

R. Dudgeon

Drill

N^o 43673.
Fig. 3.

Patented Aug. 2, 1864.

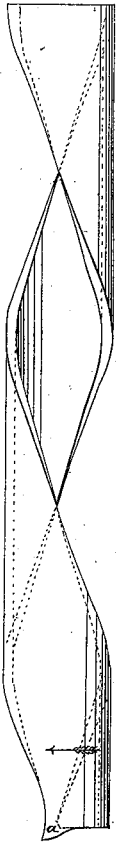


Fig. 4

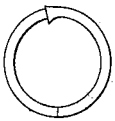


Fig. 5.

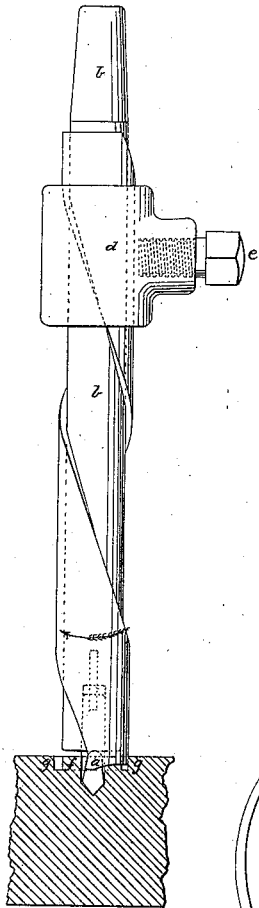


Fig. 6.

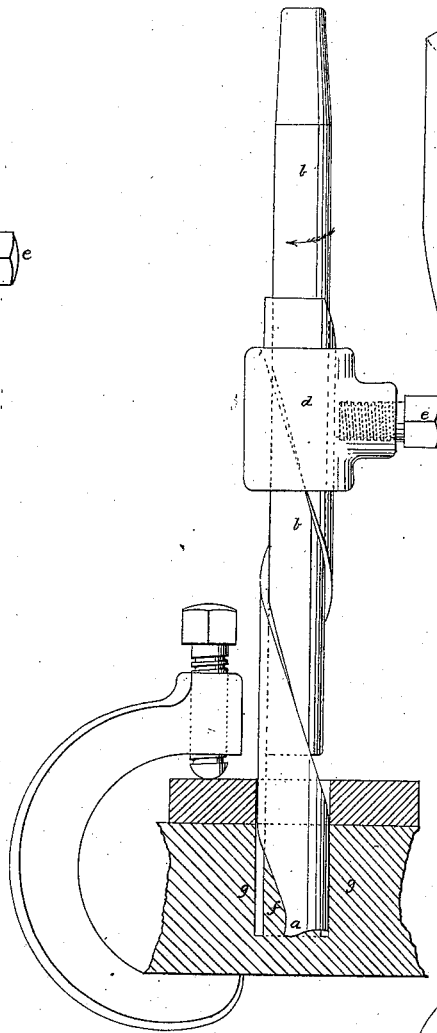


Fig. 1.

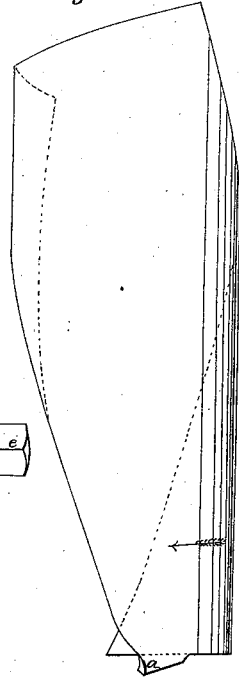


Fig. 2

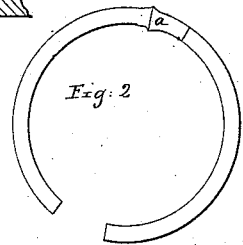
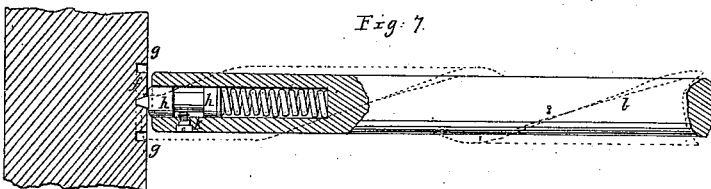


Fig. 7.



Witnesses:

Walter Buchanan
John H. DeHmar

Inventor:

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UNITED STATES PATENT OFFICE.

RICHARD DUDGEON, OF NEW YORK, N. Y.

IMPROVEMENT IN DRILLS.

Specification forming part of Letters Patent No. 43,673, dated August 2, 1864.

To all whom it may concern:

Be it known that I, RICHARD DUDGEON, of the city of New York, have invented a new and useful Drill; and I do hereby declare that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is a perspective of the drill as constructed for boring holes less in depth than its own diameter. Fig. 2 is a plan of the same. Fig. 3 is an elevation of the drill as constructed for boring deep holes. Fig. 4 is a plan thereof. Fig. 5 is an elevation of the latter, showing also in elevation the drill-stock and a plan of attaching the drill thereto, also one way of centering the drill for starting it and a piece of metal partially drilled in section. Fig. 6 represents the same parts with a different method of centering the drill. Fig. 7 represents the same parts, with the exception of the clamps for attaching the drill to the stock and a third method of centering the drill.

This drill is intended to bore an annular hole, or hole with a core projecting up in its center in metal, and possesses certain advantages in cheapness of construction, speed of cutting, and freedom from breakage above all other drills known to me.

The drill may be made of sheet metal, with a steel cutting-edge secured thereon, or wholly of steel. I prefer to make large drills of sheet metal with a steel edge, and the smaller ones wholly of sheet-steel.

In all cases, both of drills for deep and for shallow holes, I bend the sheet metal around a mandrel of suitable size for the hole that it is intended to bore, and in case of drills for drilling holes deeper than the diameter of the drill I also twist the sheet metal or ribbon into a spiral of one or more turns, or less than a turn, and in all cases make the lip or cutting-edge wider than the thickness of the ribbon, and so shape the foot or lowest part of the drill that it will be free from or not rest upon the uncut metal at the foot of the bore, except, perhaps, on a small portion of the cutting-edge, and the drill, whether spiral or otherwise, never is a complete cylinder or tube, but falls so much short of being a complete tube as to leave free space for the outward passage of chips or borings.

In all drills that are bent spirally I prefer

to locate the cutting-edge on the side represented in the drawings, and run the drill in the direction of the arrow.

The large drills—say from three inches upward—are conveniently stocked by laying them on a V or Y attached to the slide-rest of a lathe and then clamping them down in the V by laying a mandrel in the drill, which is clamped down upon it by a binder and screws, and in such use of the drill where the article to be drilled revolves I often start the drill by first cutting an annular score with an ordinary lathe-tool. The large drills may also be stocked as shown in the drawings, which is the way I have found most convenient in practice, in which the stock is made of a piece of iron, as *b b*, fitting the inside or hollow of the drill and confined to it by a collar, *d*, provided with a clamping-screw, *e*. The orifice through this collar should be so shaped that a portion of the concave of the collar should bear against either the stock or the drill. When the collar is in place, the screw is to be set up and the drill and stock are sufficiently united. The lip or cutting-edge must be forged so that it is a little wider than the thickness of the ribbon of the drill, in order to cut away so much metal that the body of the drill may pass without friction on either side between the core *f* and the metal *g g*.

The readiest way of centering the drill is shown in Fig. 6, where a piece of metal already drilled out to the size of the circle described by the outside of the lip is clamped upon the surface of the metal to be drilled, the drill is to be set within the former piece of metal and revolved as drills usually are, and it will then cut as represented in the drawings.

In Fig. 5 the stock is represented as shoved down nearly to the end of the drill, and is provided at its end with an ordinary metal drill of small size. The cutting-edge of this drill projects below the edge *a*. When the compound drill is put to work the small drill starts a hole and centers the annular drill, which commences cutting as soon as the center drill has entered far enough to permit it. When the end of the stock brings up against the core, the clamping-screw *e* is to be slackened and the stock raised in the drill. The drill will then act as in Fig. 6.

In Fig. 7 the end of the stock is provided

with a spring center-pin, *h*, prevented from being thrown out by a screw, *k*, whose point enters a recess in the pin. In drilling with this arrangement a mark is to be made with a center punch, the pin is to be placed on the mark, and the drill revolved. As it cuts in the spring will compress, and when the center-pin is driven into its limit the stock is to be raised in the drill. By giving to the pin a long range of motion holes through iron may be cut without shifting the stock in the drill. The same result may be effected by causing the ordinary drill in Fig. 3 to project from the stock to a distance a little greater than the thickness of the metal to be drilled.

I prefer to make the lip of all the spirally-wound drills as represented on the side *a*, so that the tendency of the cutting is to wind the drill up and shorten it. When the lip strikes hard places, it then generally lifts over them, instead of breaking the edge or the drill, and this arrangement also prevents or tends to prevent breakages ordinarily arising from giving too much feed. It would appear that this arrangement would prevent chips or borings from being delivered, but no such difficulty arises in practice.

This drill is very easily and cheaply constructed and with the aid of very slight mechanical skill, as all that is necessary is to bend a hot sheet or ribbon around a mandrel of proper size, and then or previously shape the root and form or weld and dovetail on the cutting-edge. It needs no turning or shaping other than the mere bending, and is sufficiently strong to bore deep holes, such as small cylinders. It need not be riveted or welded fast to a stock, and in large machine-shops, where holes of many different sizes are constantly drilled, its cheapness alone would render it preferable to all drills known to me, as in holes of any size or depth it is impossible to make a crooked hole, and with a common drill it is impossible to make a straight hole; but it is also strong, not liable to breakage, cuts very fast, and always bores a hole out of wind or straight, and saves, as other annular

drills do, the cutting of the whole amount of iron in the core. I may state that I have bored with it, and to great advantage, holes of more than a foot in diameter in monitor-towers, the eyes for large cranks of marine engines, hydraulic cylinders and jacks, and other cylinders and tube sheets for boilers, besides a great variety of other work.

I am aware of the fact that drills to cut annular holes are not new, also that a spiral auger, made of a rod of iron and stocked as augers usually are, has been contrived for boring in wood around iron or other bolts, but I never have known of an annular drill made by simply bending a piece of sheet metal or ribbon around a mandrel and then or previously fitting it with a cutting-edge projecting both on the inside and outside of the metal.

I claim as of my own invention—

1. An annular drill for drilling metal, provided with a proper cutting-edge made of a piece of a sheet or a ribbon of metal bent around a mandrel and constituting a drill, substantially such as is described.

2. A spiral drill substantially such as is herein described, with a lip or cutting-edges arranged thereon that the resistance to the cutting tends to wind up or shorten the drill, as described.

3. A sheet metal or ribbon drill substantially such as is described, in combination with a cylindrical drill-stock, by means of a collar and clamp-screw or other equivalent attaching instrumentality, the whole being as specified.

4. In combination, a drill made of sheet metal or a ribbon of metal, as described, for boring an annular hole, and a centering apparatus, the latter being within or being surrounded by the former, substantially as set forth.

In testimony whereof I have hereunto subscribed my name in the city of New York.

RICHARD DUDGEON.

In presence of—

WALTER BUCHANAN,
JOHN F. DETMAR.