No. 640,191. Patented Jan. 2, 1900.

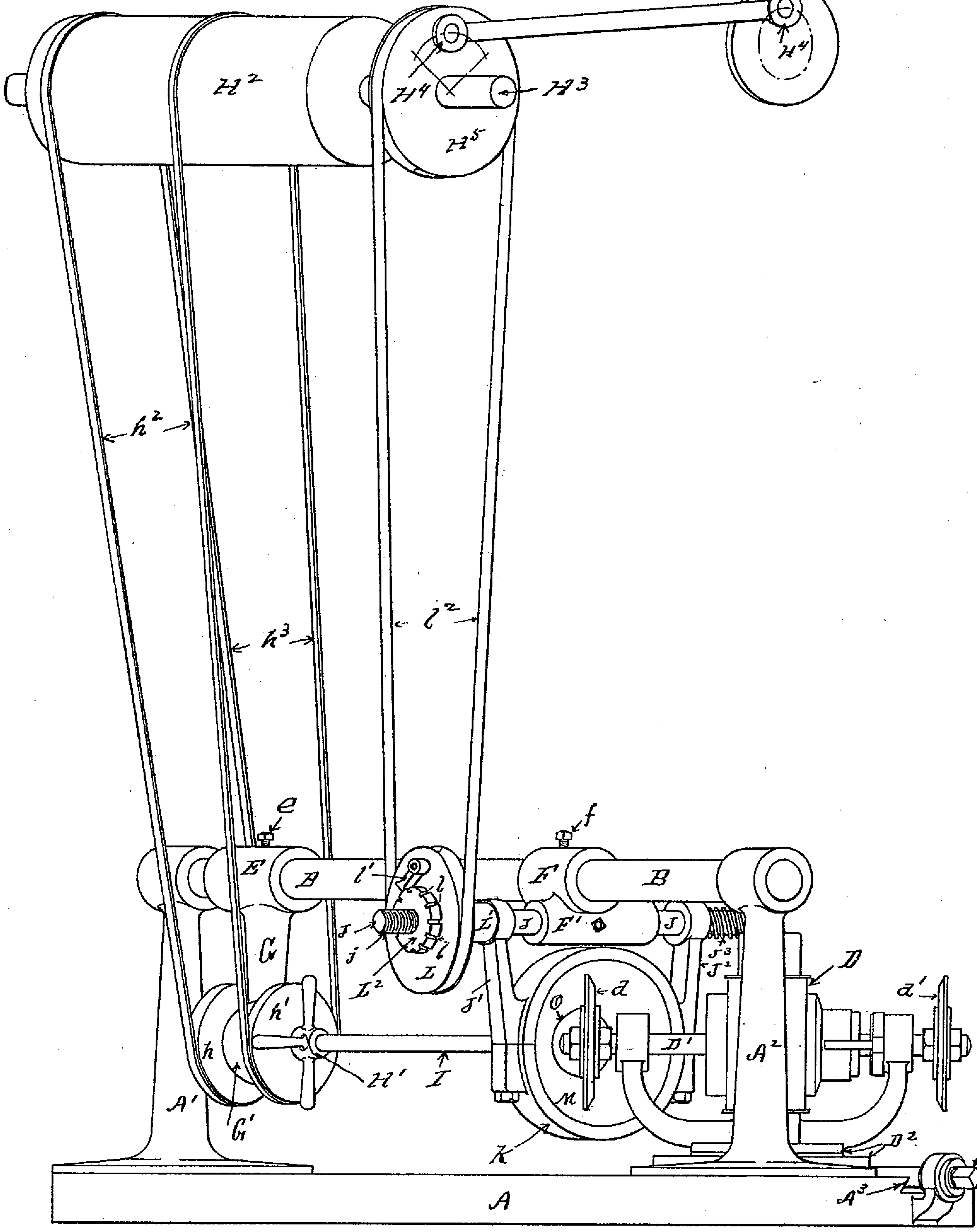
W. H. GAITHER.

BIFOCAL LENS GRINDING MACHINE.

(Application filed Apr. 21, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses.
Fred Einfeldt
A. L. Jackson

Inventor.
Wallace H. Gaither
By [signature] Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

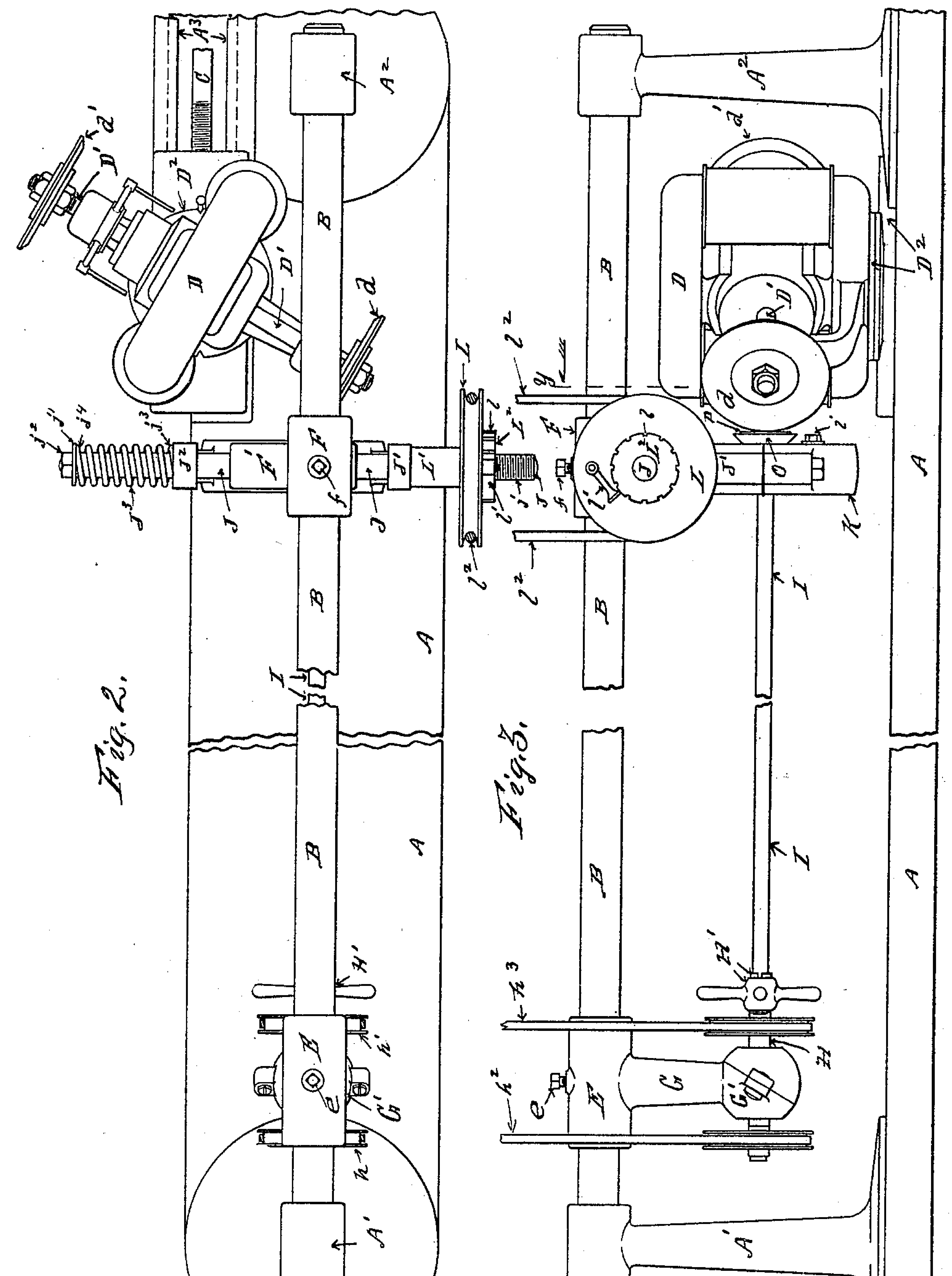
No. 640,191. Patented Jan. 2, 1900.

W. H. GAITHER.

BIFOCAL LENS GRINDING MACHINE.

(Application filed Apr. 21, 1899.)

(No Model.) 4 Sheets—Sheet 2.



Witnesses.
Fred Einfeldt
A. L. Jackson

Inventor.
Wallace H. Gaither
By J. H. Sturgeon
Atty.

No. 640,191. Patented Jan. 2, 1900.

W. H. GAITHER.

BIFOCAL LENS GRINDING MACHINE.

(Application filed Apr. 21, 1899.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 4.

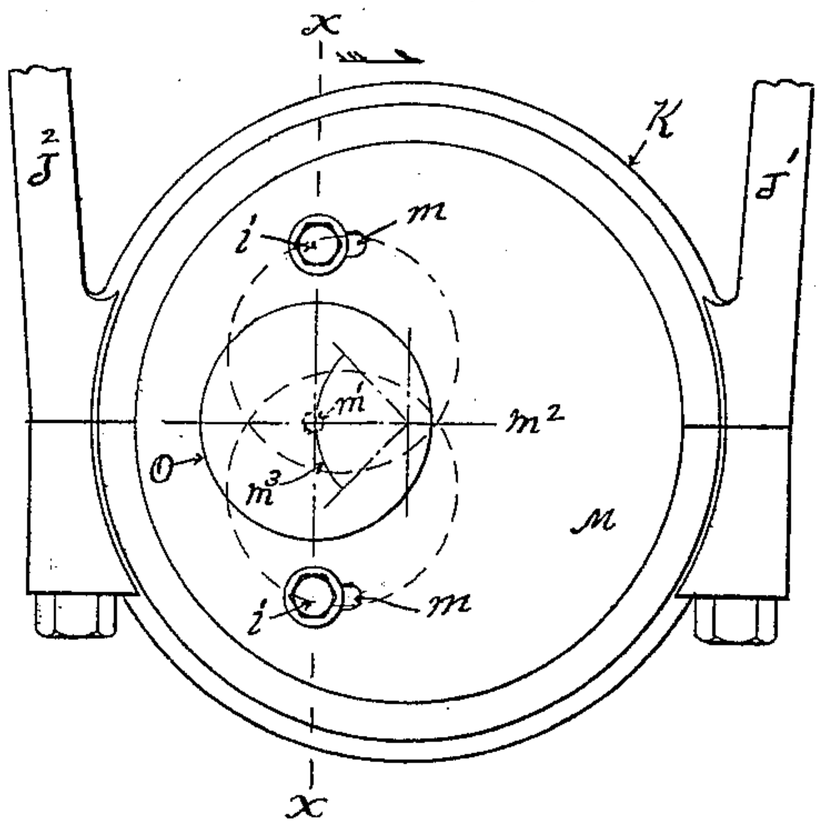
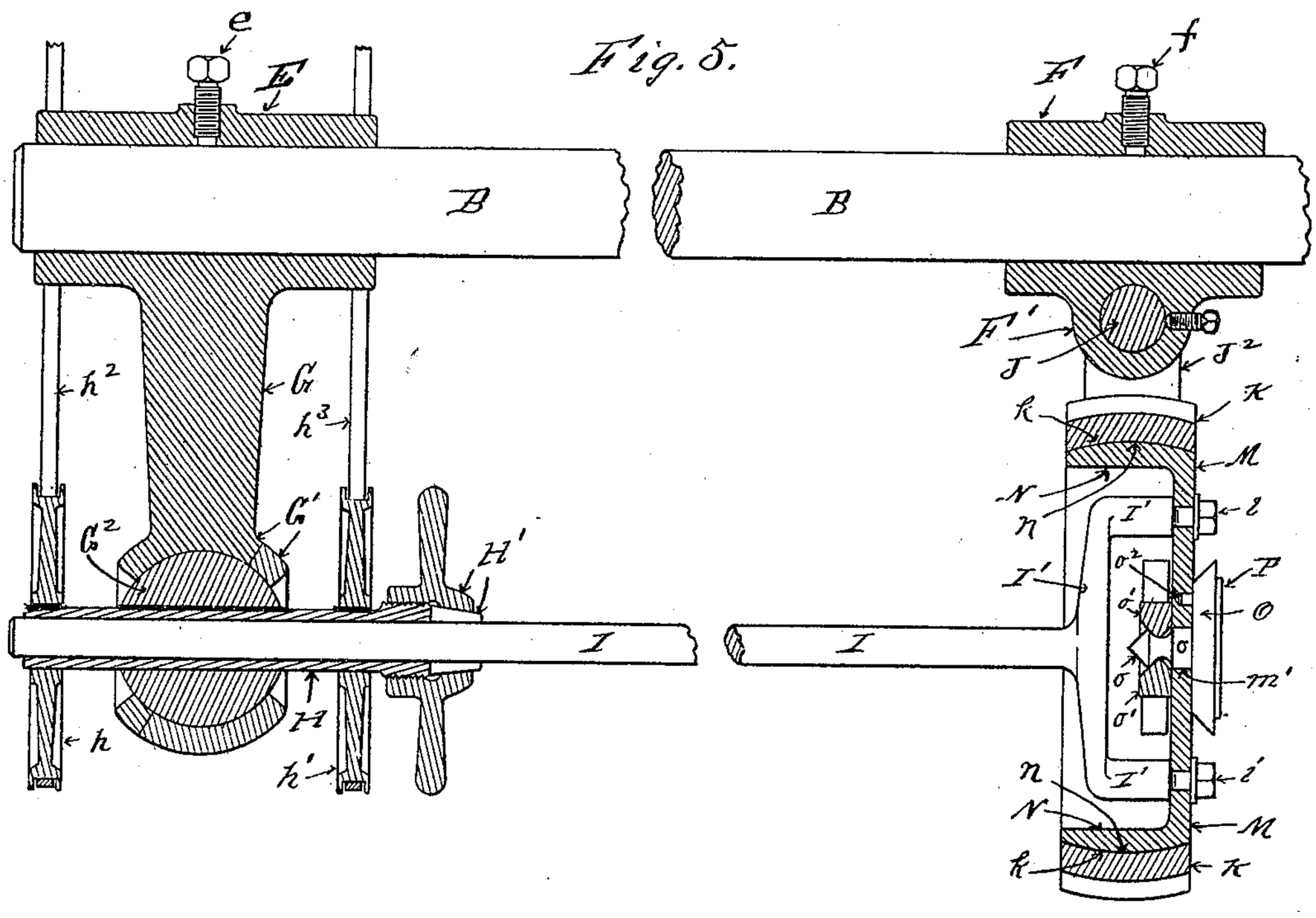


Fig. 5.



Witnesses.
Fred Einfeldt
A. L. Jackson

Inventor.
Wallace H. Gaither
By C. H. Sturgeon
Atty.

No. 640,191. Patented Jan. 2, 1900.

W. H. GAITHER.

BIFOCAL LENS GRINDING MACHINE.

(Application filed Apr. 21, 1899.)

(No Model. 4 Sheets—Sheet 4.

Fig. 6.

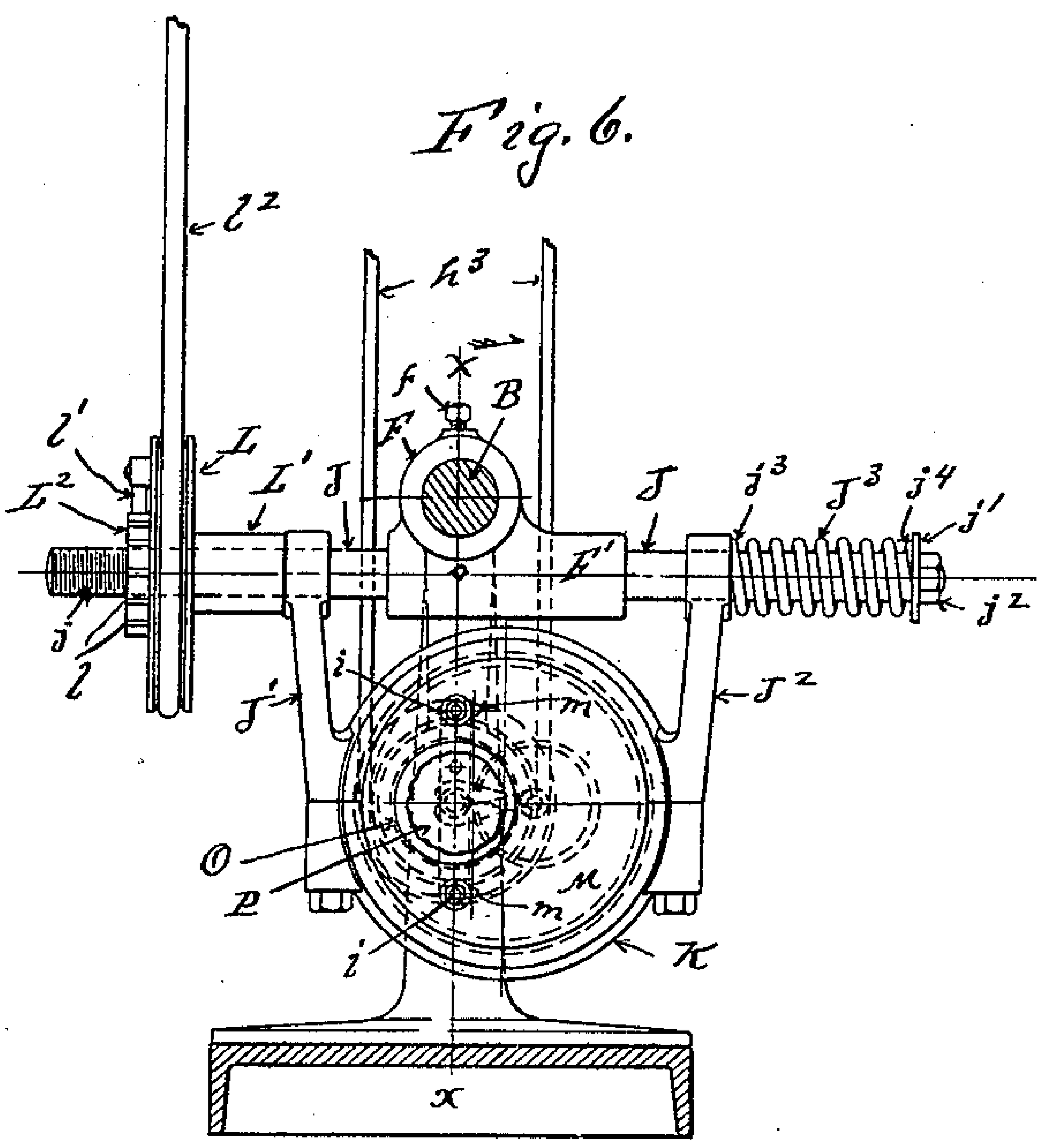
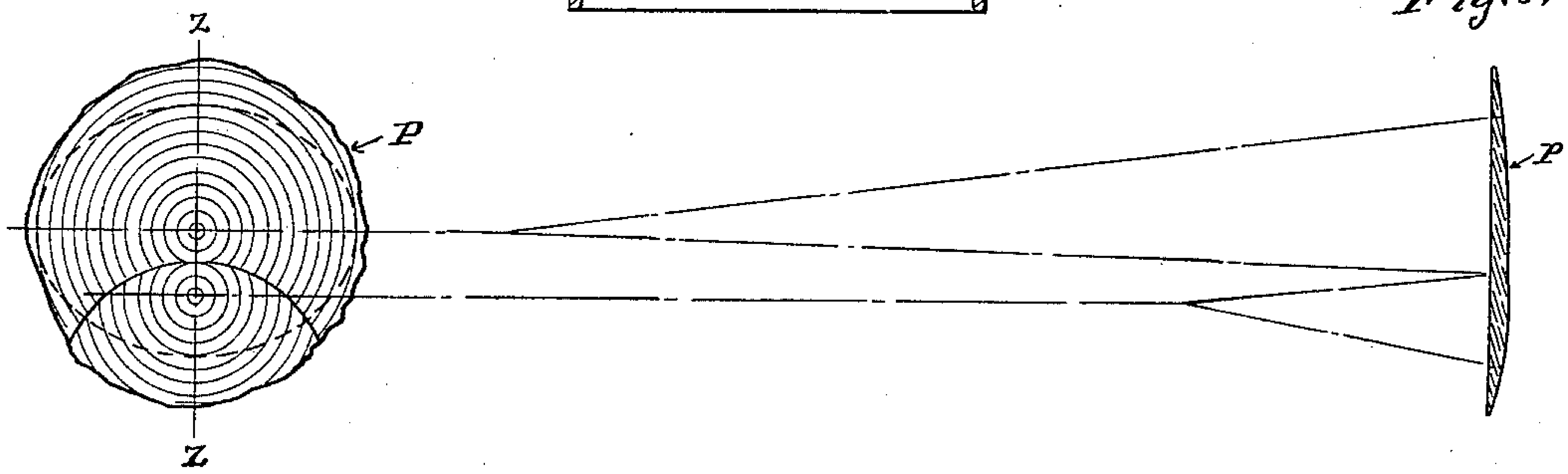


Fig. 7. *Fig. 8.*



Witnesses.
Fred Einfeldt
A. L. Jackson

Inventor.
Wallace H. Gaither
By [illegible] Sturgeon
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WALLACE H. GAITHER, OF ERIE, PENNSYLVANIA.

BIFOCAL-LENS-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,191, dated January 2, 1900.

Application filed April 21, 1899. Serial No. 713,832. (No model.)

To all whom it may concern:

Be it known that I, WALLACE H. GAITHER, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Bifocal-Lens-Grinding Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to machines for grinding optical lenses, and particularly to machines for grinding bifocal lenses; and it consists, substantially, in the construction of mechanism whereby a bifocal lens may be ground from a single glass, so that the meeting-points of the two fields of the lens are substantially on the same plane, as hereinafter set forth and described, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in perspective of a machine embodying my invention. Fig. 2 is a top or plan view of the same with the countershaft omitted. Fig. 3 is a side view in elevation of the same. Fig. 4 is a view in elevation of the adjustable chuck-plate of my machine. Fig. 5 is a longitudinal section of a portion of the machine, the section through the chuck-plate being on the line x in Figs. 4 and 6. Fig. 6 is a vertical sectional view on the line y in Fig. 3. Fig. 7 is a front view of a bifocal lens ground on my machine. Fig. 8 is a vertical section of the same on the line z in Fig. 7.

In the drawings thus illustrating my invention, A is the bed-plate of the machine. Upon the ends of this bed-plate there are standards A' A^2, in which a rod or bar B is secured, and at one side of the standard A^2 there are longitudinal ways A^3, upon which grinding mechanism D is mounted, adapted to be adjusted back and forth on said ways by a screw C. Upon the rod or bar B there are mounted sleeves E and F, secured in place by set-screws e and f and adapted to be adjusted longitudinally on the rod or bar B. The sleeve E, located adjacent to the standard A', is provided with a downwardly-projecting arm G, provided at its lower end with a socket G', having a ball G^2 journaled and rotating freely therein. In the ball G^2 there is secured a sleeve H, provided with pulleys h h' and driven by belts h^2 and h^3 from a drum H^2 on an oscillating counter-shaft H^3, driven by crank mechanism H^4 or in some other convenient manner. On one end of the sleeve H there is a clutch H', by means whereof the sleeve H may be clamped to a shaft I, as clearly shown in Fig. 5. The sleeve F is located adjacent to the grinding mechanism D and is provided on its lower side with a transverse sleeve F', in which a transverse rod J is secured. Upon this rod J there are mounted two arms J' J^2, one at each side of the sleeve F, so as to slide longitudinally and rotate on the rod J, these arms being joined at their lower ends to the edges of a lens-chuck-plate support K, which is supported from the rod J by the arms J' J^2. On the portion of the rod J extending beyond the arm J' there is loosely mounted a pulley L, provided with a sleeve L', the end of which contacts with the outside of the arm J', and the rod J is provided with a screw-thread j, extending from the end thereof back into the sleeve L', and against the outside of the pulley L there is a circular nut L^2, operating on the thread j. This nut is provided with grooves l in its periphery, adapted to engage a reversible dog l' on the pulley L, whereby the nut L^2 may be rotated in unison with the pulley L in either direction desired. On the opposite end of the rod J, extending beyond the arm J^2, there is a spiral spring J^3, the inner end j^3 of which contacts with the arm J^2 and its outer end j^4 with a collar j' on the end of the rod J, held in place by a nut j^2. Thus the rotation of the nut L^2 on the thread j in one direction operates, through the contact of the sleeve L' against the outside of the arm J', to move the arms J' and J^2 and the frame K, with the lens-chuck plate and the lens-chuck thereon, in one direction on the rod J, and in so doing compresses the spring J^3; but when the nut L^2 is rotated in the opposite direction the spring J^3, operating against the outside of the arm J^2, moves the arms J' J^2 and the chuck-plate support K in the opposite direction on the rod J. Thus in this manner the lateral movement of the chuck-

supporting frame K and the chuck therein is accomplished. The pulley L is driven by means of a belt l^2 from a pulley H^5 on the counter-shaft H^3. The chuck-support K is made in the form of a separable annular ring, the inner surface *k* of which is concave. The chuck-plate M is provided with a rearwardly-projecting flange N, the outer surface *n* of which is convex and is mounted within the concave surface *k* of the lens-chuck support K so as to move freely therein. The shaft I is connected to the back of the chuck-plate M by means of a yoke I′ on the end of the shaft I, which yoke I′ is connected to the back of the chuck-plate M by means of screws *i i*, passing through slotted holes *m m* in the chuck-plate M at some distance to one side of the center of the chuck-plate M, as clearly shown in Fig. 4, the slotted holes *m m* in the plate M enabling the yoke I′ to be adjusted toward and away from the axis of the plate M. The chuck O is provided with a rearwardly-projecting central stud *o*, passing through a hole *m′* at the intersection of the line *x* with a line m^2, passing through the plate M at right angles to the line *x*, as illustrated in Figs. 4, 5, and 6, where it is engaged by clamping-jaws *o′ o′*, and on the back of the chuck O there is a stud o^2, adapted to enter a hole in the face of the plate M, so that the chuck O will not rotate on the stud *o*. To the face of the chuck O the glass P to be ground is cemented or secured in the usual manner. It will be observed that as the chuck-plate M is oscillated back and forth it has a gyrating motion in the chuck-plate support K, which swings on the rod J, the center of the chuck O traveling in the arc m^3 of a circle, as indicated in Fig. 4.

The grinding mechanism consists, preferably, of a small electric motor D of the usual construction and operated in the usual manner, the shaft D′ of which is provided at one end with a grinding-wheel *d* and at the other end with a polishing-wheel *d′*. This motor is pivotally mounted upon a base D^2, operating on the ways A^3, so that it can be adjusted toward or away from the chuck O and can be swung around on its pivotal bearing, so that either the grinding-wheel *d* or the polishing-wheel *d′* can be used, as desired.

I have thus shown and described a convenient mechanism embodying my invention, and the operation of this mechanism is as follows: The glass P to be ground is secured to the face of the chuck O by means of adhesive material or in other convenient manner. The ratchet-nut L is then adjusted to its innermost position on the rod J, which operates to move the arms J′ J^2 and the lens-chuck support along the rod J, so as to compress the spring J^3. The sleeve F, supporting the spherical bearing G′, is then moved along the rod or bar B to such point as will determine the focal distance of the first field to be ground upon said glass P, and the clutch H′ is then secured to the shaft I. The grinding-wheel *d* is then adjusted to operate on the glass P and the mechanism started. The oscillating motion of the shaft H^3 operates, through the belts h^2 h^3 and through the intermediate mechanism hereinbefore described, to give a gyrating motion to the lens-chuck during its oscillation back and forth through the arc of a circle of approximately ninety degrees. Meanwhile the operation of the ratchet mechanism on the nut L′ operates to unscrew it, allowing the spring J^3 to impart a lateral motion to the lens-chuck support K, swinging upon the rod J and carrying the glass in front of the grinding-wheel *d*, and as it travels in this manner past the grinding-wheel one portion of the lens is ground for one focal distance, and after this is completed the chuck-plate M is adjusted by means of the screws *i i* and the slots *m m*, and the sleeve F and mechanism supported thereby are adjusted to the proper focal distance of the other field to be ground on the glass P and the clutch H′ again secured to the shaft I, when the grinding-wheel *d* operates to grind the remaining portion of the lens for the other focal distance upon said glass.

The polishing is accomplished by the use of the polishing-wheel *d′* in the same way as in the grinding hereinbefore described, which operations adapt this machine to produce the bifocal lenses illustrated in Figs. 7 and 8.

I have thus described the construction and operation of a machine for grinding bifocal lenses embodying my invention, so as to enable others to utilize the same; but I do not desire to limit myself to the exact construction hereinbefore shown and described, as many modifications of the construction thereof can be readily made by those skilled in the art to which this invention appertains without departing from the spirit of said invention. Therefore

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination in a machine for grinding bifocal lenses, of a lens-chuck having a simultaneous gyrative and transverse motion, and a grinding mechanism adapted to operate on a glass secured to said chuck, substantially as and for the purpose set forth.

2. The combination in a machine for grinding bifocal lenses, of a lens-chuck, mechanism for imparting gyrating and transverse motion to said lens-chuck, and grinding mechanism adapted to be adjusted toward and away from said lens-chuck, substantially as and for the purpose set forth.

3. The combination in a machine for grinding bifocal lenses, of a lens-chuck, mechananism for imparting a gyrating motion to said chuck, means for adjusting the amount of the gyrative motion of the lens-chuck, mechanism for moving the lens-chuck support transversely back and forth, and grinding and polishing mechanism adapted to operate on a glass secured to the lens-chuck, substantially as and for the purpose set forth.

4. The combination in a machine for grinding bifocal lenses, of a lens-chuck-supporting mechanism, a lens-chuck adjustably mounted thereon, oscillating shaft and yoke mechanism adapted to rotate said lens-chuck mechanism simultaneously with the transverse movement of said chuck, a longitudinally-adjustable ball-and-sleeve bearing for the rear end of said oscillating shaft, clamp mechanism for securing said sleeve to said shaft, reversible mechanism for moving the lens-chuck-supporting mechanism transversely back and forth, and grinding mechanism adapted to be adjusted to operate on a glass secured to said lens-chuck, substantially as and for the purpose set forth.

5. The combination in a machine for grinding bifocal lenses, of a lens-chuck support suspended upon a transverse rod, a lens-chuck plate mounted in a globular bearing thereon, a lens-chuck mounted on said plate at one side of the center thereof, mechanism for moving said lens-chuck support to and fro on said rod, a shaft having a yoke thereon adjustably secured to said lens-chuck plate, a longitudinally-adjustable sleeve and ball bearing support for the rear end of said shaft, and mechanism for oscillating said sleeve and shaft, substantially as and for the purpose set forth.

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

WALLACE H. GAITHER.

Witnesses:

H. E. FISH,

KARL W. SCHUUR.