(No Model.)

A. SÖDERSTRÖM.

SELF OILING DRILL CHUCK.

No. 288,957. Patented Nov. 20, 1883.

Fig 1.

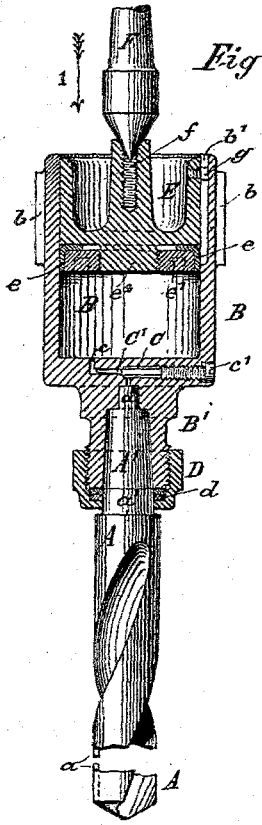

Fig 2.

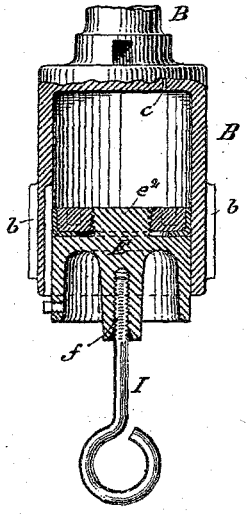

Fig 3.

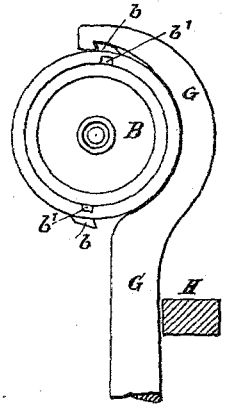

Fig 4.

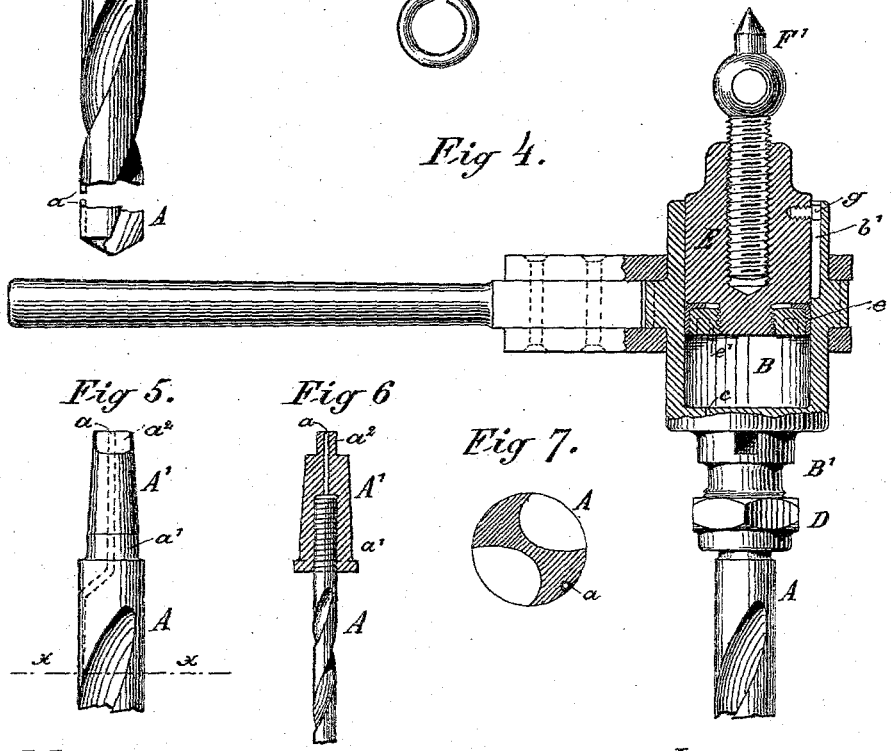

Fig 5.

Fig 6

Fig 7.

Witnesses:

Rob. Wm. Matthews

Edvard Kjellberg

Inventor:

Albert Söderström

by A. W. Almqvist

Attorney.

UNITED STATES PATENT OFFICE.

ALBERT SÖDERSTRÖM, OF STOCKHOLM, SWEDEN.

SELF-OILING DRILL-CHUCK.

SPECIFICATION forming part of Letters Patent No. 288,957, dated November 20, 1883.

Application filed March 7, 1883. (No model.) Patented in Sweden September 13, 1882.

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 invented a new and useful Improvement in Self-Oiling Drill-Chucks, of which the following is a specification.

My invention relates to improvements in boring-tools, especially such as are used for boring long or deep holes in metals. It is well known that according as the hole increases in depth by the boring the difficulty of lubricating the cutting end of the drill increases, and the drill runs hot, loses its temper, wears very rapidly, and soon gets spoiled, while at the same time the bore becomes rough and ragged, instead of smooth, for want of lubrication, and no matter how much oil is poured into it it is met and pushed back by the borings filling the entire space between the drill and the bore, which borings constantly keep rising as the drill descends, thus only causing a considerable waste of oil without applying any of it at the point where lubrication should take place.

The object of my present invention is to obviate this great difficulty, and to provide a simple and efficient means whereby the oil or other lubricant will always be applied at the extreme cutting end of the drill no matter how deep the hole is required to be bored, the cut will be smooth, a proper temper of the drill will be maintained and its wear greatly reduced, and the time heretofore wasted in stopping the motion, removing the drill to clean the borings out of the hole, again inserting the drill, and starting its motion will be saved.

In the accompanying drawings, Figure 1 represents a horizontal section of a drill-chuck with drill attached as when used in a lathe for drilling holes, or it may be considered a vertical section if used in an upright boring-machine or drill-press. Fig. 2 is a section similar to Fig. 1 of the drill-chuck with a handle attached for the manipulation of filling the reservoir. Fig. 3 is an end view of the drill-chuck as seen in the direction of arrow 1 of Fig. 1, and illustrating the mode of holding it stationary in the lathe, while the article to be bored is secured in the revolving lathe-chuck. Fig. 4 is a section similar to Fig. 2, showing my invention applied to an ordinary ratchet-drill. Figs. 5 and 6 are detail views of modifications of the upper end of the drill. Fig. 7 is a detail cross-section on a larger scale, the section being taken on the line x x of Fig. 5.

Like letters of reference indicate like parts in the several figures.

A is the ordinary twist or spiral drill for boring metals, and provided at its upper end with a conical head, A′, adapted to be inserted into a socket of the drill-chuck. The said conical head has a cylindrical portion, a', at its junction with the drill proper, and a flattened portion, a^2, at its extreme end, which fits into a similar socket or notch in the drill-chuck, to prevent the drill from turning in the chuck. From the extreme upper end of the drill A to its cutting-edge is formed an oil-channel, a. This is done preferably by making a groove in the cylindrical surface of the drill and inserting into the said groove a fine tube, as shown in Fig. 7, the said tube being then soldered into the groove and the space outside of it filled with tin, so as to be even with the cylindrical surface of the drill. It will be seen that by thus arranging the oil-tube a it will not be exposed to wear, as it would be if placed in the spiral groove, where the borings rise. The conical head A′ should be of the same size for several sizes of drills, so as to adapt them to be used in the same chuck. For smaller drills I therefore preferably make the said head A′ of a separate piece, with a portion of the oil-channel a formed into it and leading into the upper end of the socket in the said head, in which socket the small-sized drill is inserted and secured by soldering, as shown in Fig. 6. To insure a firm hold of the drill in the said socket of the head A′, it may be provided with a fine thread, as in said Fig. 6, thus giving a larger surface of contact with the tin or other easily-melted solder. The drill-chuck is formed of a hollow cylindrical vessel, B, provided with a nipple, B′, into which is formed a conical socket and a notch or recess, intended to receive and tightly hold the conical drill-head A′ and its projection a^2, respectively, as shown in Fig. 1. The nipple B′ is threaded on the outside suitably to receive a cap-nut or packing-nut, D,

by which suitable leather or other packing-rings, *d*, are tightened securely around the cylindrical portion *a'* of the drill-head A'. Through the solid metal, between the hollow cylindrical portion of the drill-chuck and the socket which receives the drill-head, is bored horizontally a fine channel, C, which has a narrow valve-seat opening, closed by a tapering needle-valve or block, C', which is adjustable by means of a screw, *c'*, the latter forming one piece with and the outer accessible portion of the said valve. The horizontal channel C is connected at alternate sides of the valve-seat by small vertical channels *c* to the interior of the vessel B and the drill-retaining socket in the nipple B'. Upon the outer surface of the cylinder B are provided ribs *b*, by means of which and a suitable hooked bar, G, supported upon some stationary portion, H, of the lathe, it may be held fast and prevented from turning, being simply fed forward by the usual feed of the center F, while the metal to be bored is fastened to the chuck at the other lathe-center and revolves with it. On the inner surface of the cylinder B, parallel with its axis, is a groove, *b'*. E is a piston fitted tightly within the cylinder B, being provided with a suitable piston-packing, *e*, tightened and expanded by a ring-nut, *e'*, threaded upon a central portion, e^2, of the piston E. The said piston E is also provided with a conical central recess for receiving the end of the lathe-center F, and the said conical recess is extended by means of a threaded socket, *f*, adapted to receive the threaded end of a handle, I, (shown in Fig. 2,) for purposes hereinafter to be stated. The piston E is also provided with a projection, *g*, threaded or otherwise secured into its surface, the said projection being of proper shape and size to fit and slide into the groove *b'* in the cylinder B when the piston E is depressed into the cylinder B, and thus serve to prevent the piston from being revolved within the cylinder. The cylinder B serves as a reservoir to be filled with oil or other suitable lubricant. The oil being poured in, the handle I is secured to the piston E and the latter inserted in the cylinder B, the air above the oil-space escaping through the groove *b'* until the piston is pushed past the said groove. The chuck is then preferably inverted, as in Fig. 2, allowing the air to ascend to the opening *c*. The screw-valve *c'* is then opened a little, while the piston is pushed forward by the handle I, thus expelling the air from the cylinder B, until the oil by the pressure has reached the point of the drill through the channel *a*. The handle I is then removed from the socket *f*, and the drill is ready for operation. During the drilling the feed-pressure upon the center F, by which the drill is pressed forward to cut into the metal, also acts directly upon the oil contained in the cylinder B, forcing it through the channel *a*, down to the very cutting-edge of the drill, and, the feed-pressure on the oil being exactly the same as on the drill, there never can be any failure in lubricating the cutting-point of the latter.

Fig. 4 shows the application of my invention to a ratchet-drill, the lathe-center F being simply replaced by the ordinary feed-screw F'. As is well known, there are numerous instances in which it is necessary to apply the drill in a position to cut upward—such as when removing and securing new plates to the bottom of an iron-clad vessel, in repairing boilers, &c.—and in all such cases there has heretofore been no mode known by which the point of the drill could be lubricated, except the usual way of constantly removing the drill and squirting in a few drops of oil by an ordinary pneumatic oil-can into the cavity made by the drill; but by this means it is evident that the point will always be lubricated so long as there is any oil left in the cylinder and any feeding forward of the drill to cut its way through the metal.

Experiments made have proven that holes of one inch diameter and twelve to fourteen inches depth may be bored through solid metal in one continuous run without overheating the drill, and leaving a smooth surface of the bore.

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

1. The combination of a drill, a lubricating-vessel, a conduit leading from the said vessel to the cutting end of the said drill, and means actuating the lubricating matter in the said vessel by the feed-pressure on the said drill.

2. A drill or boring-tool having within its surface a lubricating-conduit leading to the cutting end of the said drill, said conduit forming a part of and thus revolving with the said drill, for the purpose set forth.

3. The combination, with a drill or boring-tool, A, having along its surface a groove leading to its cutting end, of a lubricating-tube, *a*, said tube being secured in and along the said groove and within the circumference of the said drill, substantially as and for the purpose set forth.

4. The combination of a chuck formed of a lubricating-receptacle, B, a follower or piston, E, within the said receptacle, a drill-holding device, B', a conduit or conduits, *a*, connecting the said receptacle with the cutting end of said drill, and means exerting pressure upon the said piston, substantially as and for the purpose set forth.

5. The combination of the lubricating-receptacle B, the nipple B', provided with a drill-holding socket, a conduit, *c* C *c*, connecting the said receptacle and socket, and the follower or piston E, substantially as and for the purpose set forth.

6. The combination of the piston E, the oil-receptacle B, the nipple B', a packing device, D *d*, and socket to receive the drill, the conduits *c* C *c*, and the screw-valve C' *c'*, substantially as and for the purpose set forth.

7. The oil-receptacle B, provided with drill-holder B′, and conduits *c* C *c*, as described, and having an interior guide-groove, *b′*, and exterior retaining-ribs, *b*, in combination with the piston E, having a side projection, *g*, and with means, G, preventing the revolving of the said piece B by contact with the said ribs *b*, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 24th day of January, 1883.

ALBERT SÖDERSTRÖM.

Witnesses:
AUG. ZURÉEN,
NERE A. ELFWING.