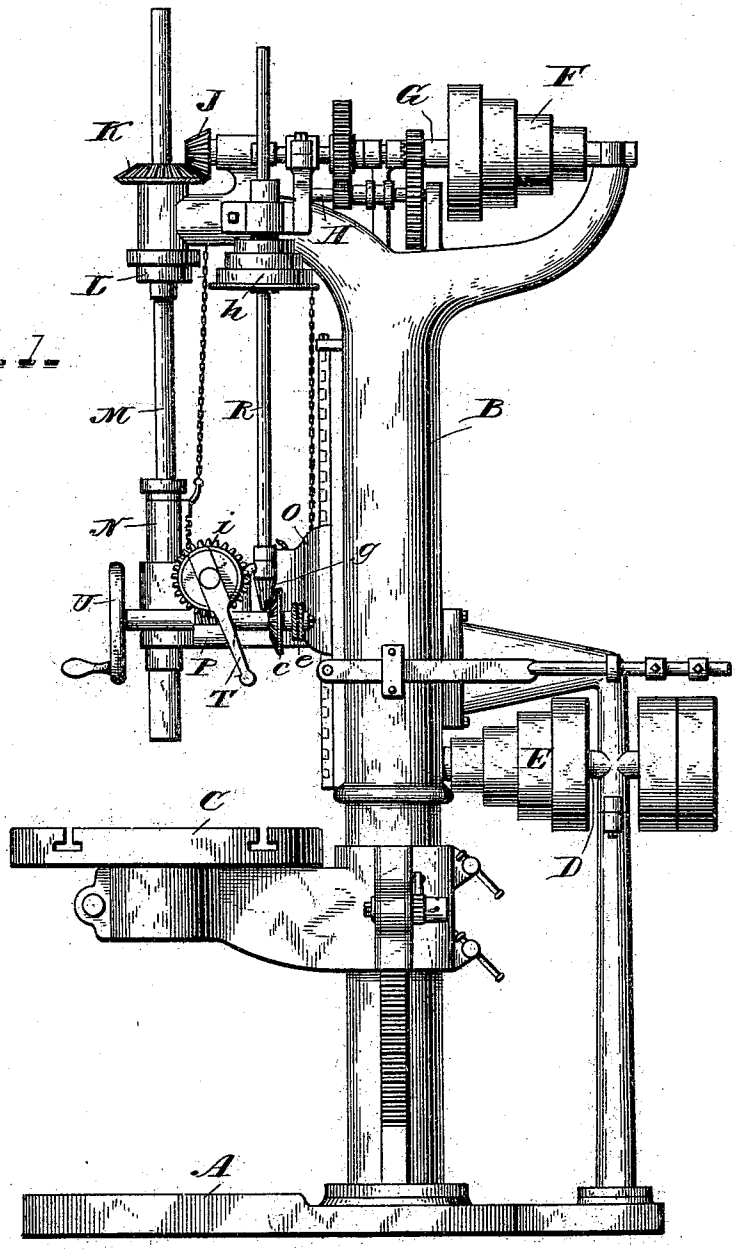
(No Model.) 4 Sheets—Sheet 1.

A. J. F. MILL.

DRILL PRESS.

No. 503,153. Patented Aug. 15, 1893.

Fig. 1.



Witnesses.
J. Thomson Cross
E. W. Goodinghaus

Inventor.
Arthur Johann Friedrich Mill
by Chas. M. Beck
his Attorney.

(No Model.)

4 Sheets—Sheet 2.

A. J. F. MILL.

DRILL PRESS.

No. 503,153. Patented Aug. 15, 1893.

Fig. 2.

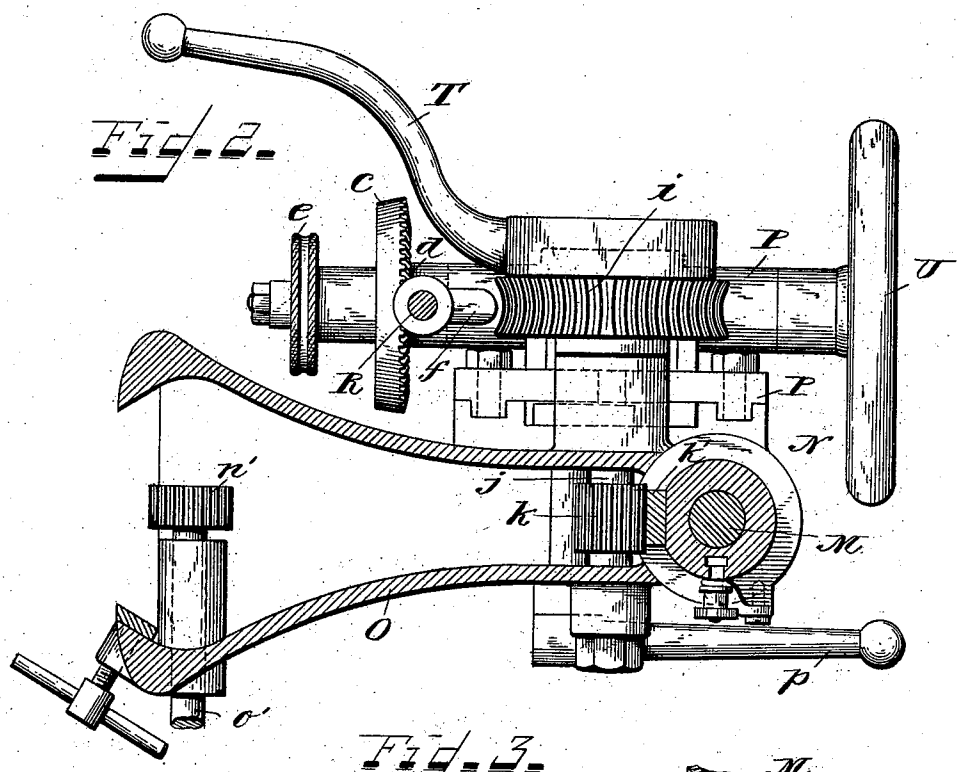
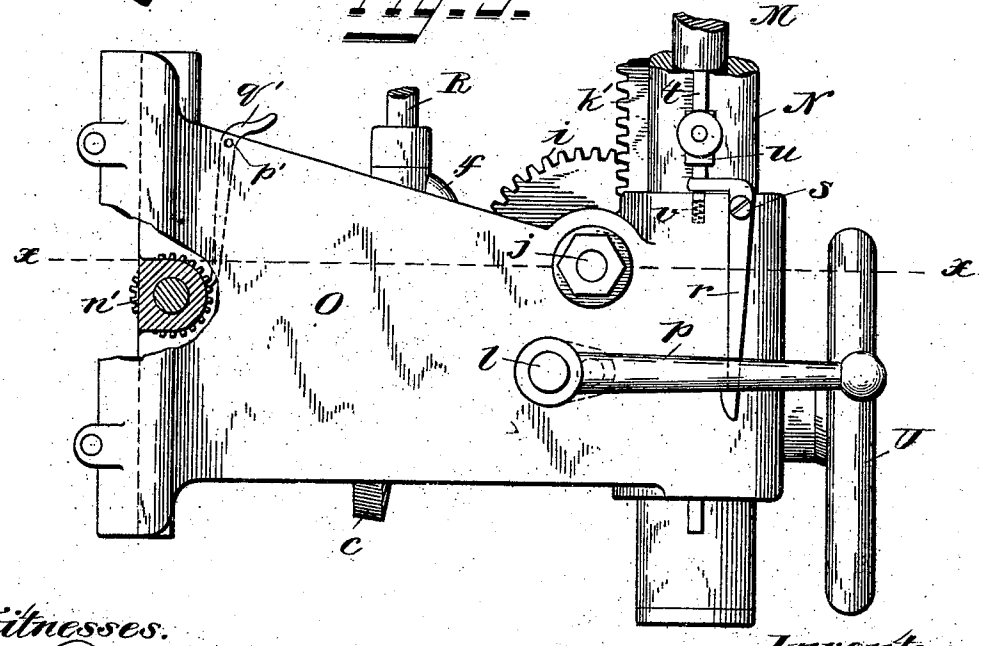


Fig. 3.



Witnesses.

J. Thomson Cross.

Ed. Hardingham

Inventor.

Arthur Johann Friedrich Mill

by Chas. M. Beck

his Attorney.

(No Model.)

4 Sheets—Sheet 3.

A. J. F. MILL.

DRILL PRESS.

No. 503,153. Patented Aug. 15, 1893.

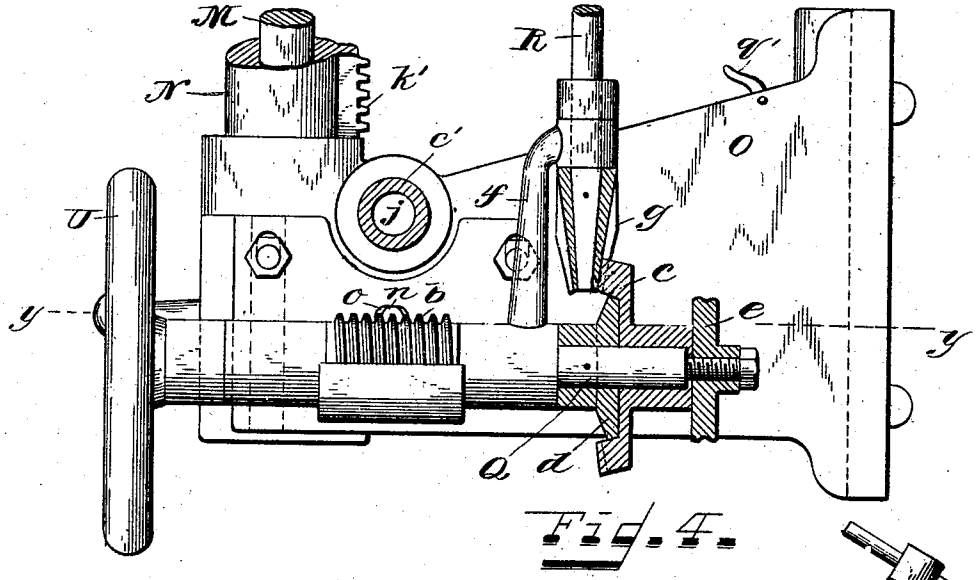


Fig. 4.

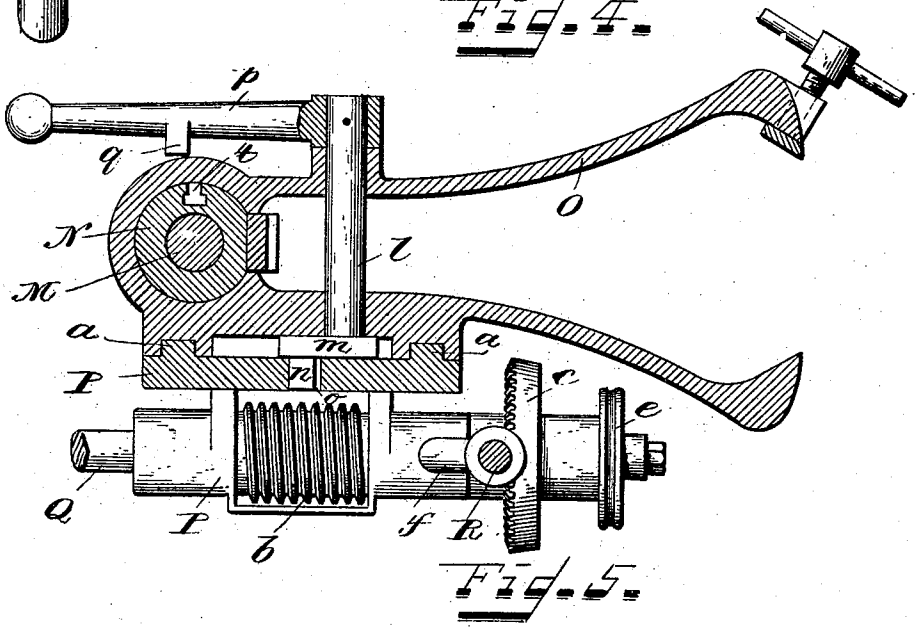


Fig. 5.

Witnesses.

J. Thomas Cross.

E. W. Cunningham

Inventor.

Arthur Johann Friedrich Mill

by Chasmore & Peck

his Attorneys.

(No Model.) 4 Sheets—Sheet 4.

A. J. F. MILL.

DRILL PRESS.

No. 503,153. Patented Aug. 15, 1893.

Fig. 6.

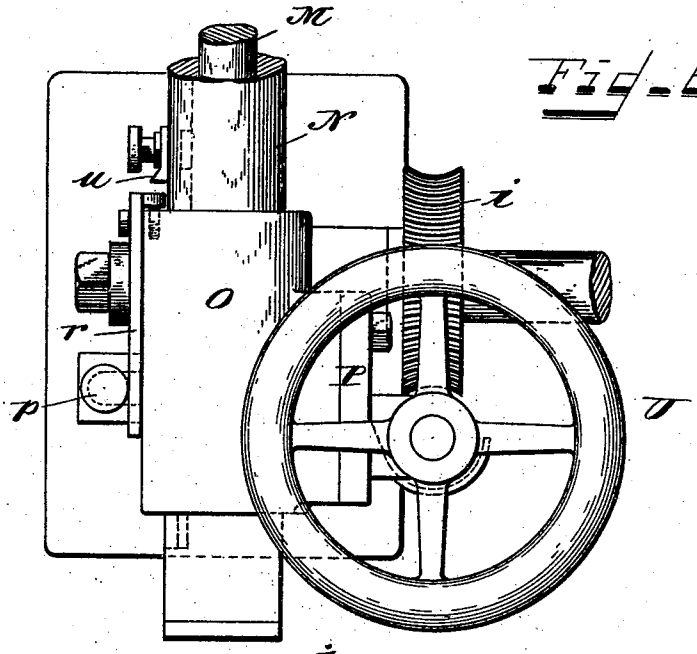


Fig. 7.

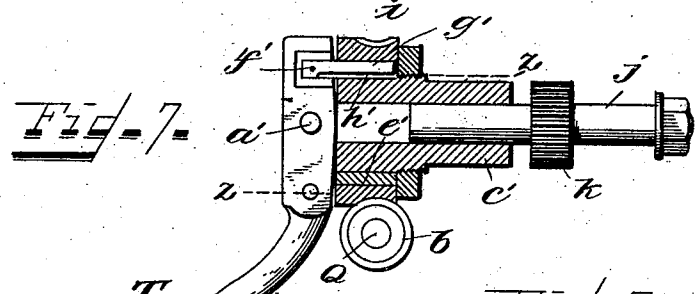


Fig. 8.

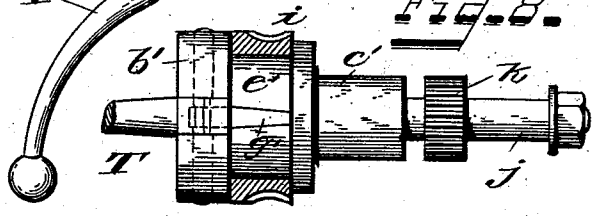
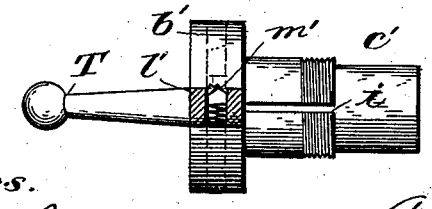


Fig. 9.



Witnesses.
J. Thomas Cross
E. W. Gudinghaus

Inventor.
Arthur Johann Friedrich Mill
by Chas. M. Beck
his Attorney.

UNITED STATES PATENT OFFICE.

ARTHUR JOHANN FRIDRICH MILL, OF AURORA, INDIANA.

DRILL-PRESS.

SPECIFICATION forming part of Letters Patent No. 503,153, dated August 15, 1893.

Application filed May 16, 1892. Serial No. 433,166. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR JOHANN FRIDRICH MILL, a citizen of the United States, residing at Aurora, in the county of Dearborn and State of Indiana, have invented certain new and useful Improvements in Drill-Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to power drill presses and has for its object the improved construction of the same.

The novelty of my invention will be hereinafter set forth and specifically pointed out in the claims.

In the accompanying drawings: Figure 1, Sheet 1, is a side elevation of a drill press embodying my invention. Fig. 2, Sheet 2, is a sectional plan view of the sliding head through the dotted line *x x* of Fig. 3. Fig. 3, Sheet 2, is a side elevation of the sliding head on the side opposite that shown in Fig. 1. Fig. 4, Sheet 3, is an opposite side elevation of the same partly in section. Fig. 5, Sheet 3, is a sectional plan view of the sliding head on the dotted line *y y* of Fig. 4. Fig. 6, Sheet 4, is a front elevation of the sliding head. Fig. 7, Sheet 4, is a diminished detail view partly in section of the worm wheel shaft connected parts in side elevation. Fig. 8, Sheet 4, is a corresponding plan view. Fig. 9, Sheet 4, is a plan view of the sleeve of the worm wheel shaft on the line *z z* of Fig. 7.

The same letters of reference are used to indicate identical parts in all the figures.

The frame work and operating parts of the machine, except in the particulars hereinafter pointed out, are of the usual or any suitable construction, so that in describing them it is only necessary to say that A is the base, B the standard, C the work-carrying table adjustable on the standard, D the driving shaft with cone pulley E belted to cone pulley F on a shaft G journaled in the head of the standard and having upon its end a beveled pinion J meshing with a beveled gear K upon a vertical sleeve journaled in the head of the standard and having fast thereon at its lower end a cone pulley L.

M is the tool shaft feathered through the sleeve of the gear K and carried by a sleeve N journaled in the extremity of the sliding head O, which is adjustable in the usual or any suitable manner upon the standard B.

To feed the tool shaft and tool downward and to automatically stop the feed I employ the following mechanism: Horizontally journaled in a box P, Figs. 2, 4 and 5, secured to the side of the head O by bolts through vertical slots and guided thereon by vertical ways *a* is a worm shaft Q having a worm *b* thereon. Frictionally held upon the rear end of the worm shaft is a beveled gear *c* held tight, against a friction disk sleeve *d* fast on the shaft, by a nut *e* upon the threaded end of the shaft. Journaled in a bearing *f* carried by the worm box is a vertical shaft R having on its lower end a beveled pinion *g* meshing with the gear *c*. The upper end of the shaft R is feathered through a cone pulley *h*, Fig. 1, on a sleeve journaled in the head of the standard. A belt connects the pulleys L and *h*. Meshing with the worm *b* is a worm wheel *i*, Figs. 1, 2 and 3, normally fast, as presently explained, on a shaft *j* journaled transversely through the head O; and also fast on said shaft is a pinion *k* engaging a rack *k'* on the rear side of the sleeve N. Just below the shaft *j* is a shaft *l*, Fig. 5, having on one end a crank *m* whose pin *n* is confined in a horizontal slot *o* in the wall of the worm box. The opposite projecting end of the shaft *l* has upon it an arm *p*, Fig. 3, with a projection *q* to be engaged by a bell-crank latch *r* pivoted as at *s* to the head O. When the arm *p* is held up by the engagement of the latch, the worm box is raised so as to bring the worm into engagement with the worm wheel. Vertically adjustable in a slot *t* in the sleeve N is a tripping projection *u* which, when the sleeve has fed the tool down sufficiently, comes in contact with the upper arm of the latch and tilts the same thereby freeing the arm *p*. As soon as the arm *p* is freed the worm box drops by gravity and the worm is disengaged from the worm wheel thereby stopping the feed, as will be readily understood. A hand lever T Fig. 2 is provided upon the end of the shaft *j* for quickly running the sleeve and tool up again before re-engaging the arm *p* with the latch *r*. If desired the latch may be a gravitating one though in this instance I have shown it provided with a spring *v*, Fig. 3. The sleeve N is provided

with a scale at one side of the slot t for the ready and accurate adjustment of the trip u. When it is desired to feed by hand it is only necessary to loosen the nut e, Fig. 4, so that the gear c no longer actuates the shaft Q and to turn said shaft by means of a hand wheel U upon its forward end. Again, to provide means for instantly disconnecting the power feed and for operating the shaft j Fig. 2 directly by hand either to feed or run up the tool, I employ the construction shown in Figs. 7, 8 and 9, where the lever T is pivoted as at a' in a slot in the head b' of a sleeve c' fast on the shaft j and has by reason of its inner beveled edge but a slight rocking motion on its pivot. Between the head b' and a nut d' on the sleeve is a split ring e' surrounding the sleeve within the bore of the worm wheel i. Pivoted as at f' is a wedging key g' having on its under side a straight rib h' confined in a slot or recess i' in the sleeve while its taper portion is between the adjacent ends of the split in the ring. When the outer end of the lever T is pressed inward the wedging key is drawn outward permitting the ends of the split ring to come toward each other and freeing the worm wheel which is then loose on the ring and shaft j. When the worm wheel is thus loose the shaft j can be turned by means of the lever T in either direction. To again make the worm wheel fast it is only necessary to draw out the outer end of the lever T when the wedging key is forced inward to expand the split ring which by expanding locks the worm wheel to the sleeve and shaft j, as will be readily understood. To hold the lever T in either of its adjusted positions I employ a spring bolt l', Figs. 7 and 9 recessed in the lever T and whose wedge-shaped projecting end engages one or the other of two notches m in the slot in the head b'. The notches m are side by side in the slot of the head in which the lever T is confined and when said lever is pulled out the bolt l' slips out of one notch and into the other, its spring being only sufficiently strong to hold the lever from jarring loose from either of its adjusted positions.

The remaining feature of my invention, illustrated in Figs. 1, 2 and 3, is a locking dog for positively locking the sliding head O, when adjusted, from upward movement. Here n' is the pinion carried by the head O and engaging the rack on the standard B which pinion is turned by a projecting shaft o' and a handle, not shown, in the usual manner. Pivoted as at p' in the head O is a gravitating dog q' whose lower end engages the teeth of the pinion n' and locks it. The upper end of the dog q' projects through an opening in the head O so that when it is desired to adjust the head the dog may be held out of engagement with the pinion.

Having thus fully described my invention, I claim—

1. The combination of a reciprocating sleeve provided with a rack, a head in which said sleeve is guided, a shaft journaled in said head and having fast thereon a worm wheel and a pinion engaging with said rack, a worm shaft journaled in a vertically movable worm box on the side of the head and having a worm engaging the worm wheel, driving mechanism for the worm shaft, a second shaft for holding up the worm box and provided with an arm, a latch upon the head for engaging said arm, and an adjustable trip on the sleeve for disengaging the latch and arm to permit the worm box and worm to drop to stop the feeding of the sleeve, substantially as described.

2. In a drill press, the combination of the head O, the worm box P vertically movable thereon, the worm shaft Q journaled in the worm box and having the gear c, the pinion g constantly meshing with the gear c and fast on the shaft R, the tool shaft operatively connected with the said shaft R to be driven therefrom, and the bearing f for the shaft R carried by the worm box, substantially as described.

3. The combination of the shaft j, the worm wheel i, a split ring in the bore of said worm wheel, the lever T and wedging key g' actuated by said lever to make the worm wheel fast or loose with the shaft j, substantially as described.

4. The combination of the shaft j, the sleeve c', fast on said shaft, the split ring e' surrounding the sleeve in the bore of the worm wheel i, and the lever T pivoted to the sleeve c' and carrying a wedging key g' engaging the split ring, substantially as described.

5. The combination of the shaft j, the sleeve c' fast on said shaft, the split ring e' surrounding the sleeve in the bore of the worm wheel i', the lever T pivoted to the sleeve c' and carrying a wedging key g' engaging the split ring, and a locking bolt for the lever, substantially as described.

ARTHUR JOHANN FRIDRICH MILL.

Witnesses:
ALEXANDER B. PATTISON,
JOHN N. SARGENT.