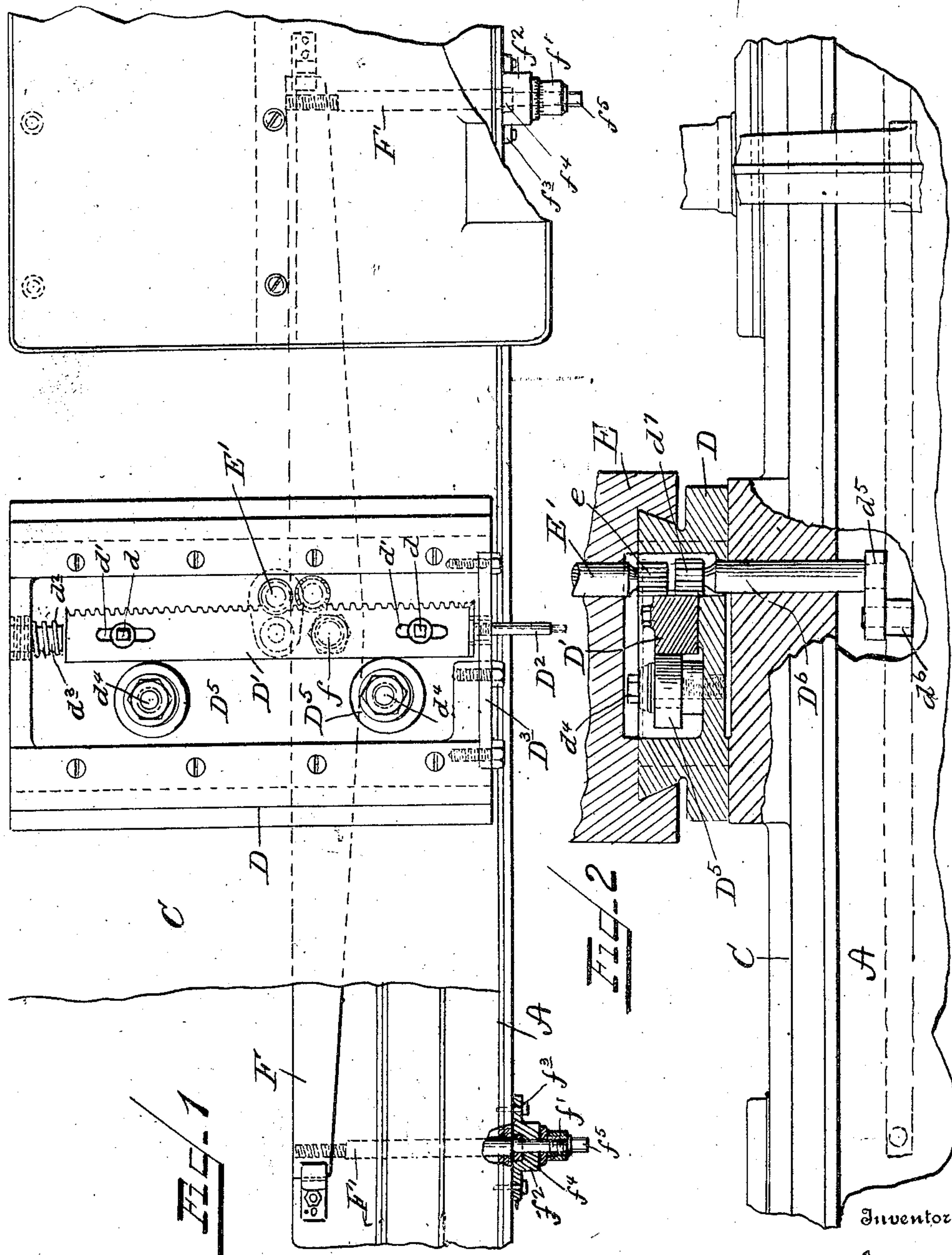


No. 861,738.

PATENTED JULY 30, 1907.

A. B. LANDIS.
GRINDING MACHINE.
APPLICATION FILED APR. 6, 1906.

3 SHEETS—SHEET 1.



Witnesses
F. L. O'Connell
M. W. Darg

By

Abraham B. Landis,
E. W. Bradford

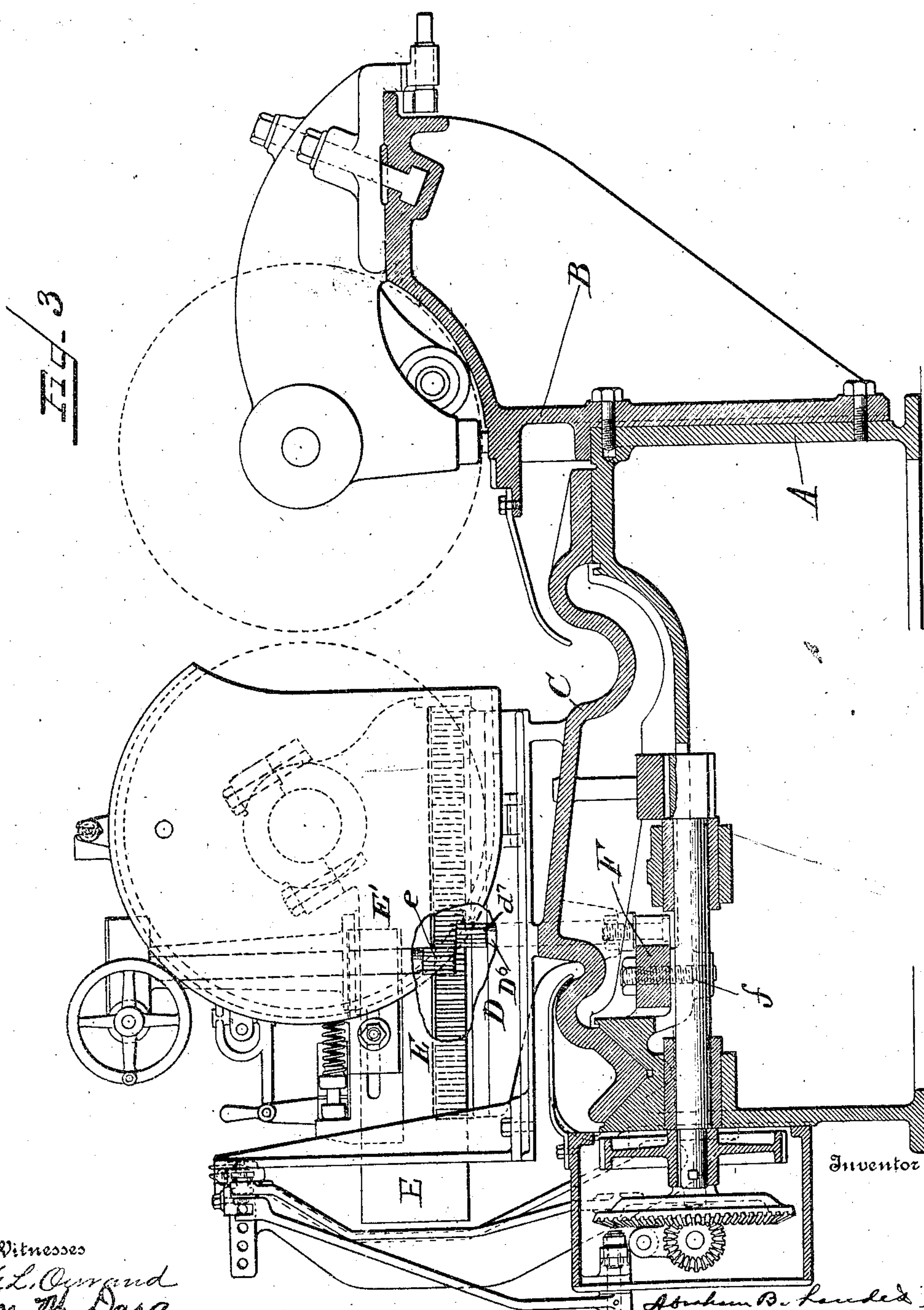
Attorney

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3 SHEETS—SHEET 2.



Witnesses
F. L. Osgood
M. W. Darg.

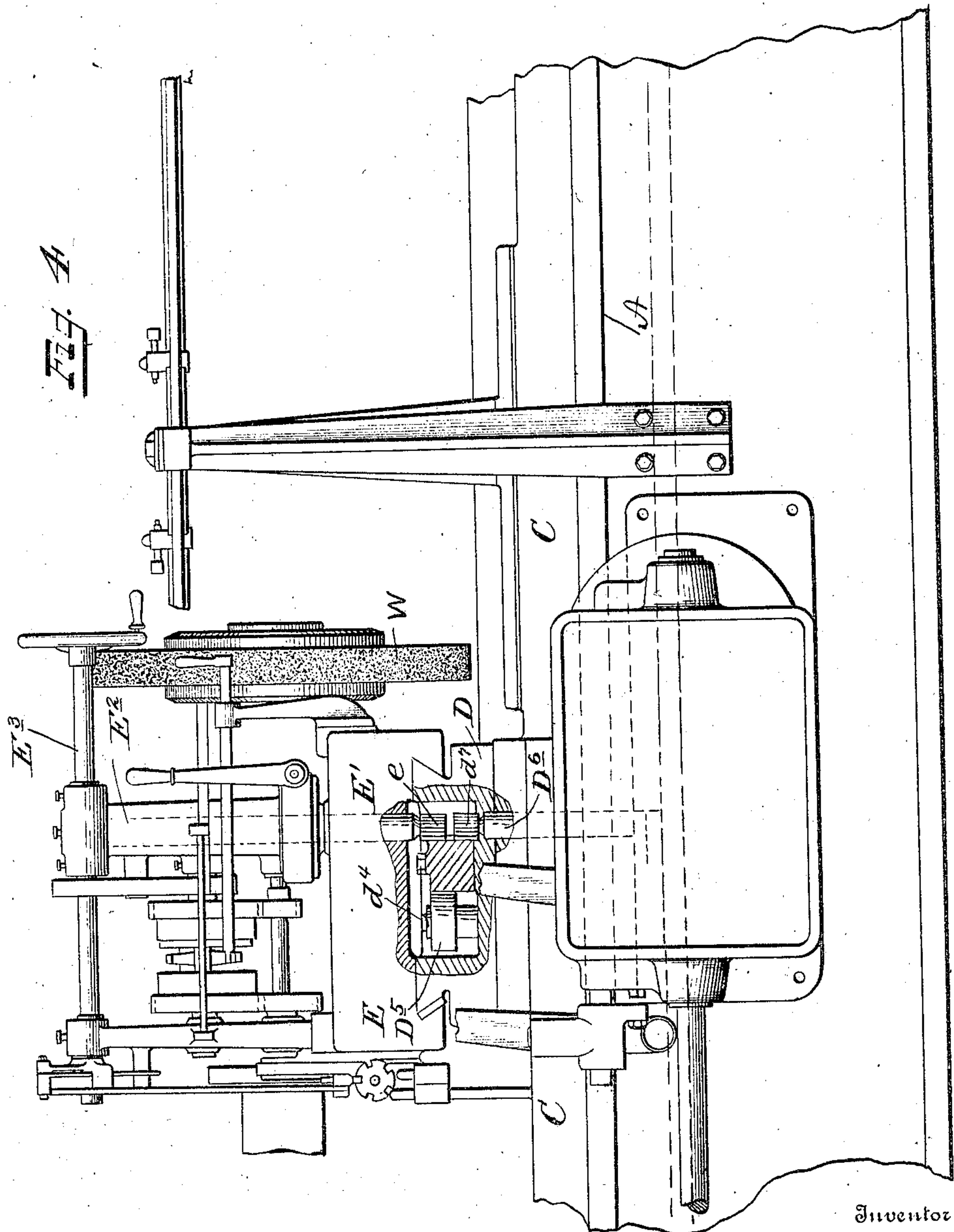
Attest: Abraham B. Landed,
per, Geo. Bradford Attorney

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3 SHEETS—SHEET 3.



Witnesses
J. L. Curran
M. H. Darg

By

Inventor
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UNITED STATES PATENT OFFICE.

ABRAHAM B. LANDIS, OF WAYNESBORO, PENNSYLVANIA.

GRINDING-MACHINE.

No. 861,738.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed April 6, 1906. Serial No. 310,327.

To all whom it may concern:

Be it known that I, ABRAHAM B. LANDIS, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

My said invention consists in certain improvements in the construction and arrangement of grinding machines, particularly that class designed for grinding rolls, the improvements consisting in specific details of construction for enabling the machine to grind such work with a longitudinally slightly concaved or convex surface, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a top or plan view of a portion of a grinding machine of my improved construction with the grinding wheel slider removed, Fig. 2 a side elevation of the same, Fig. 3 a cross-section through a grinding machine embodying said improvements, and Fig. 4 a front elevation of the central portion of the same with a part of the slide and slider broken away to show the internal mechanism.

In said drawings the portions marked A represent the bed of the machine, B the work-holding table, C the grinding wheel carriage, D the slide on said grinding wheel carriage, E the slider carrying the grinding-wheel, and F the guide bar or track. These several parts of the machine are or may be of the usual or any appropriate construction, such as shown in several of my former patents, except in so far as relates to the details which constitute the improvements forming the subject matter of this application.

A leading feature of said improvements is the bar F, which is formed with a normally straight front edge and mounted upon a central pivot bolt f on a suitable part of the bed A. Its ends are formed with transverse screw-threaded perforations, in which the inner screw-threaded ends of transversely extending rods F' are mounted. Said rods extend through the side of the bed A to its outside, at each end, where they are provided with nuts f' adapted to bear against washers f^2 interposed between said nuts and the face of the bed A. Said washers f^2 are formed with flanges and they are bolted to the bed A by bolts f^3 , and are formed with recesses in their faces adjacent to the bed in which collars f^4 , rigid on said rods F' , operate, thus holding said rods from longitudinal movement no matter which way they are turned. Said rods F' are first adjusted to bring the front edge of said bar F in an absolutely true line parallel with the work, and then, by continuing the turning thereof in one direction or the other, said bar can be sprung to give its front edge either a slightly convex or a slightly concave form, longitudinally, the ends thereof being sprung either forward or backward from the cen-

tral pivot f . The collars f^4 prevent any longitudinal movement of said rods and they are turned by any kind of a wrench or crank applied to their squared outer ends f^5 . Graduation marks are preferably formed around the edge of the washers or legs f^2 , as shown, with which similar marks around the edge of the nuts f may register, in order that a uniform adjustment of both ends of said bar may be determined with absolute accuracy, and then secured by an appropriate adjustment of the nuts. Said bar F thus furnishes a track of either a straight or a curved form and is adapted to guide the slide supporting the grinding wheel in its relation to the work as the carriage travels back and forth. This is accomplished by the following mechanism: A rack-bar D' is mounted within a longitudinal recess in the slide D by means of screw-bolts d which extend through longitudinal slots d' in said bar and into screw-threaded perforations formed in the bottom of the slide beneath. Said rack-bar is thus adapted to have a limited longitudinal movement. A locking screw D^2 is mounted in the outer end plate D^3 of slide D and adapted to lock said rack-bar when grinding only straight work by forcing said rack-bar against stud d^3 . A coiled spring d^2 mounted upon a stud d^6 in the opposite end piece D^4 of the slide D, is adapted to press against the adjacent end of said rack-bar and through the rack connection normally hold the roller d^6 on crank arm d^5 against said bar F. The rear edge of said rack-bar rests solidly against anti-friction rollers D^5 mounted upon short shafts or bolts d^4 set into screw-threaded perforations in the bottom of slide D, as shown. Said rack-bar is of considerable thickness as best shown in Figs. 2 and 4, and the teeth extend across its entire width. A vertical shaft D^6 is journaled in bearings in the slide and has a crank arm d^5 on its lower end with a crank-pin on its outer end having an anti-friction roller d^6 thereon in position to run upon the front edge of bar F when the rack-bar D' is adapted to be under a yielding engagement with the slide. A pinion d^7 on the upper end of said crank shaft D^6 engages with the lower part of the face of the rack-bar D' . A second shaft E' is journaled in the slider E, passing up through the standard E^2 and engaging in the usual way with a shaft E^3 by which it may be operated to feed the slider E, carrying the grinding wheel W, to and from the work. The lower end of said shaft E' is provided with a pinion e adapted to engage with the upper side of the face of rack-bar D' as shown in Figs. 2 and 4.

The operation is as follows: When it is desired to grind the work, such as a roll, with a slightly concave or convex surface longitudinally, the track bar F is sprung by means of the screw-rods F' as before described to give its front edge the concavity or convexity required for the degree of curvature desired in the work. The rack-bar D' is loosened in its connections to the slide D by releasing screw D^2 . The pinion d^7 and e of

the crank shaft D⁶ and the grinding wheel feed shaft E' are in engagement therewith. The spring d² holds said rack-bar D' normally against the pinion d⁷ and thereby the roller d⁶ against track bar F by which the movement of the slider is controlled to produce either a concave or convex surface on the work. As the grinding wheel carriage traverses back and forth carrying the slider and the grinding wheel thereon, the anti-friction roller d⁶ on the outer end of crank arm d⁵ on the lower end of crank shaft D⁶ follows and bears upon the edge of track bar F. As said roller passes along over the curved track thus provided, the crank will be swung slightly and operate to oscillate the crank-shaft D⁶ in its bearings and through the pinion d⁷ on its upper end will move the rack-bar D' longitudinally, which, through the pinion e, imparts motion to the feeding shaft E' and moves the slider with the grinding wheel thereon slightly toward or from the work in a line to correspond with the curvature of said bar F. By this means the surface of said work, which is ground while in rapid rotation, is given the desired concave or convex form as will be readily understood. When it is desired to use the machine for grinding straight work, set-screw D² is forced inward to slide the rack-bar D' against the inner end of pin d³ and said bar is thus locked in this position. This movement will turn the crank d⁵ with the friction roller away from the edge of bar F and thus as said carriage moves back and forth the position of the grinding wheel in relation to the work is not effected, being fed forward as usual and held in a fixed position during the traverse of said carriage by means of the shaft E' and the feeding mechanism connected therewith.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a grinding machine, the combination, with the grinding wheel carriage, of the slider mounted thereon and

containing a movable rack-bar, the slider mounted on said slide and carrying a shaft for moving said slider back and forth having a pinion on its lower end engaging with said rack-bar, a crank-shaft journaled in the bottom of said slide and having a pinion on its upper end engaging with said rack-bar and a crank on its lower end provided with an anti-friction roller adapted to engage with a track mounted upon the frame of the machine, and said track, substantially as set forth.

2. In a grinding machine, the combination, of the frame, the grinding-wheel carriage, the slider thereon having a longitudinal recess, a rack-bar mounted in said recess to move longitudinally, the slider mounted on said slide and having a shaft with a pinion on its lower end engaging with said rack-bar, a crank-shaft mounted in the carriage with a pinion on its upper end engaging with said rack-bar and a crank on its lower end having a part engaging with a track on the frame, and means for curving said track, longitudinally, substantially as set forth.

3. In a grinding machine, the combination, of the frame, the grinding-wheel carriage, the slide on said carriage, a rack-bar in said slide adapted to have a limited movement, a spring for normally holding said rack-bar in one direction, the slider containing the feeding shaft with a pinion engaging with said rack-bar, a crank-shaft mounted in the carriage and having a pinion engaging with said rack-bar on its upper end and a crank on its lower end engaging with the track in the frame, and said track consisting of a bar pivoted at its center and connected with adjusting mechanism at each end, whereby said ends may be sprung from said central pivot and held in a fixed position, substantially as set forth.

4. In a grinding machine, the combination, of the carriage, the slider carrying the grinding wheel, a rack-bar in a part of said carriage, the slider feeding shaft having a pinion engaging with said rack-bar, and a crank-shaft mounted in said carriage with a pinion on one end engaging with said rack-bar and a crank on the other end engaging with a track mounted in the frame, substantially as set forth.

In witness whereof, I have herunto set my hand and seal at Washington D. C. this 28th day of March, A. D. 1906.

ABRAHAM B. LANDIS. [L. S.]

Witnesses:

A. M. PARKINS,
E. W. BRADFORD.