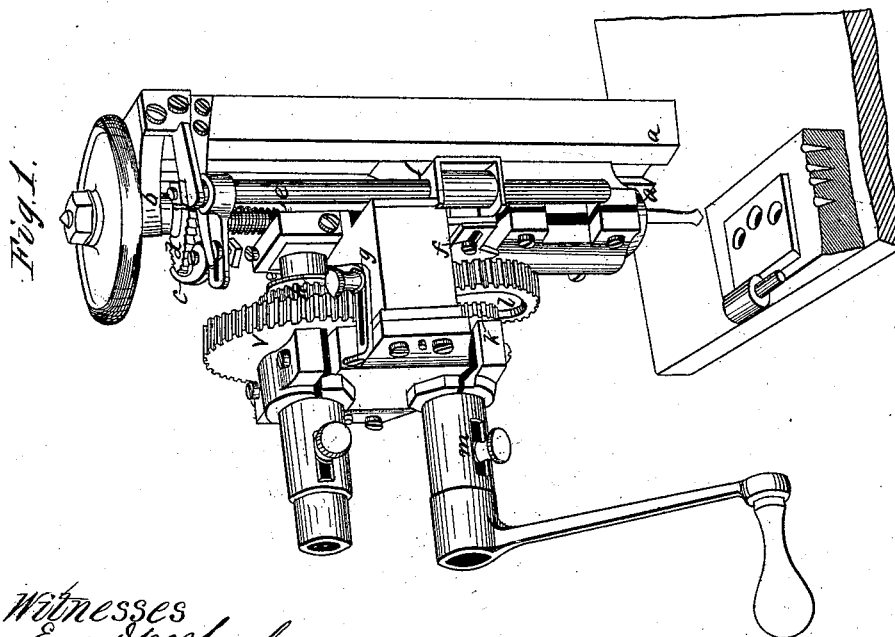
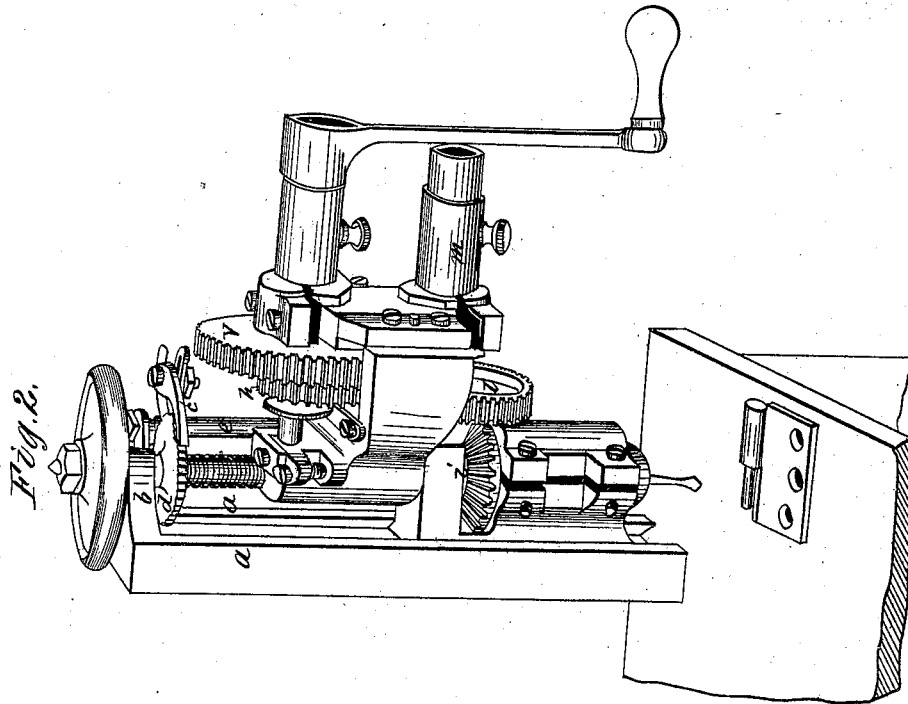


J. G. HIRZEL.
METAL-DRILL.

No. 53,145.

Patented March 13, 1866.



Witnesses
Edw. M. Hoopes
Wm. Wiggins

Inventor
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Fig. 3.

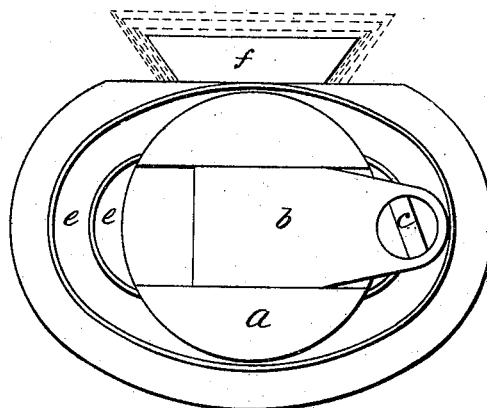


Fig. 5.

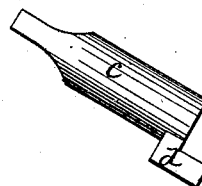
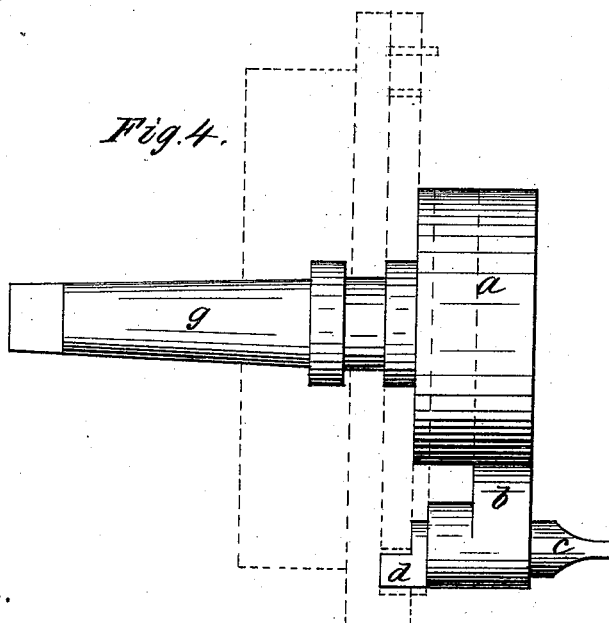


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN GEORGE HIRZEL, OF WILMINGTON, DELAWARE.

IMPROVEMENT IN DRILLING-MACHINES.

Specification forming part of Letters Patent No. 53,145, dated March 13, 1866.

To all whom it may concern:

Be it known that I, JOHN GEORGE HIRZEL, of the city of Wilmington, in the county of New Castle and State of Delaware, have invented a new and useful Portable Self-Acting Metallic Drill for Drilling Oval or Round Holes; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a right-hand perspective view of the machine without the appendage for drilling oval holes. Fig. 2 is a left-handed perspective view of the machine. Fig. 3 is a view of that portion of the machine which is used when drilling oval holes, showing the face thereof. Fig. 4 is a drawing showing the arm or foot with slide holding the drill-bit which traverses the ways set in this foot. Fig. 5 is a drawing of the drill-bit with its guiding-heel by which it traverses the ways in this foot-piece.

I compose my drill of iron or steel, as the particular part thereof may require.

The wheels are set as shown in the drawings, gearing together and coupled by means of couplings in the axes and a slide set upon the boxing, reaching to and resting upon the upper pinion-wheel. I provide a screw for feeding down the drill, as required, worked by means of a ratchet in connection with a ratchet-wheel, rod, and lever working upon a pin set in the inside face of the lower wheel.

In Figs. 1 and 2, *a a* are the slide-ways in which the drill slides in feeding. *b* is the feeding-screw. *c* is the ratchet which works upon the wheel *d* in feeding. *e* is the rod which lifts the ratchet by means of the lever *f*. *g* is the slide-coupling for working the upper pinion-wheel, *h*. *i* is a bevel pinion-wheel working into a corresponding stationary pinion-wheel, and turning the drill. This stationary pinion-wheel is set upon the lower larger wheel, *l*.

k is a pinion-wheel working into the large wheel *l*, which is uncoupled by means of the thumb-screw in the axis at *m*. A similar screw is set in the upper axis for coupling and uncoupling.

In Fig. 3, *b* is that part of the foot-piece which slides into the ways *a a*. (Shown in Figs. 1 and 2.) In feeding, *a* is the foot-piece holding the slide *b*, by means of which the

drill-bit traverses the ways *e e*, which gives the shape and size of the oval hole.

In Fig. 4, *g* is the axis of the foot-piece. *a* is the foot itself; *b*, the slide holding the drill-bit *c*.

Fig. 5 is the drill-bit *c* with its heel *o*.

This machine may be worked with hand or power, and by removing the drill from the ways it can be used in place of a ratchet-drill.

In drilling oval holes, very little feed being required, the operation of the ratchet-wheel may be dispensed with by sliding back the arm or lever or raising the ratchet, and to regulate the speed of feed the lever is advanced or withdrawn by means of the screw in the slotted part of the arm at *s*. In using this in lieu of a ratchet-drill an arm should be placed in the center of the back to keep it square in its place.

For obtaining the slowest motion for cutting oval holes in boilers I connect the lower pinion, *k*, with the upper wheel, *v*, and the upper pinion, *h*, with the lower wheel, *l*, operating with the crank on the lower axle.

The machine has three faster motions for drilling or boring holes smaller than the ones above described. The next faster motion is obtained by connecting the upper pinion, *h*, with the lower wheel, *l*, by means of slide-coupling *g*, and uncoupling lower pinion, *k*, operating with crank on the upper axle. The next faster motion is obtained by uncoupling the upper pinion, *h*, and wheel *v*, operating with crank on lower axle. The last and fastest motion is obtained by connecting the large wheel *v* with the lower pinion-wheel, *k*, and disconnecting the upper pinion operating with crank on upper axle.

I do not claim any part of this machine by itself, as I am well satisfied that its component parts are well known, and have been used long since in other machines; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of the wheels, pinions, slides, ways, plates, spring, screw, and couplings, foot-piece with slide, and drill-bit with heel, as arranged and described, for drilling oval or round holes, constituting a portable metallic self-acting hand-drill.

J. G. HIRZEL.

Witnesses:

EDWD. W. HOOPES,
WM. B. WIGGINS.