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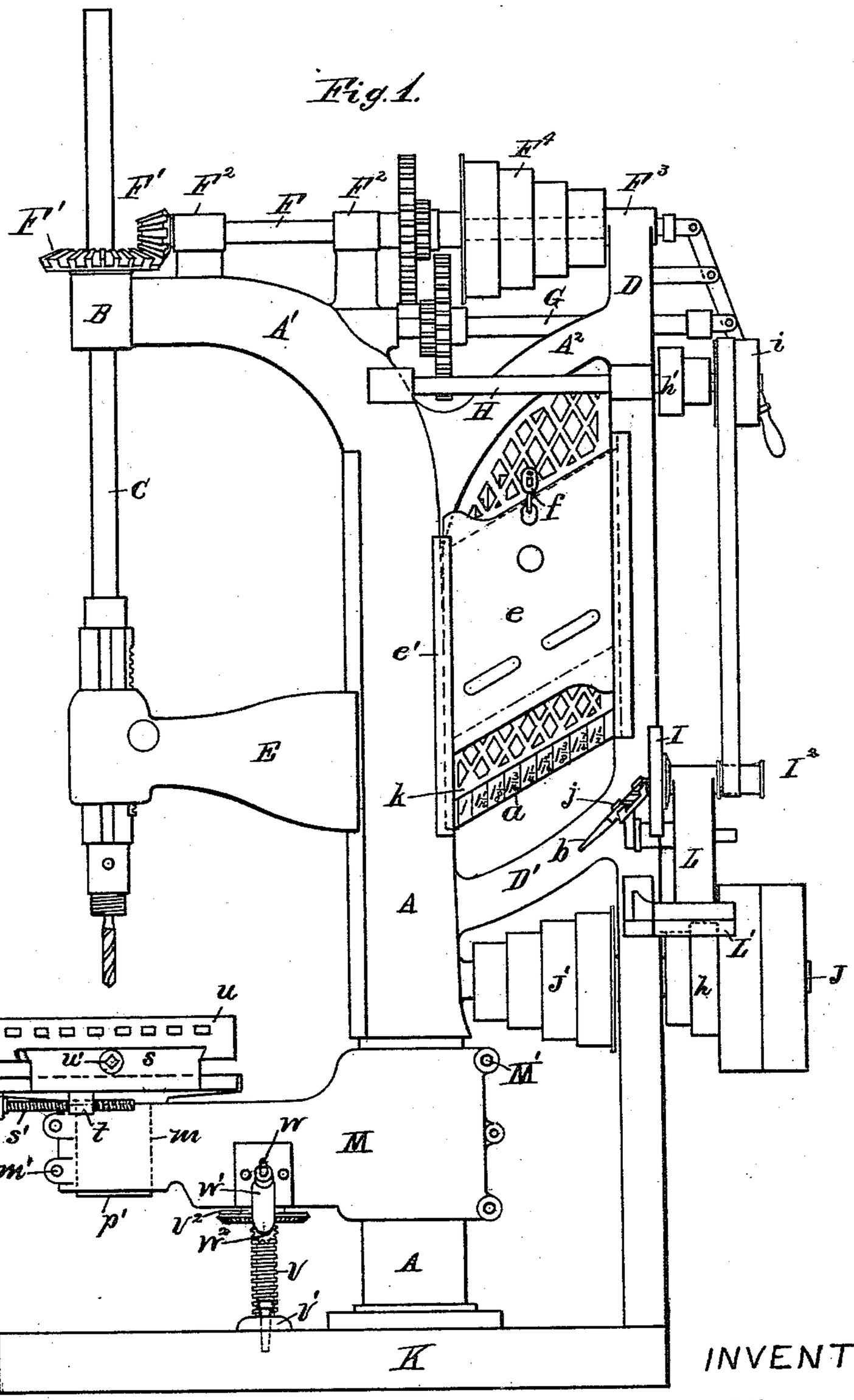
COLUMN DRILL PRESS.

No. 461,951. Patented Oct. 27, 1891.

Fig. 1.



INVENTORS

Attest:
L. Lee.
J. VanHook Jr.

Ulrich Eberhardt
and
Fred'k. L. Eberhardt,
per
Cramer & Miller, Attys.

(No Model.) 4 Sheets—Sheet 2.

U. & F. L. EBERHARDT.

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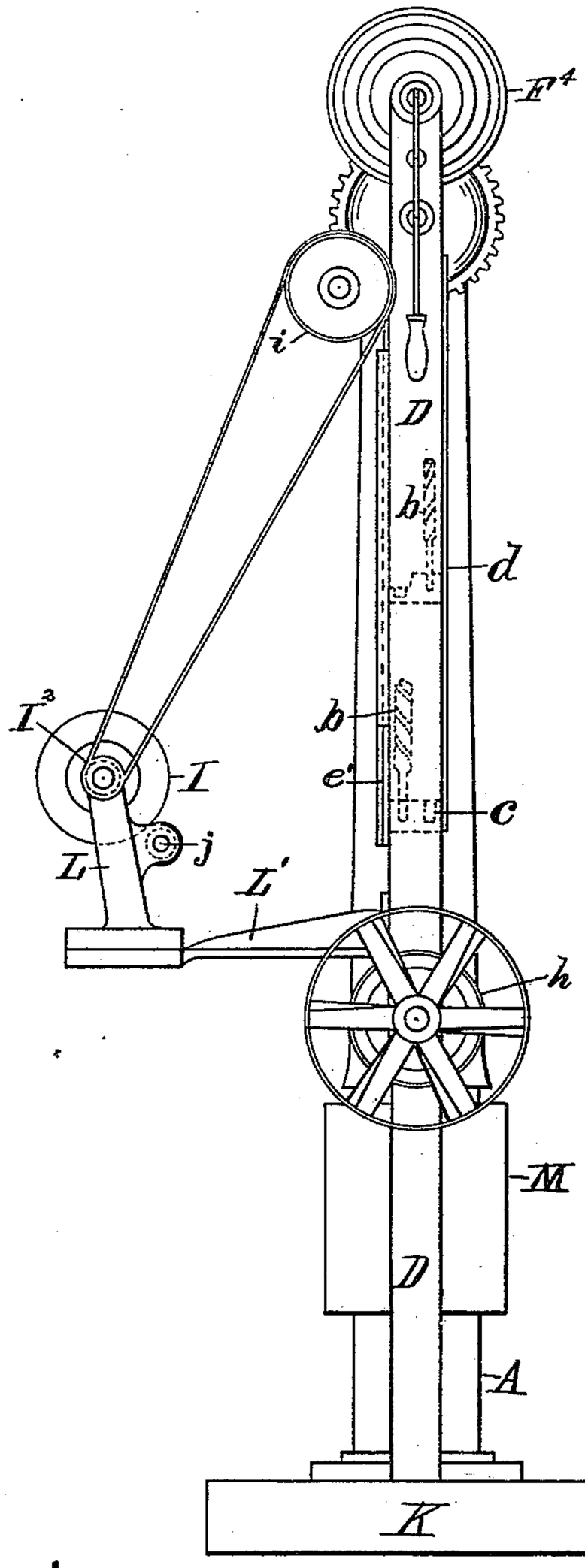
Fig. 2.



Attest:
L. Lee.
J. Van Vleck Jr.

INVENTORS.
Ulrich Eberhardt.
and
Fred.k L. Eberhardt.
per
Cranch Miller, attys.

(No Model.) 4 Sheets—Sheet 3.

U. & F. L. EBERHARDT.

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Fig. 3.

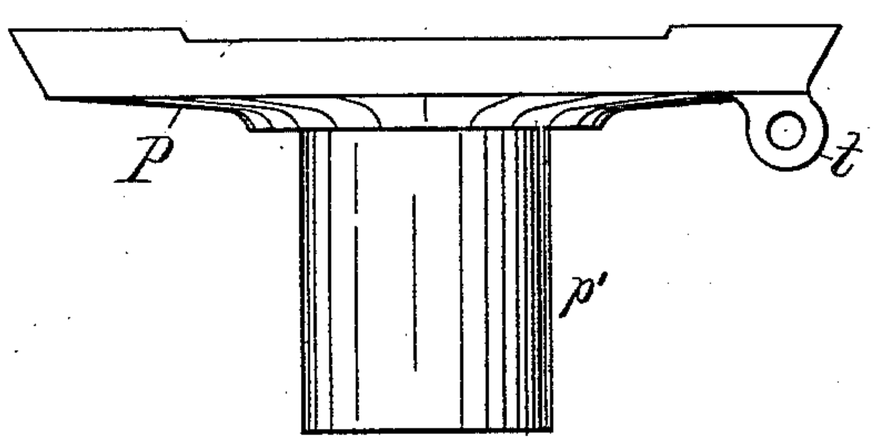


Fig. 4.

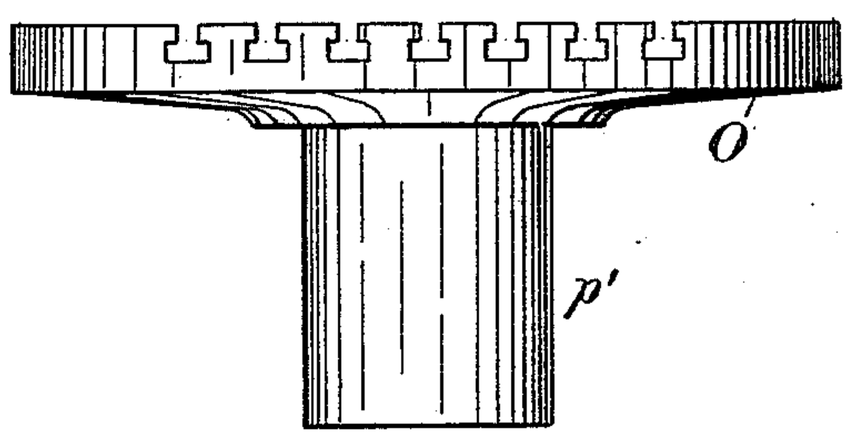
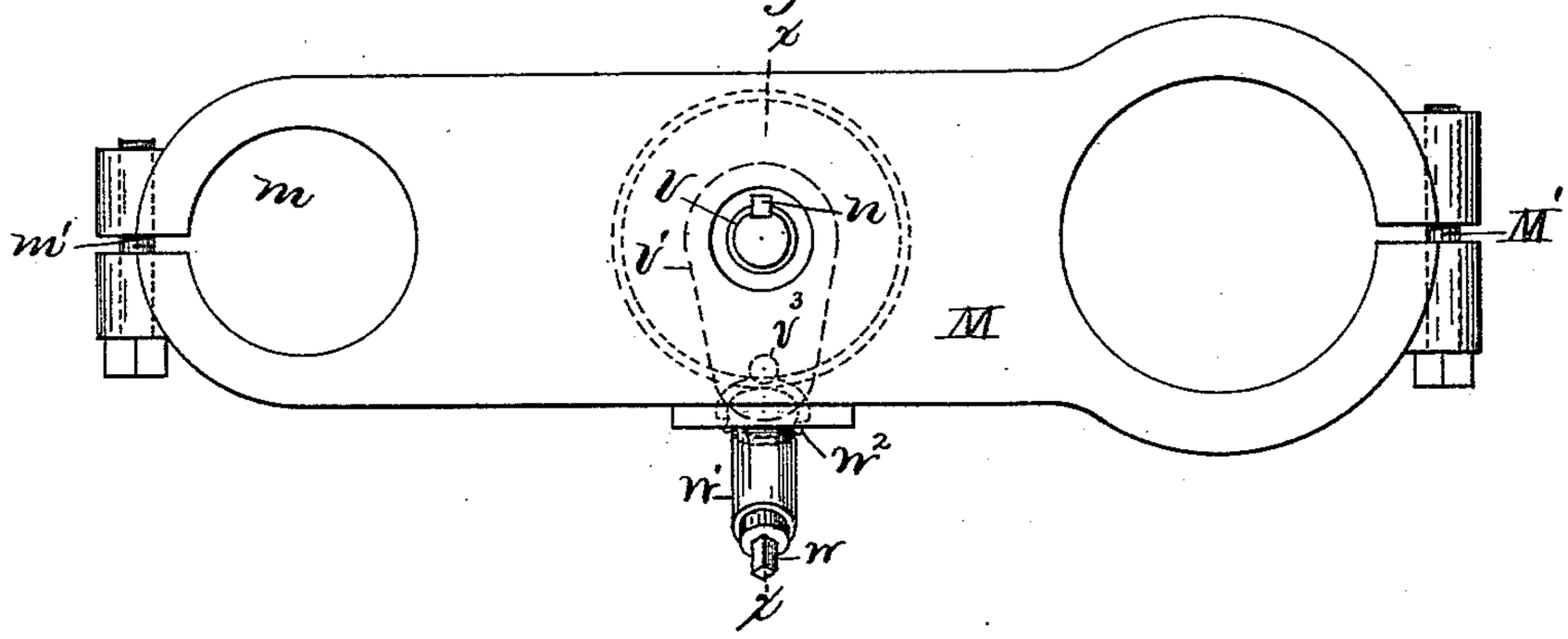


Fig. 5.



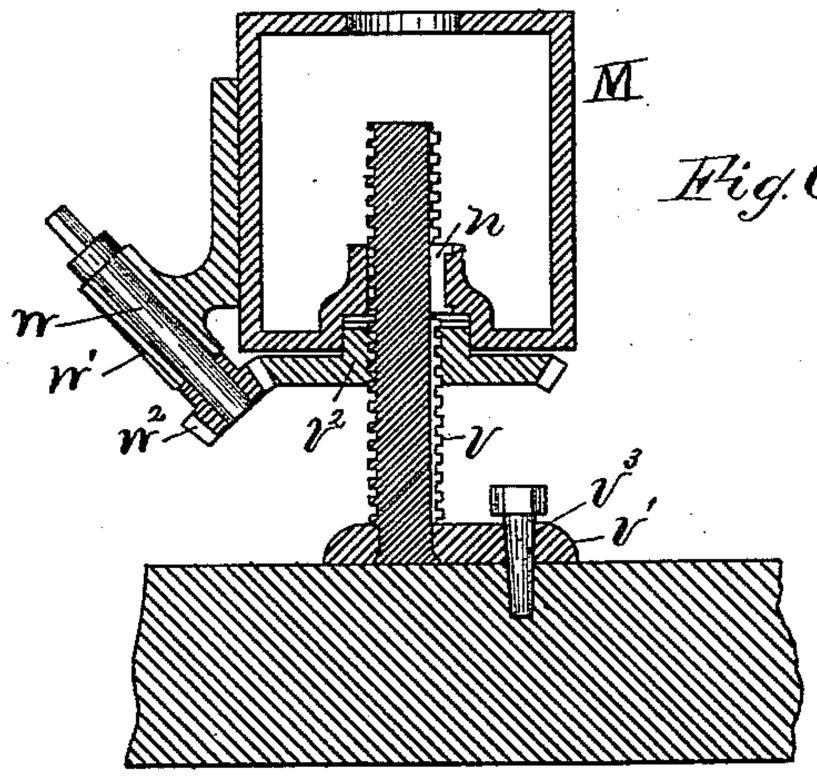


Fig. 6.

INVENTORS.

Ulrich Eberhardt, and
Fred.k L. Eberhardt,
by Crane & Miller, attys.

Attest:
L. Lee.
J. Vanhastfr.

(No Model.) 4 Sheets—Sheet 4.

U. & F. L. EBERHARDT.

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Fig. 7.

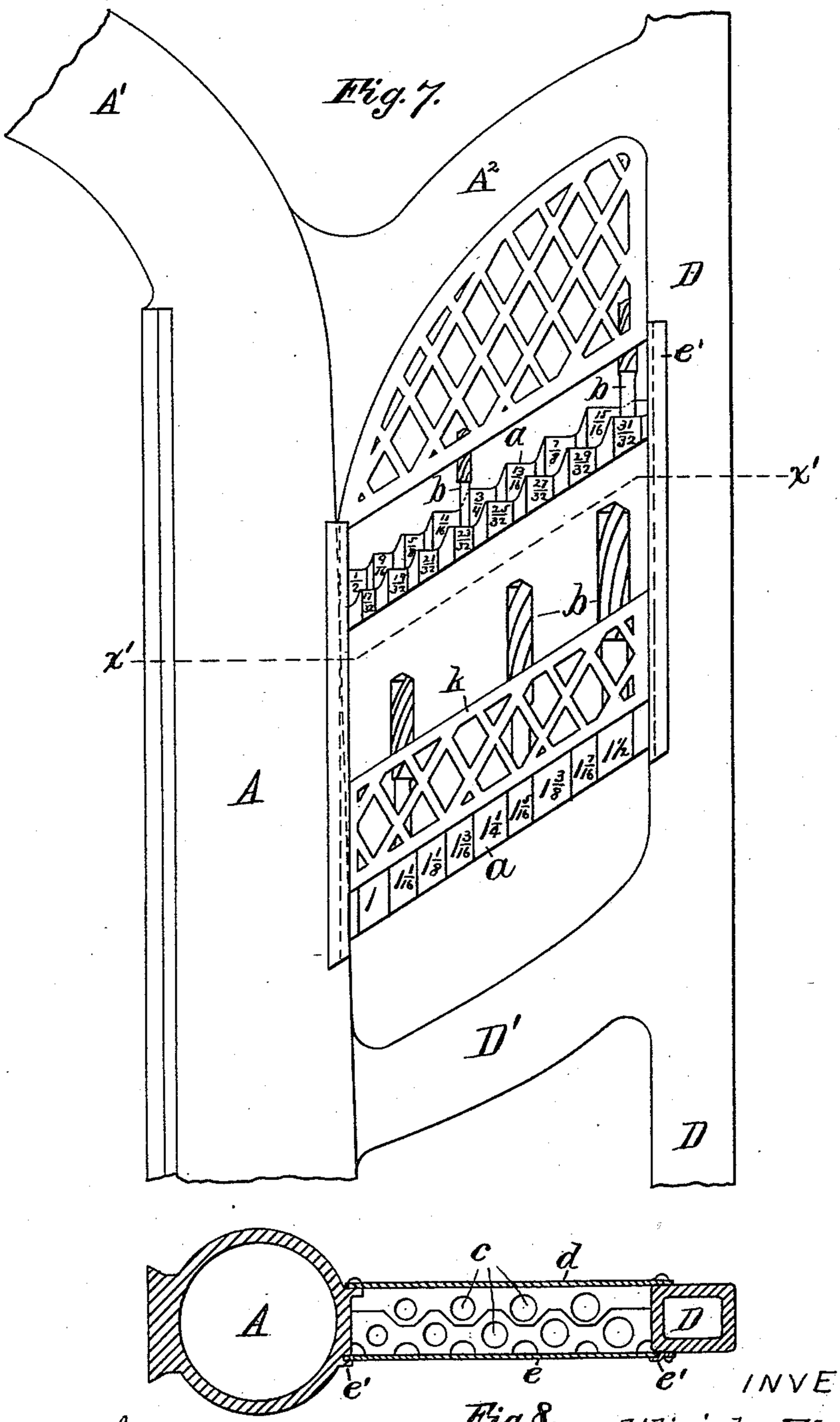

Fig. 8.

Attest:
L. Lee.
J. Vanhuel Jr.

INVENTORS.
Ulrich Eberhardt.
and
Fred'k L. Eberhardt.
by
Crane & Miller, Attys.

UNITED STATES PATENT OFFICE.

ULRICH EBERHARDT AND FREDERICK L. EBERHARDT, OF NEWARK, NEW JERSEY.

COLUMN DRILL-PRESS.

SPECIFICATION forming part of Letters Patent No. 461,951, dated October 27, 1891.

Application filed July 19, 1890. Serial No. 359,284. (No model.)

To all whom it may concern:

Be it known that we, ULRICH EBERHARDT and FREDERICK L. EBERHARDT, citizens of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Column Drill-Presses, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

Up to the present time it has always been the practice to construct drill-presses and similar classes of machines which required separate contrivances both for holding the set of tools therefor and for keeping the same in order, and which also required frequently, even when supplied with these separate devices, a supplementary machine having a different form of table in order to perform the work required of such class of machines.

The present invention relates to an upright column drilling-machine having a vertical post in the rear of the column to sustain the outer bearings for the counter-shaft and the back gearing; and it consists in the various attachments hereinafter described and claimed.

The primary object of our invention is to avoid the necessity of employing several separate agencies in order to operate the machine continuously and effectively and to furnish a machine which is completely provided with the drills necessary to operate it and with a grinding-wheel for sharpening the drills when required, so that the machine is rendered wholly independent of outside means for its continuous operation and is ready for use by the mere application of power to its driving-pulley. It has been common heretofore to keep the drills for drill-presses in a tool-room or other place apart from the drilling-machine, and to also furnish the grinding-machine wholly apart from the drill-press, by which arrangement the workman when changing drills is required to visit the tool-room and for sharpening the drills is required to visit the grinding-wheel. By the present invention the machine is furnished with a stock of drills and a grinding apparatus, by which construction it is evident that much time may be saved to the operator, as after starting his drill upon the work and setting the feed properly he may grind his tools or select another to be applied to the spindle while the work assigned him is in process of completion; and as he is not required to leave the drilling-machine for the performance of these duties he is constantly able to watch the work as it progresses, whereas if he had to leave the machine for such purposes it would in many cases necessitate the stopping of the machine until his return.

Our improvements are illustrated in the annexed drawings, in which—

Figure 1 is a side elevation of the entire machine. Fig. 2 is an elevation of the rear post and fixtures attached thereto. Fig. 3 is a front elevation of the removable seat for a compound table. Fig. 4 is a front elevation of a round table. Fig. 5 is a plan of the arm. Fig. 6 is a cross-section of the arm on line x x in Fig. 5. Fig. 7 is a side elevation of part of the column and post with the door removed from the drill-closet in Fig. 2. Fig. 8 is a plan of the drill-closet in section on line x' x' in Fig. 7.

A is the upright column of the drill, with branch A′ at the top to support the upper bearing B of the drill-spindle C at the front side of the machine. The column is also formed at the top with a rear branch A^2 to support the upper end of the post D, which carries the rear bearings of the speed-cones.

E is the bracket-bearing for the spindle C, and F the top or cone shaft, connected with the drill-spindle by bevel-gears F′, as usual. The shaft is mounted in bearings F^2 and F^3 upon the branch A′ and post D, and a back gear-shaft G is mounted in bearings upon the column A and upon the post D. The back gear-shaft forms no part of the present invention.

H is a shaft mounted adjacent to the shaft G to transmit power to a drill-grinding wheel I.

J is the counter-shaft of the machine, with bearings upon the column and post a considerable distance below the shafts F to secure a considerable length of belt between the cone J′ upon the counter-shaft and the cone F^4 upon the top shaft. The counter-shaft is connected with the shaft H by cone-pulleys h and

h'. The space between the post and column above the shaft J is utilized for a drill and tap closet, the latter being provided with shelves a, made of the same width as the post D and extended from the post to the column, as shown in Figs. 7 and 8. The shelves are provided with sockets c, in which the shanks of the drills or taps b may be inserted, and figures c' are marked upon seats formed upon the fronts of the sockets to indicate the sizes of the tools therein. Such a closet may be made to hold a large number of tools by crowding them closely together, and the figures are of great value in enabling the operator to select with accuracy the tools that he desires. A plate d incloses the closet upon the rear side, and a sliding door e, in Figs. 1 and 8, is fitted to guides e' upon the front side of the column and post and arranged to slide downward for uncovering the drills. It will be noticed that as the closet lies vertically between the cones J' and F^4 the belt running over such cones would pass over the front and rear sides of the closet. It could not, therefore, be inclosed by a door except the door were arranged to slide.

Staples f are provided to insert a padlock for securing the door when closed in its elevated position, as in Fig. 1, thus preventing the drills from being removed except by the authorized person.

To utilize the greatest amount of space above the counter-shaft J, the shelves are placed at an inclination corresponding with the slant of the brace D' over the cone J', and the top and bottom of the door are formed at a corresponding angle with the guides e'.

Two rows of sockets to receive drills are shown in each shelf, and a seat is provided upon the front side of each socket to receive numbers indicating the sizes of the drills. To expose the numbers on the rear rows of sockets, the latter are made to project above the shelves higher than those in the front row, as clearly indicated in Fig. 7.

To limit the movement of the door, the same is shortened by applying gratings k to the upper and lower parts of the closet in such manner as to cover the upper ends of the drills upon the upper shelf and the lower ends of the drills upon the lower shelf, and the numbers upon the sockets upon such shelf are formed upon the front edge of the shelf below such grating. With this construction the top of the door need be lowered only as far as the top of the grating, when the drills upon the lower shelf may be readily reached and removed by lifting them from the shelf. The drills or tools upon the upper shelf may be removed by raising them behind the grating until their shanks are clear of the sockets, and they may then be drawn downward and removed from the closet. The larger tools are preferably kept upon the lower shelf, as shown in the drawings, so as to render them accessible above the grating.

A grinding-wheel I is mounted upon a stand L, attached to a bracket L', which is projected from the post D, adjacent to the lower counter-shaft J. The spindle of the grinding-wheel is provided with a pulley I^2 and is driven at a variable speed by providing a secondary counter-shaft H upon the upper part of the machine as far from the lower counter-shaft as possible and providing the two counter-shafts with cone-pulleys h and h'. The secondary counter-shaft is also provided with fast and loose pulleys i, connected with the grinder-pulley I^2 by a belt. The grinder-wheel is shown with a holder j for applying the drills b to the wheel at the proper angle; but such holder does not form any part of the present invention. By arranging the secondary counter-shaft over the grinding-wheel the belts for operating the wheel may be made of greater length and may be shifted with great facility.

By the provision of a stock of drills and a grinding-wheel upon the drill-press actuated by the counter-shaft of the press the machine is adapted for erection and use independent of all other appliances or in places where other tools are not employed and where no grinding-wheel is otherwise provided.

The drilling-machine would be provided with the grinding-wheel when sold, and when supplied with a stock of drills by the purchaser furnishes a complete outfit for drilling when merely supplied with the necessary power to drive the counter-shaft.

One of the present improvements consists in furnishing the drilling-machine with a compound table upon which the work can be held and shifted longitudinally and transversely to the bed, and also adapted for circular motion by furnishing the bed with a cylindrical shank adapted to fit a round socket in the end of the table-arm.

Heretofore drilling-machines provided with a compound table have not been adapted for use with a plain rotary table; but the bed or bottom seat of the compound table has been cast integral with the table-arm projected from the drill-press column. By my improvement the drilling-machine may therefore be formed with a socket in the arm to receive the ordinary plain table, and a compound table may also be fitted thereto and without any additional expense by mere application to the socket in the table-arm. The compound table is thus adapted for setting in various angular positions during the drilling of any work-piece.

The table-arm M is shown in Fig. 5 provided with the round hole m in the end, split at one side and provided with clamp-bolts m', as usual. The round table O and the base P for a compound table are shown in Figs. 3 and 4 provided with the round shanks p', of equal dimensions, to fit the hole m, and are thus rendered interchangeable. A movable plate s is shown in Fig. 1 fitted upon the base P

and provided with a screw s' to adjust the same. The screw is fitted to lugs t upon the base and plate, respectively. The upper plate u of the compound table is fitted upon the plate s in the usual manner and provided with a screw u' to adjust the same. The base and the two plates of the compound table are thus held together and secured to the shank p', so that they may be lifted from the arm M as a unit and the round table O substituted therefor.

The compound table may be turned by loosening the clamp-bolts m', and is held in any desired angular adjustment by tightening the bolts when the table is set in the desired position. This feature of the construction enables us to reset the work in a new position with relation to the spindle C without removing it from the table, and while in certain cases this result may be effected by the exclusive use of the adjusting-screws upon the table the limited movement of the sliding plates of the table will often render it necessary to remove the work and fasten it upon another part of the table in order that the points upon which it is desired to operate may be accessible. By the use of the circular shank p' this defect in previous constructions is avoided.

The arm M is provided with a screw v to move it vertically upon the column A, such screw being secured rigidly to a foot v', Figs. 1 and 6, which rests upon the bed K, to which the column is attached. A hand-shaft w is secured in an upwardly-inclined bearing w' upon the arm M, and is connected by the cog-wheel w^2 with the nut-wheel v^2. The nut-wheel v^2 bears upon the under side of the arm, and the screw is provided with a groove fitted to a key or feather n, secured in a socket within the arm. The arm is permitted to slide vertically upon the screw, while the screw is held from rotation by the feather n. The nut-wheel is applied to the screw adjacent to the socket in which the feather is held, and is rotated by applying a crank or wrench to the hand-shaft w, which is held in a convenient position by its upward inclination. The turning of the shaft w operates to raise and lower the arm by rotating the nut, while the support of the foot v' upon the flat surface of the bed K permits the arm to be swung around the column at pleasure.

To set the arm M with the center of the hole m in a line with the drill-spindle C, a taper steady-pin v^3 is fitted to holes in the foot v' and the bed K when the arm is properly adjusted. The arm M is provided with clamp-screws M′ where it is fitted to the column A to clamp it thereon when desired.

The elevating-screw v is shown in Fig. 1 set at a suitable point between the column and the hole m to nearly balance the weight of the arm and work-table. The application in this manner of the force to raise the arm greatly reduces the frictional resistance of the arm upon the column when moving the arm. The clamping of the arm to the column and the application of the screw v between the same and the work-table sustains with great rigidity the weight that may be imposed upon the table.

Heretofore it has been common in holding the table-arm from rotation to apply a steady-pin in close proximity to the column; but in our construction we apply the steady-pin v^3 intermediate to the ends of the arm M, and a greater leverage about the column is obtained therefor, and the arm is held in position much more rigidly than when the means for preventing its turning is applied close to the column, as in former constructions.

By the improvements above mentioned the tool is rendered much more convenient for use with a comparatively slight addition to its cost.

Having thus set forth the nature of the invention, what is claimed herein is—

1. A column drill having the spindle C sustained at the front side of the column A and having at the rear side of the column a post D to support the speed cone-bearings, with the cone-shafts J and F sustained transversely to the post and column, as set forth, and a tool-closet located vertically between the said cones and inclosed by a sliding door, as and for the purpose set forth.

2. A column drill having the spindle C sustained at the front of the column A and having at the rear side of the column a post D to support the speed cone-bearings, the cone-shafts J and F, arranged transversely to the post and column, as set forth, a closet containing the shelves a between the post and column and provided with sockets c, having figures c' thereon to indicate the sizes of the tools, and the sliding door e, movable in guides e' upon the post and column, as and for the purpose set forth.

3. As a new article of manufacture, the combination-tool herein shown and described, and consisting in a column drill having the drill-spindle supported at the front side of the column, a post at the rear side of the column to support the speed cone-bearings, a drill-closet inserted between the column and the post, the counter-shaft J, supported in bearings upon the lower part of such post and column, the bracket L′, projected from the post near said counter-shaft, the stand L, carrying the grinding-wheel I, mounted upon such bracket, the secondary counter-shaft H, mounted upon the upper part of the post and column, the pulleys h h' to receive a belt for connecting the two counter-shafts, and the pulleys i and I^2 for connecting the secondary counter-shaft with the grinder, substantially as herein set forth.

4. A column drill having the table-arm M movable upon the column, with a cylindrical socket m in the end of the arm, provided with the clamp-bolts m', a compound table ad-

justable transversely, longitudinally, and circularly by means of the plate *u*, movable upon the plate *s*, the plate *s*, movable upon the base P, and the base and plate *s* having the lugs *t* connected by screw *s'*, and the base being provided with a cylindrical shank *p'*, clamped adjustably in the socket *m* by the bolts *m'*, substantially as set forth.

5. A column drill having the table-arm M, the screw *v*, provided with the foot *v'*, having the taper steady-pin v^3, the rotary nut v^2, the shaft *w*, and gear w^2, all constructed and arranged substantially as herein set forth.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

ULRICH EBERHARDT.
FREDERICK L. EBERHARDT.

Witnesses:
THOS. S. CRANE,
JOS. B. PIERSON.