

(No Model.)

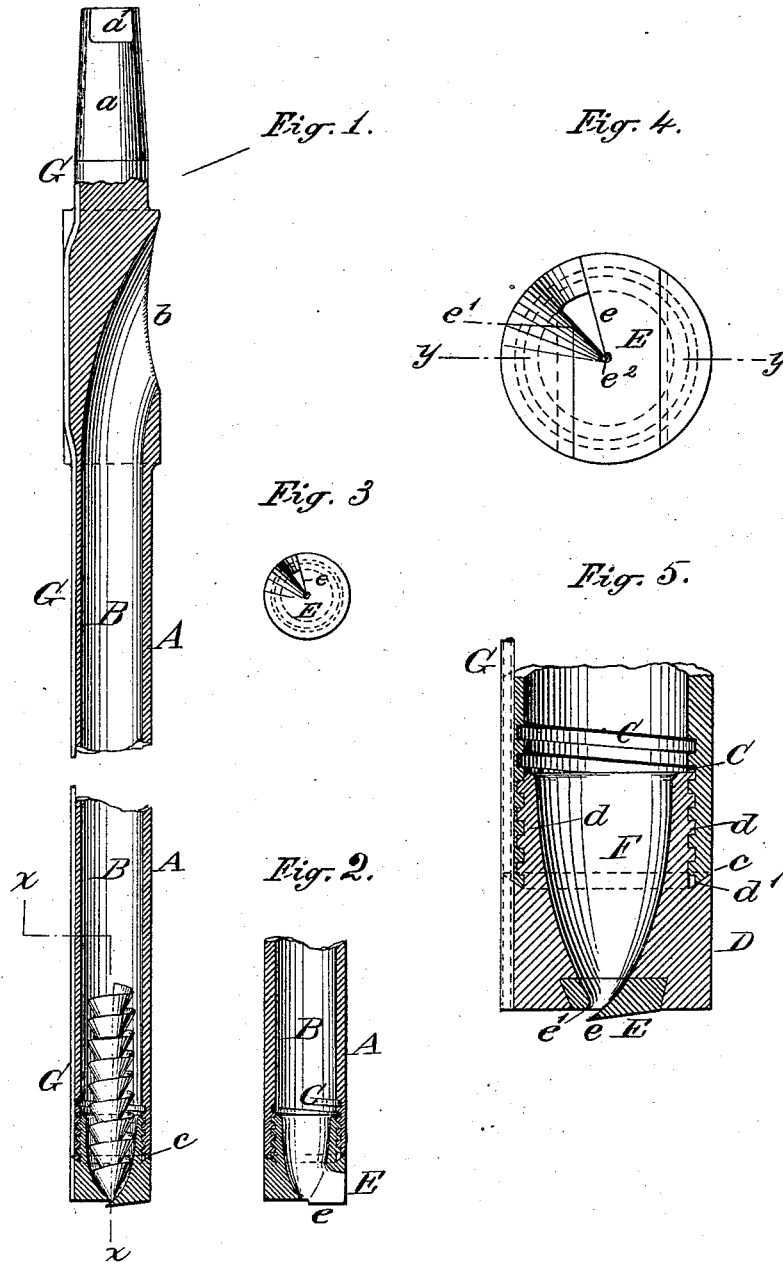
2 Sheets—Sheet 1.

A. SÖDERSTRÖM.

TUBULAR DRILL.

No. 302,292.

Patented July 22, 1884.



WITNESSES:

Edvard Schifeltz  
Robt W. Matthews

INVENTOR

Albert Söderström

BY A. W. Almqvist

ATTORNEY

(No Model.)

2 Sheets—Sheet 2.

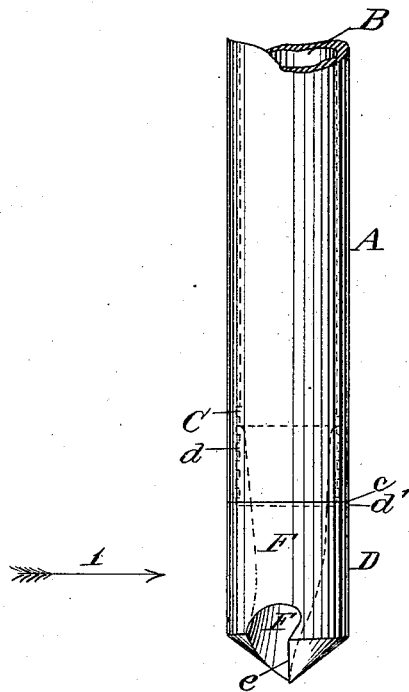
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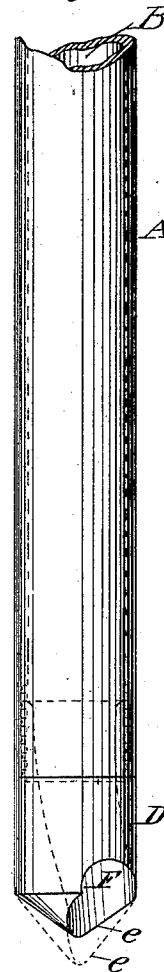
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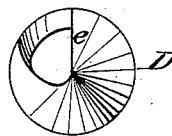
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ALBERT SÖDERSTRÖM, OF STOCKHOLM, SWEDEN.

## TUBULAR DRILL.

SPECIFICATION forming part of Letters Patent No. 302,292, dated July 22, 1884.

Application filed September 14, 1883. (No model.)

### *To all whom it may concern:*

Be it known that I, ALBERT SÖDERSTRÖM, a citizen of Sweden, and a resident of the city of Stockholm, in the Kingdom of Sweden, have  
5 invented a new and useful Improvement in Tubular Drills, of which the following is a specification.

The object of my invention is to provide tubular drills of improved construction to be used  
10 for boring deep holes of medium or large caliber in metals, particularly in tough metals—such as wrought-iron, soft steel, and copper, &c.—which, in being worked, form long, continuous chips, my improvement being designed to  
15 render unnecessary the withdrawal of the drill from the bore for removing the chips until the desired depth of bore has been reached.

My invention consists, mainly, in the construction of the cutting end and point of the  
20 drill and the manner of fastening it to a tubular shank, and in the construction whereby the continuous chip is contracted in forming, so as not to clog the interior bore of the drill, and is continuously discharged through a side opening  
25 just below the head of the said drill, as will be hereinafter described and claimed.

In the accompanying two sheets of drawings, Figure 1 represents a longitudinal central section of my improved tubular drill having flat  
30 cutting end. Fig. 2 is a longitudinal section of the same, taken through the line *xx* of Fig. 1. Fig. 3 is an end view of the cutting end of the same. Fig. 4 is an end view of the same provided with detachable bit or cutter. Fig.  
35 5 is a detail section on about the line *yy* of Fig. 4. Fig. 6 is a side view (from the cutting-edge) of one of my tubular drills of the most preferred form, having conical cutting end. Fig. 7 is a side view of the same, seen in the  
40 direction of arrow 1 in Fig. 6. Fig. 8 is an end view of Fig. 6.

The drill-shank A is tubular, provided with a conical head, *a*, having one or more flattened surfaces, *a'*, to prevent it from turning in the  
45 drill-chuck.

B is the bore or hollow portion of the tube A, and is curved at its outer end, and ending with an opening, *b*, in the side of the drill-shank below the head *a*, as shown in Fig. 1.  
50 On the inside the end of the shank A is provided with flat threads C, and is beveled at *c*

upon its outer circumferential edge, as shown more clearly in Fig. 5.

D is the cutting-head. This is threaded upon the outside for a certain distance at *d*, the  
55 thread corresponding with and fitting tightly into the aforesaid thread of the tube A, and at the end of the thread *d* the head D is provided with an inward bevel or groove, *d'*, which, when the head D is screwed home into the  
60 tube, engages with and compresses toward the threads the beveled or conical surface of the tube A, thereby preventing any widening of the tube by extraordinary resistance to the  
65 drill, and consequent tendency to burst the lower end of said tube. The cutting-head D should be made preferably of slightly larger diameter than the tube A, so as to make the  
latter work freely through the bore—that is, without causing any friction against its sides.  
70 The bit E is either made in one piece with the head when of medium size, as in Figs. 1, 2, and 3, or it is made in a separate piece inserted into the head, as in Figs. 4 and 5, the larger  
75 construction being always preferable for larger sizes, as it enables the same to be renewed and replaced with new ones (if broken) at slight expense. The cutting-edge *e* of the bit E projects a little below the opposite rounded edge,  
80 *e'*, which guides the chip in about the same manner as the bit of a hand-plane, so that the size of the chip may be determined by the opening, in order that the drill may not be overstrained; and in the center of the bit and  
85 axis of the tube is a small hole, *e''*, around which the continuous spiral of the chip is cut and rises. From the bore B to the cutting-edge the cavity F in the cutting-head D is contracted in a conical, or preferably conoidal,  
90 shape, so that the chip, in rising through the said conoidal cavity into the tubular cavity B, is contracted, as shown in Fig. 1, and thus its  
diameter is much less than that of the bore B, and consequently it cannot clog the latter; but  
95 as the drill descends the chip or borings will continuously issue through the side opening, *b*, below the head *a*. Instead, however, of forcing the chip (after it has been cut) to bend into the conically spiral shape shown in Fig. 1  
100 by the pressure of the inner wall of the cavity above the cutting-edge, (to which action the chip causes great resistance,) I have found it

to work better and take less power by curling the chip in cornucopia shape by the cutting-edge itself, and I therefore prefer the conical cutting end shown in Sheet 2. The cone should be made tolerably acute and rounded off at the point, as indicated in dotted lines in Fig. 7. It will then work best, wear well, and when the cutting-edge shall have become dull may be ground down gradually until it assumes the obtuse shape shown in full lines without materially impairing its working capacity.

In order to provide for lubrication directly at the cutting end, I inclose in a groove upon the outer surface of the drill a fine oil tube or conduit running the entire length of the drill, from the extreme outer end of the head *a* to the cutting end, in a manner which I have described in a separate application for a patent.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A metal-boring drill consisting of the combination of the cutting-head D with the tubular shank A, provided with the chuck-head *a* and side opening, *b*.

2. In combination with the tubular shank A, having side opening, *b*, and head *a*, and with the cutting-head D, the oil-pipe G, placed in a groove continuous through the said shank and cutting-head and within the outer circumference of the drill and shank, substantially as and for the purpose hereinbefore set forth.

3. In a tubular drill, the combination of the shank A, provided with the inside rectangular threads, C, and exterior end bevel, *c*, with the cutting-head D, having exteriorly corresponding rectangular threads, *d*, and a conical groove or bevel, *d'*, engaging the said bevel *c*, as and for the purpose hereinbefore set forth.

4. In combination with the tubular shank A, the cutting-head D, provided with a conical or conoidal cavity, F, widening from the cutting-edge toward the bore B, substantially as set forth.

5. In combination with the tubular shank A, the head D, having conical cutting end rounded at the point, and an internal cavity, F, widening from the cutting-edge toward the bore B, substantially as specified.

6. In combination with the tubular drill-shank A and with the cutting-head D, secured to the end of the said shank, the bit E, detachably secured to the said head D, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 9th day of February, 1883.

ALBERT SÖDERSTRÖM.

Witnesses:

AUG. YURÉEN,

NERE A. ELFWING.