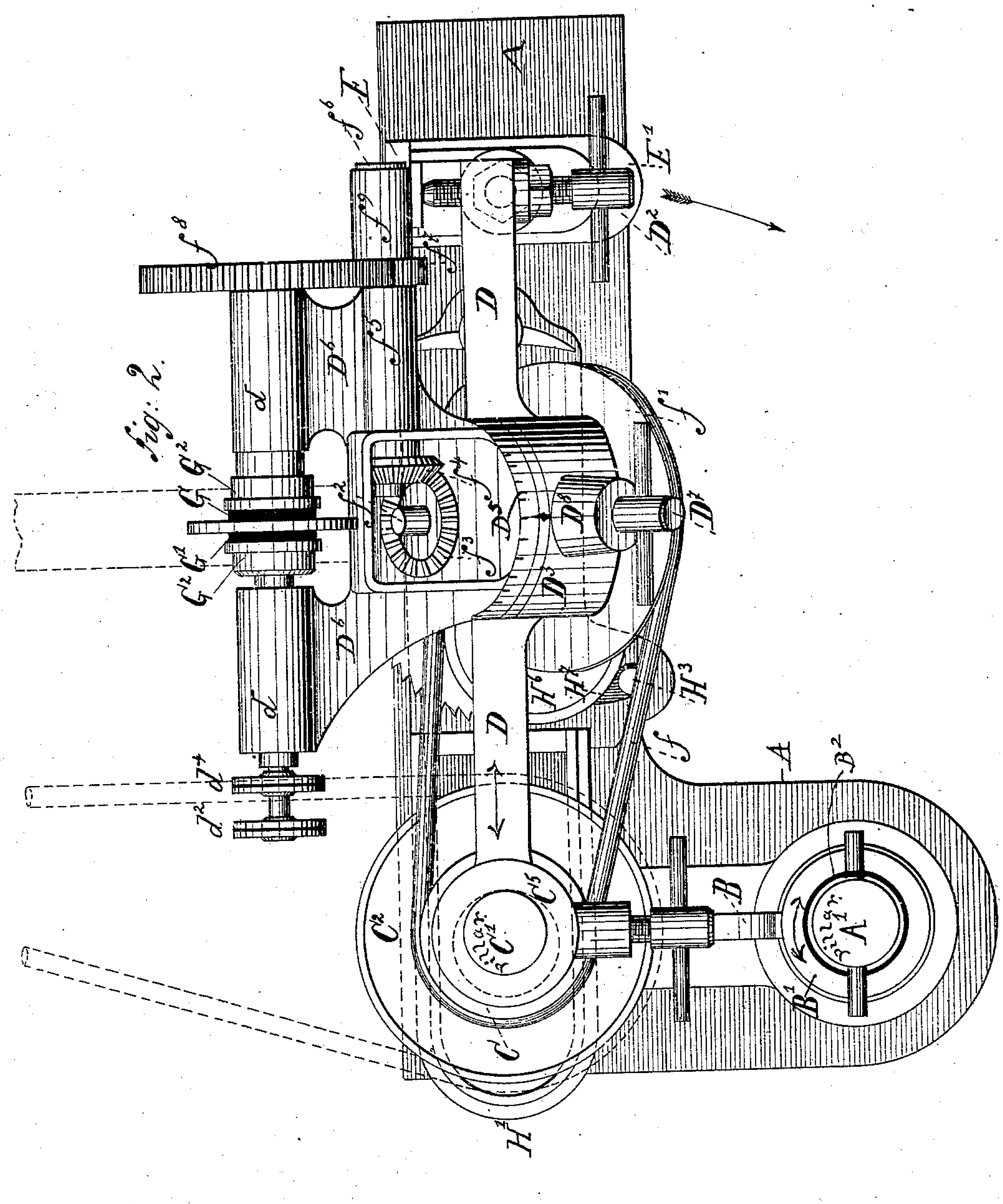

Fig. 2.

WITNESSES:

A. Schehl.

Sidney Mann

INVENTOR

Charles E. Dressler

BY Goepel & Raegener

ATTORNEYS.

N. PETERS. Photo-Lithographer. Washington. D. C.

(No Model.) 4 Sheets—Sheet 3.

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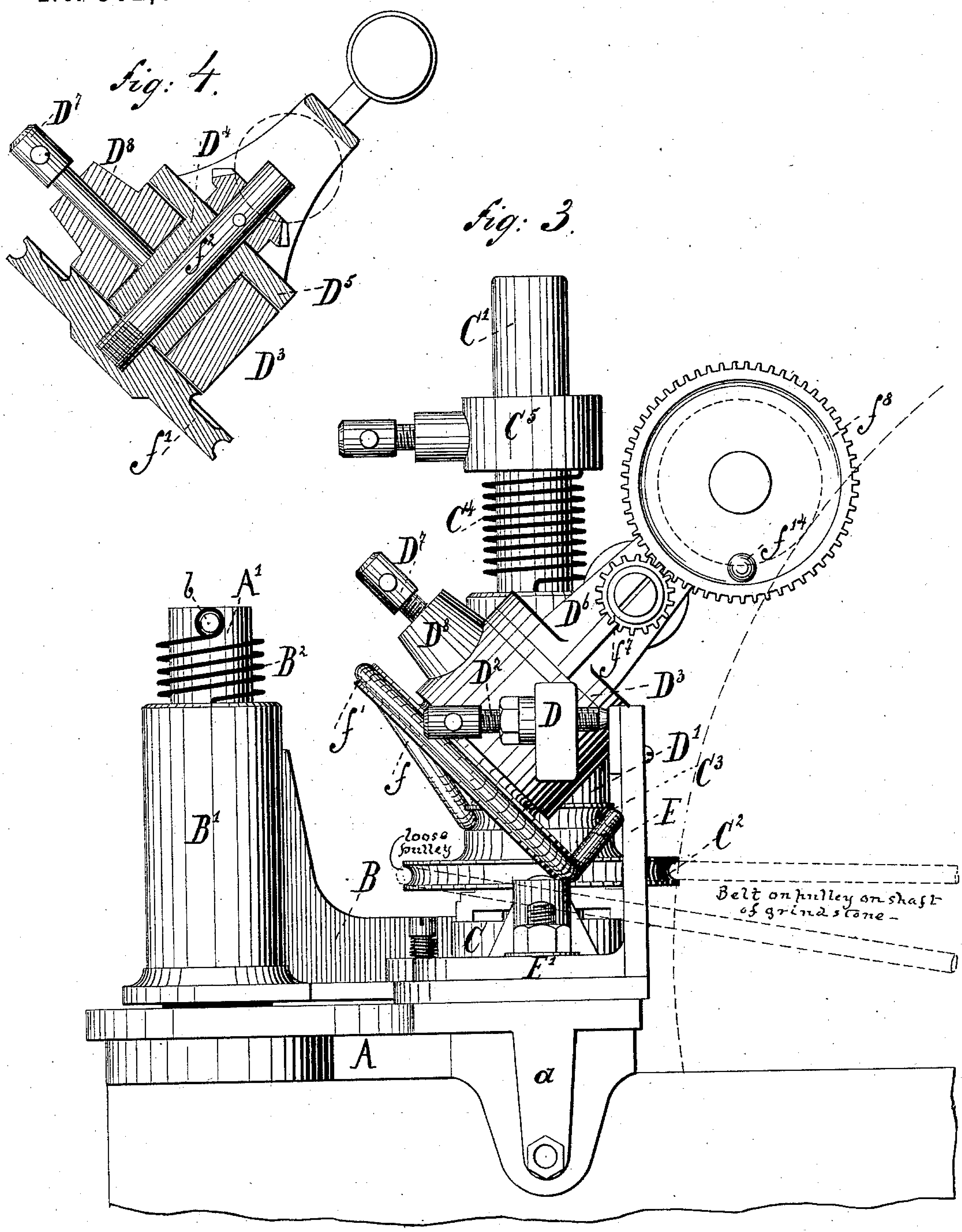

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Sidney Mann

INVENTOR

Charles E. Dressler

BY Goepel & Raegener

ATTORNEYS.

N. PETERS, Photo-Lithographer, Washington, D. C.

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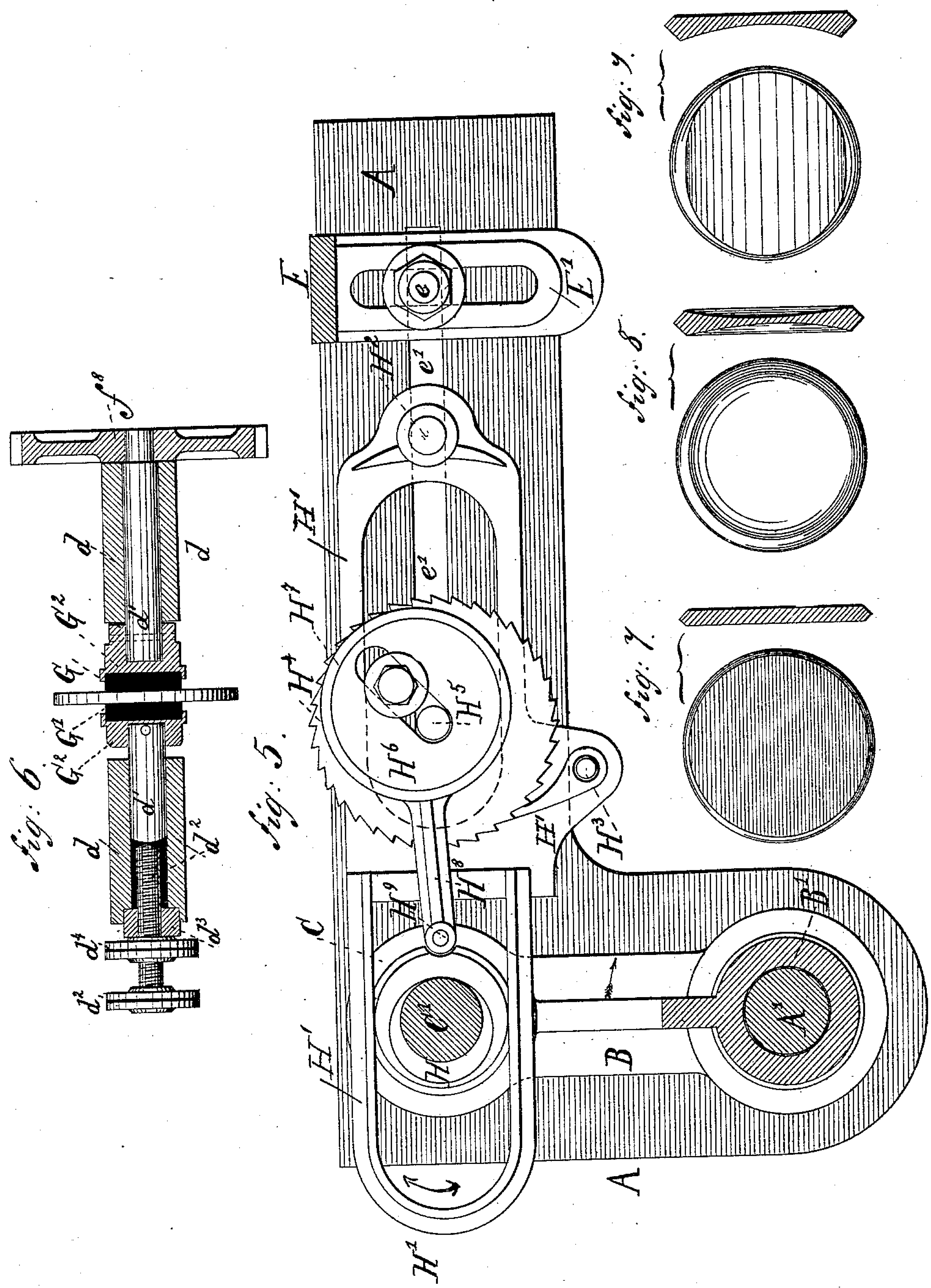

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UNITED STATES PATENT OFFICE.

CHARLES E. DRESSLER, OF NEW YORK, N. Y.

MACHINE FOR GRINDING THE RIMS OF LENSES.

SPECIFICATION forming part of Letters Patent No. 302,386, dated July 22, 1884.

Application filed February 27, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EMIL DRESSLER, of the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Grinding the Rims of Trial and other Lenses, of which the following is a specification.

This invention has reference to an improved machine for grinding the rims of trial-lenses for optometers, opera-glasses, and other optical instruments; and the invention consists of two elastic clamps, which hold the rim of the lens against the grindstone, one of the clamps being laterally adjustable. The inclined supporting-frame of the clamps is adapted to be axially adjusted in a sleeve of a horizontal and spring-actuated arm, which is supported by a pillar of a second arm that is pivoted to a fixed pillar. Revolving motion is imparted to the lens-holding clamps by suitable transmitting mechanism. Laterally-reciprocating step-by-step-motion is imparted to the lens-supporting frame and its horizontal arm by mechanism arranged on the bed-plate of the machine, so that the lens is moved laterally across the face of the grindstone and produces the even wear of the same.

In the accompanying drawings, Figure 1 represents a front elevation of my improved machine for grinding the rims of trial and other lenses. Fig. 1^a represents a detail of Fig. 1. Fig. 2 is a plan of the machine; Fig. 3, a side elevation of the same; Fig. 4, a detail vertical transverse section of the supporting-shaft of the lens-carrying frame; Fig. 5, a horizontal section on line $x\,x$ of Fig. 1; Fig. 6, a vertical transverse section through the lens-holding clamps; and Figs. 7, 8, and 9 show different forms of trial-lenses, the beveled rims of which have been ground upon my machine.

Similar letters of reference indicate the same parts throughout the several views.

A in the drawings represents an L-shaped bed-plate, which is rigidly secured by downwardly-extending lugs *a a* and clamp-screws *a′ a′* to a wooden supporting-frame, that is arranged in proximity to a revolving grindstone of fine texture, such as are usually employed in grinding off the rims of lenses of optometers, opera-glasses, and other optical instruments. The grindstone is indicated in dotted lines in Figs. 1 and 3, and forms no part of this invention. The forward-extending shorter leg of the bed-blate A carries a fixed vertical pillar, A′. An arm, B, extends backward toward the grindstone, and is applied by a sleeve, B′, to the standard A′, the sleeve B′ being acted upon by a strong spiral spring, B^2, that is secured at one end to the upper end of the sleeve B′, and at the other end to a cross-pin, *b*, at the upper end of the pillar A′, as shown in Figs. 1 and 3. The spiral spring B^2 tends to turn the arm B toward the left. The outer end of the arm B carries a socket, C, and a pillar, C′. Above the socket C is placed on the pillar C′ a loose pulley, C^2, to which motion is transmitted by a cross-belt from a pulley on the shaft of the grindstone. A second smaller pulley, C^3, is arranged on the hub of the larger pulley C^2. A second laterally-extending arm, D, is supported by means of a sleeve, D′, on the pillar C′, above the pulleys C^2 C^3. The arm D extends in the direction of the longer leg of the L-shaped bed-plate A. A spiral spring, C^4, is applied to an axially-adjustable collar, C^5, of the second pillar, C′, and to the upper end of the sleeve C, the spring C^4 imparting to the sleeve C a tendency to turn axially on the pillar C′ and move the arm D backward toward the grindstone, pressing it thereby against an upright arm, E, that is arranged at the outer end of the longer leg of the L-shaped bed-plate A. The arm E is rigidly secured by its slotted horizontal base E′, and a clamp-screw, *e*, to a longitudinal slot, *e′*, of the bed-plate A, so that it can be adjusted forward or back, as required. The horizontal arm D is adjusted closer to or farther away from the upright arm E by a set-screw, D^2, at its outer end. The arm D is provided at its middle portion with an inclined sleeve, D^3, that is made integral with the arm D. The sleeve D^3 carries a sleeve-shaped bearing, D^4, that has a disk-shaped enlargement, D^5, at the upper end, from which extends a yoke-shaped piece, D^7, having lateral standards D^6. The yoke-shaped piece serves for providing a sufficient space for the motion-transmitting gear-wheels, to be described hereinafter. This yoke-shaped portion is clearly shown in Figs. 1, 2, 3, and 5. The circumference of the disk D^5 is graduated, so as to be adjusted axially in the sleeve D^3 to any angle from a central index-point on the latter, as shown in Fig. 2. When the disk D^5 has been adjusted to the required angle, its bearing D^4 is rigidly secured to the sleeve D^3 by a clamp-screw, D^7, that turns in a socket, D^8, of the sleeve D^3, as shown in Figs. 1, 2, 3, and 4. The laterally-extending standards D^6 are provided at their upper ends with horizontal bearings d d, that are in line with each other, and which support the shanks d' d' of the lens-holding elastic clamps G G′. The clamps G G′ are made of soft-rubber or other suitable elastic material, and are secured to sockets G^2 G^2 at the ends of the shanks d' d'. To one of the clamps, G, rotary motion is imparted, while the other clamp, G′, is capable of lateral motion in its bearing d by means of a screw, d^2, that turns in a nut, d^3, at the outer end of the bearing d, and that bears on the inner end of the shank d' of the movable clamp G′, as shown in Fig. 6. A jam-nut, d^4, secures the set-screw d^3 rigidly in position after the clamp G′ has been set to hold the lens by the milled head at its outer end. The lens the rim of which is to be ground is placed between the clamps G G′ and centered, the laterally-movable clamp G′ being then tightly applied to the middle part of the lens, whereby the same is rigidly pressed against the clamp G, so as to be held tightly between the clamps, which are then rotated, while the rim of the lens is pressed against the face of the grindstone by the action of the spring-actuated arm D. Rotary motion is transmitted to the clamps G G′, and the lens held between the same, from the pulley C^3 on the pillar C′ by a belt, f, to a pulley, f', at the lower end of an inclined shaft, f^2, that passes through the sleeve-shaped bearing D^4, as shown clearly in Figs. 1 and 4. The upper end of the shaft f^2 projects above the disk D^5, and carries a bevel-wheel, f^3, which meshes with a second bevel-wheel, f^4, at the inner end of a horizontal shaft, f^6, that turns in a bearing, f^5, of the right-hand standard D^6, as shown in Fig. 1. A pinion, f^7, at the outer end of the shaft f^6 meshes with a gear-wheel, f^8, at the outer end of the shank d' of the lens-holding clamp G′, which receives thereby rotary motion, and carries the clamp G′ along by its friction with the lens. The pinion f^7 is applied to a clutch device, by which it may be thrown in or out of gear with the wheel f^8. The clutch device consists of a sleeve, f^9, which is guided by an interior shoulder, f^{10}, resting on the shaft f^6, and by a collar, f^{11}, at the end of the shaft f^6. An interior spiral spring, f^{12}, that is interposed between the shoulder f^{10} of the sleeve f^9 and the collar f^{11} at the outer end of the shaft f^6 presses the pinion f^7 against a collar, f^{13}, of the shaft f^6, as shown in Fig. 1^a, and keeps thereby the pinion in mesh with the gear-wheel f^8. The sleeve f^9 is splined to the shaft f^6, so as to follow the rotary motion of the same but be capable of lateral motion, so that the pinion f^7 can be drawn or thrown out of mesh with the gear-wheel f^8 whenever it is desired to interrupt the motion of the lens-holding clamps or to adjust the lenses in the clamps, or for any other purpose. The gear-wheel f^8 is provided with a hand-crank, f^{14}, so that the clamp G can be turned independently of the motion-transmitting mechanism when the lens is to be centered between the clamps. When the sleeve f^9 is released, the interior spiral spring, f^{12}, moves it over and throws the pinion f^7 into mesh with the gear-wheel f^8, whereby rotary motion is transmitted to the lens-holding clamps G G′. As the clamp-supporting frame or yoke can be turned around the axis of the inclined shaft f^2, so as to assume any desired angle toward the face of the grindstone, as indicated in dotted lines in Fig. 1, it is obvious that the edges of the lenses may be ground off to any desired bevel. When a V-shaped rim is required, the supporting-frame is first set to the required angle at one side of the center line of the grindstone, and thereby one side of the rim ground to the proper bevel, after which the supporting-frame is set to the same angle of inclination at the other side of the center line of the grindstone, and then the other side of the rim beveled. The rims of lenses of any size and shape may thus be ground with great facility and with an accuracy and finish that could not be obtained by holding them by hand to the grindstone. The lenses are ground off to the same diameter, which is of special advantage in optometers and other optical instruments in which a large number of lenses of the same size is required. By the graduated disk of the clamp-supporting frame the exact angle of the bevel can be set off directly in a mathematically-accurate manner.

To grind lenses of different diameters on the machine, the horizontal arm D is adjusted by the set-screw D^2 and upright arm E to a distance from the face of the grindstone corresponding to the radius of the lens. As the face of the grindstone would be worn out unevenly, provision has to be made to reciprocate the lens during the grinding action from one side to the other across the face of the grindstone. This is accomplished by a mechanism that imparts a laterally-reciprocating motion to the supporting-arm D and the entire lens-holding frame. For this purpose an eccentric, H, is arranged on the pillar C′, between the socket C and the pulley C^2, and attached to the under side of the pulley C^2, so that it turns with the same on the pillar C by the action of the cross-belt and a pulley on the shaft of the grindstone. The eccentric H engages a slotted slide frame, H′, that is pivoted at its opposite end to a fixed screw-post, H^2, that passes through the slot e' of the bed-plate A. The eccentric H imparts an oscillating motion to the slide-frame H′. A spring-pawl, H^3, is pivoted to the slide-frame and adapted to engage a ratchet-wheel, H^4, the shaft H^5 of which is passed through the slot e', and rigidly secured to the bed-plate A.

To a radial slot of the ratchet-wheel H^4 is clamped a slotted eccentric, H^6, which is connected by a strap, H^7, and rod H^8, with a pivot, H^9, of the socket C of the horizontal arm B. A laterally-reciprocating step-by-step motion is imparted by the oscillations of the slide-frame H and action of pawl H^3, ratchet-wheel H^4, eccentric H^6, and connecting-rod H^8, to the pillar C and the lens-holding frame supported thereon. The eccentric H^6 turns with the ratchet-wheel H^4, and moves thereby the arm B against the tension of its spring B^2 toward the right and then back toward the left, the spring B^2 assisting the return motion of the lens-supporting frame. In this manner every part of the face of the grindstone is uniformly worn off, so that the frequent and expensive truing of the grindstone is dispensed with. As the diameter of the grindstone becomes smaller the bed-plate A is moved on its support toward the grindstone. The laterally-reciprocating motion of the lens-supporting frame is equal to twice the distance of the clamping-screw of the eccentric H^6 from the shaft of the ratchet-wheel H^4, which has to be adjusted to the width of the face of the grindstone.

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

1. The combination of elastic lens-holding clamps with an axially-adjustable supporting-frame supported on a traversing arm, means to support said arm, and means whereby rotary motion is imparted to the lens-holding clamps, substantially as set forth.

2. The combination of the lens-holding clamps, an axially-adjustable supporting-frame, a traversing arm, means to support said arm, and means whereby said frame is clamped at a suitable inclination toward the face of the grindstone, substantially as set forth.

3. The combination of the lens-holding clamps secured to sockets of horizontal shanks, a supporting-frame having bearings for the shanks, and means whereby one of the clamps may be laterally adjusted for inserting the lenses between or removing them from the clamps, substantially as set forth.

4. The combination of a bed-plate, A, having a fixed pillar, A′, a horizontal and spring-actuated arm, B, hinged to the pillar A′, a pillar, C, supported on the arm B, a second horizontal and spring-actuated arm, D, hinged to the pillar C, an axially-adjustable inclined frame supported on the arm D, lens-holding clamps G G′, supported by said frame, and means whereby rotary motion is imparted to the lens-holding clamps, and means whereby rotary motion is imparted to the non-adjustable clamp, substantially as set forth.

5. The combination of lens-holding clamps, an axially-adjustable frame, a traversing-arm supporting the lens-holding frame, means to support said arm, means for imparting rotary motion to the lens-holding clamps, and means whereby a laterally-reciprocating step-by-step motion is imparted to the lens-holders and their supporting-frame, so that the face of the grindstone is evenly worn off, substantially as set forth.

6. The combination of the lens-holding clamps, an axially-adjustable supporting-frame, a horizontally-oscillating and spring-actuated bracket-arm having a set-screw at the outer end, and a laterally-adjustable upright post, whereby the exact diameter to which the lenses are to be ground off is regulated, substantially as set forth.

7. The combination of a bed-plate having a fixed pillar, an oscillating and spring-actuated arm hinged to said pillar, a second pillar supported in a socket of said arm, a second horizontal and spring-pressed arm hinged to the second pillar, an inclined and axially-adjustable frame supported on said arm, lens-holding clamps supported by said frame, means for imparting rotary motion to said clamps, and means whereby simultaneously a laterally-reciprocating step-by-step motion is imparted to the supporting arms and frame, substantially as and for the purpose set forth.

8. The combination of the horizontal and spring-actuated arm B, carrying a pillar, C′, an eccentric, H, on said pillar, means to rotate the eccentric H, a slotted frame, H′, oscillated by said eccentric, a pawl and ratchet-wheel, H^3 H^4, an adjustable eccentric, H^6, on said ratchet-wheel, a strap, H^7, encircling the eccentric H^6, and a rod, H^8, connecting the strap with the arm B, whereby laterally-reciprocating step-by-step motion is imparted to said arm and its pillar, substantially as described.

9. The combination of the lens-holding clamps, axially-adjustable supporting-frame, means for imparting rotary motion to said clamps, and a clutch device applied to an intermediate shaft of the motion-transmitting mechanism, whereby the rotary motion of the clamps is interrupted without interrupting the motion of the transmitting mechanism, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES E. DRESSLER.

Witnesses:

PAUL GOEPEL,
SIDNEY MANN.