A. R. SILVER & E. W. FAWCETT.

Metal Drilling-Machines.

No. 151,444. Patented May 26, 1874.

Fig. 1.

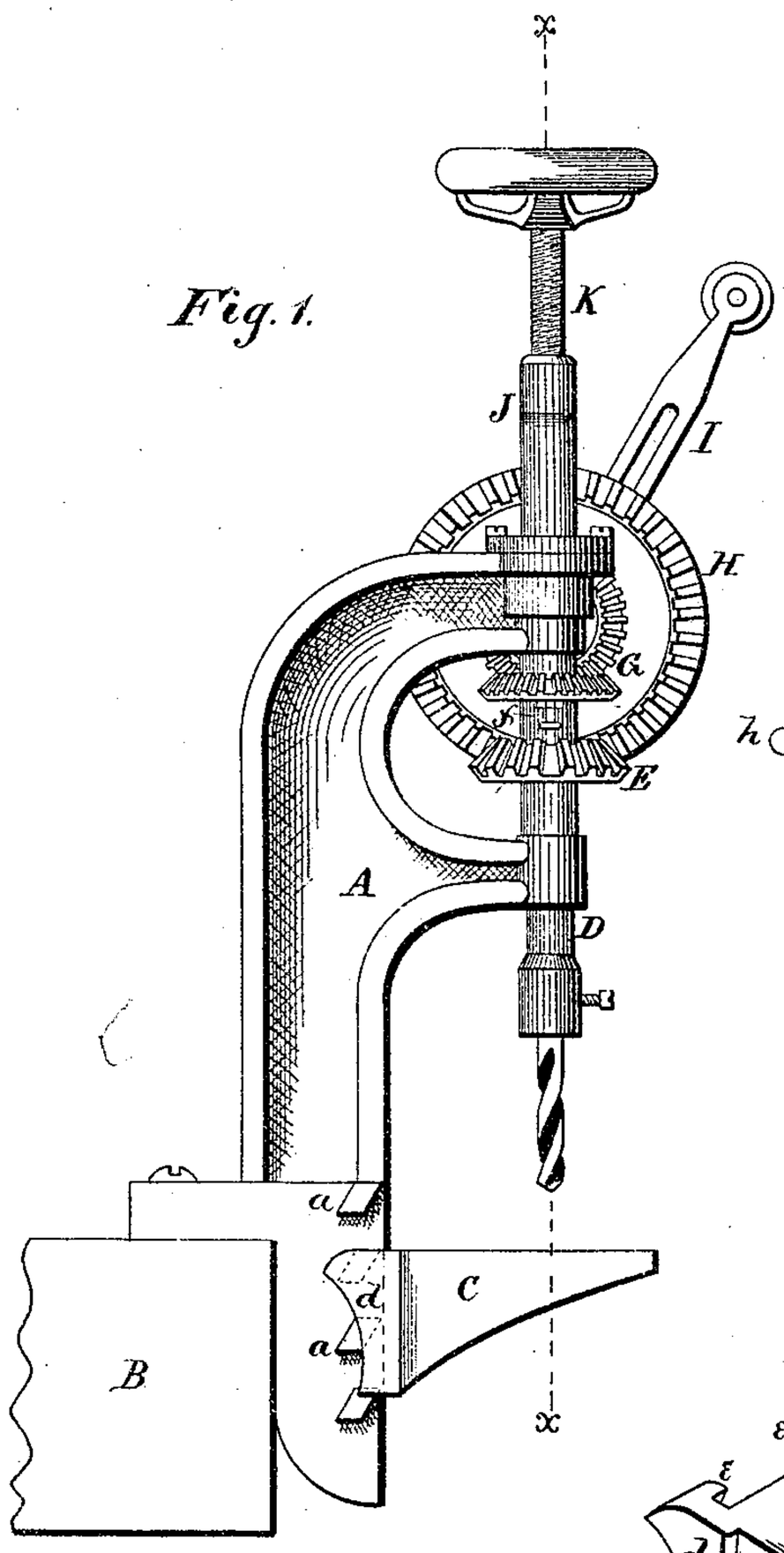


Fig. 2.

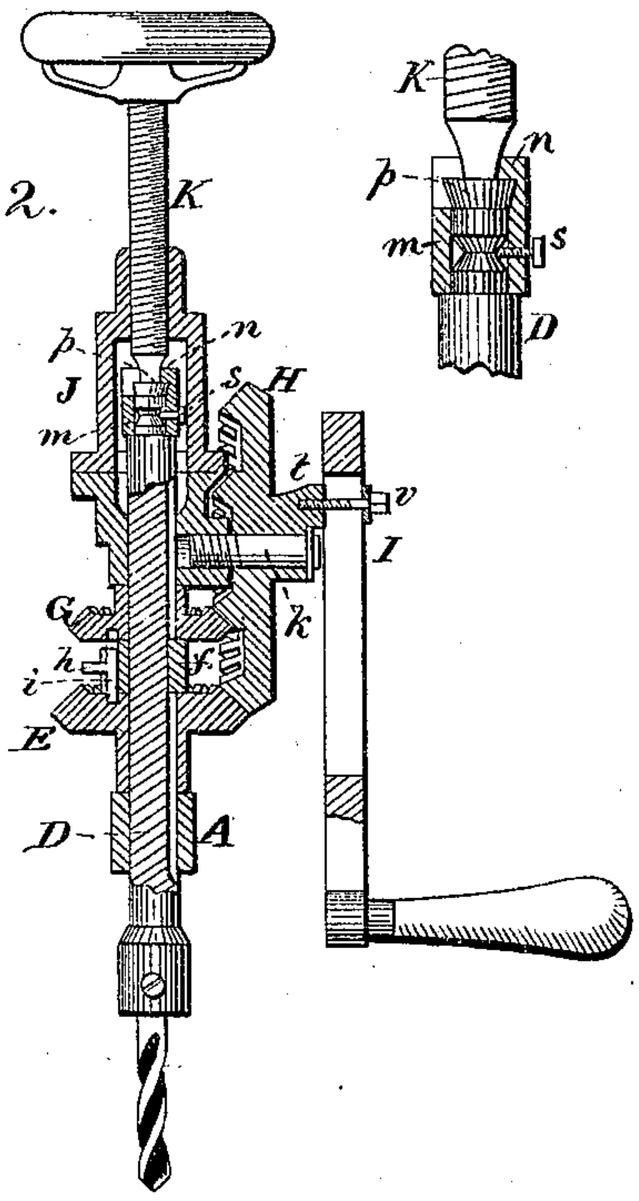
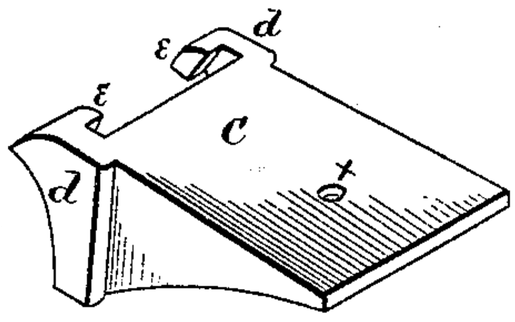


Fig. 4.

Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

ALBERT R. SILVER AND EDWARD W. FAWCETT, OF SALEM, OHIO; SAID FAWCETT ASSIGNOR TO JOHN DEMING, OF SAME PLACE.

IMPROVEMENT IN METAL-DRILLING MACHINES.

Specification forming part of Letters Patent No. **151,444**, dated May 26, 1874; application filed April 24, 1874.

To all whom it may concern:

Be it known that we, A. R. SILVER and E. W. FAWCETT, of Salem, county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Drills, of which the following is a specification:

Our invention relates to that class of drills known as blacksmiths' drills or drill-presses; and the nature of our invention consists in the arrangement for holding and adjusting the table; in the peculiar device for changing from fast to slow speed; and in the peculiar device for coupling the feed-screw with the drill-shaft, all of which will be hereinafter more fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side elevation of our machine. Fig. 2 is a longitudinal section of the drill-shaft and the various parts connected therewith. Fig. 3 is a perspective view of the table; and Fig. 4 is a plan view of the device by which the speed is changed from fast to slow, and vice versa.

A represents the frame of our machine, constructed in any suitable manner, to be attached to a work-bench or other support, B. Upon each side of the lower part of the frame A are inclined or beveled lugs *a a*, a suitable distance from the front edge. C represents the table of the machine, provided with a hole, *x*, for the point of the drill. On the back of the table C are vertical side flanges *d*, to fit on each side of the frame A, and at the upper end of each flange is an inwardly-projecting inclined or beveled lug, *e*. These lugs fit over the lugs *a* upon the frame A, and thereby hold the table to the frame; and the lugs being inclined, the more the table is pressed down the firmer and tighter it becomes. By these devices the table C is easily adjusted up and down, as may be desired. The frame A has two forward-projecting arms, through which the vertical drill-shaft D passes; and between said arms, upon the shaft, are placed two loose miter or beveled gear-wheels, E and G, of unequal diameter, and a collar, *f*, between said wheels. The wheels E and G are loose upon the shaft, so as to turn independent of the shaft, while the collar *f* is feathered in a longitudinal groove on the shaft, as shown in Figs. 2 and 4, so as to turn with the shaft. In a projection upon one side of the collar *f* is placed a vertical pin or bolt, *i*, from which projects a horizontal lever or handle, *h*, by means of which the bolt is moved up and down, the projection or socket upon the outside of the collar for the bolt being slotted vertically for the passage of the handle. In the upper side of the wheel E, and on the under side of the wheel G, are suitable holes, into either of which the bolt *i* may be moved, so as to couple either of said wheels to the shaft. Upon a stud or screw, *k*, projecting from one side of the upper arm of the frame is mounted a wheel, H, provided on its outer side with a crank, I, and on its inner side with two concentric circles of beveled cogs, the outer one of which meshes with the cog-wheel E, and the inner with the wheel G.

When the wheel H is revolved, both of the wheels E and G are revolved by it, and, according as either of these is coupled to the shaft, said shaft receives a rapid or a slow motion. When the bolt *i* is pushed up into the hole in the wheel G, the handle *h* is turned to either side into a notch cut out for that purpose, so as to prevent the bolt from falling out of said wheel. This shifting device—from fast to slow, and vice versa—being on the exterior of the drill-shaft and located between the wheels, is in open sight, so that the operator can see it at all times, and in a moment effect the desired change.

On top of the upper arm of the frame A is secured a frame, J, in the top of which is formed a nut for the passage of the feed-screw K, directly in a line with the drill-shaft. The drill-shaft D and feed-screw K are coupled together by means of a coupling, *m*. This coupling is simply a short sleeve, with a flange, *n*, around its inner circumference at the upper end, and an aperture is cut on one side at the upper end for the insertion of a headed tenor, *p*, formed upon the lower end of the feed-screw K. The lower end of the sleeve or coupling passes freely over the upper end of the drill-

shaft D, and a set-screw, *s*, passes through this part of the coupling into a circumferential beveled groove made in the drill-shaft. By this means either the screw or shaft may turn independent of the other, while by turning the screw the shaft will be raised or lowered, as desired. On the outer side of the wheel H is formed a flanged seat, *t*, in which the crank I fits and is held by a screw, *v*. The lever I is slotted longitudinally, so as to be moved at will, and bring the handle closer to or farther from the center at will, as a greater or less leverage may be required.

A "feather" traveling in a groove on the drill-shaft has long been used in a drill to connect and disconnect gear-wheels of varying diameters, as shown in various patents granted by Great Britain and the United States. This feather has always been inclosed by the hubs of the gear-wheels, or otherwise concealed from view. As a consequence, the adjustment has been slow and uncertain.

Our improvement consists more particularly in the construction and arrangement of the collar *f*, between the gear-wheels G and E, on the outside of the drill-shaft, and providing the same with a bolt, *i*, in plain view, which can be readily and quickly "shot" into position to connect or disconnect either the larger or smaller gear-wheel. This bolt operates as a perfectly certain and secure fastening.

A coupling for connecting the feed-screw and drill-shaft, permanently attached to the drill-shaft, has also long been in use, as may be seen in the patent granted to Amos Morgan, May 30, 1844. This device has been found to be objectionable, for the reason that the coupling must travel with the shaft, and it is weakened by being constructed in two parts.

Our improvement consists in the manner of constructing and arranging the coupling *m* so as to permit of the free revolution of the drill-shaft and feed-screw without regard to the coupling.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The table C, provided with side flanges *d*, having inclined lugs *c*, in combination with the frame A, provided with inclined lugs *a*, substantially as and for the purposes herein set forth.

2. The combination, with the drill-shaft D and wheels E G, of the feathered collar *f*, arranged on the outside of the shaft between the wheels, and provided with the bolt *i*, having handle *h*, said bolt entering a hole in either of the wheels, all substantially as and for the purposes herein set forth.

3. The coupling *m*, provided with flange *n* and set-screw *s*, in combination with the circumferentially-grooved drill-shaft D and the feed-screw K, provided with headed tenon *p*, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing as our invention we hereunto affix our signatures this 2d day of April, 1874.

ALBERT R. SILVER.
EDWARD W. FAWCETT.

Witnesses:
HIRAM GREINER,
PETER AMBLER.