

J. OAKLEY.
DEEP HOLE DRILL.
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1,189,727.

Patented July 4, 1916.

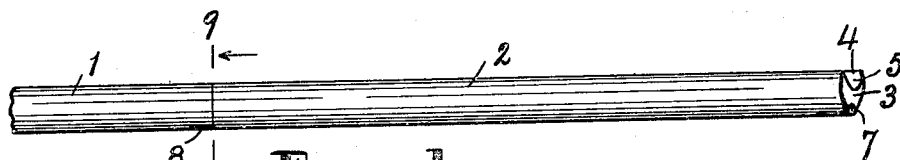


FIG. 1-

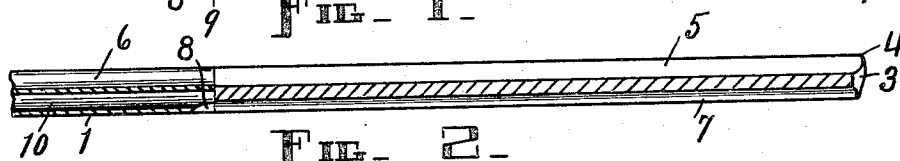


FIG. 2-

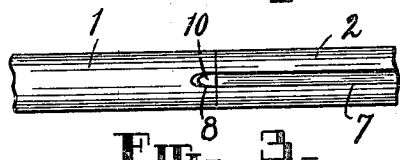


FIG. 3-

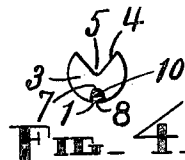


FIG. 4-



FIG. 5-

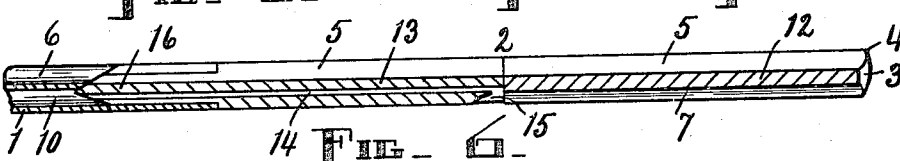


FIG. 6-

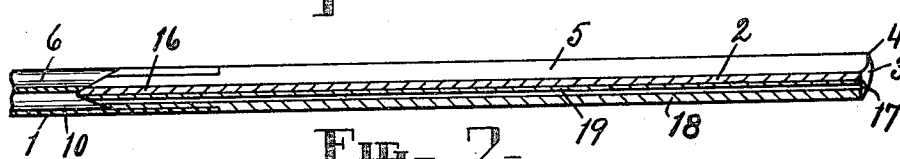


FIG. 7-

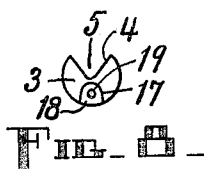


FIG. 8-

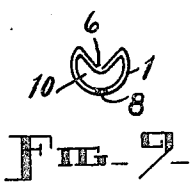


FIG. 9-

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DEEP-HOLE DRILL.

1,189,727.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN OAKLEY, a subject of the King of Great Britain, residing at Springfield, in the county of Hampden and State of Massachusetts, United States of America, have invented a new and useful Deep-Hole Drill, of which the following is a specification.

My invention relates to improvements in tools for boring long and comparatively small holes in metal objects, such as rifle barrels, and consists broadly and essentially of a cutting tip which is made preferably of a material that is so hard as to resist all efforts to machine the same for the formation of the passage for the lubricant or oil, which passage must be provided in order to enable said oil to be projected to the head of said tip, except by grinding, and of a tip that has what may be termed an exterior oil passage to afford clearance for the flow of oil to said head, all as hereinafter set forth.

The general shape and formation of the cutting tip and tube, which together constitute the tool or drill, are or need not be changed, but structural changes of the utmost importance are made in the former, while in some cases the structure of the latter, at the end where said tip is received or attached, is altered somewhat, as will presently appear.

Obviously it is desirable that the hardest kind of material be used for the cutting tip of a drill for rifle barrels and the like, and it is equally important that the head of such tip while doing its work be most freely lubricated and the chips flooded back out of the way, to which end the oil is in practice forced through the drill under great pressure, and the primary object of my invention, which object is twofold, is to provide the drill with an exceedingly hard and therefore durable and quick-cutting tip, which tip affords the necessary oil clearance to the head, and not only that but enables to flow to such head a larger stream of oil than is possible when the old type of tip is used. With this drill, therefore, the work can be done better and more expeditiously, the cutting tip lasts longer, and there is effected a saving in time, money, and material.

Other objects and advantages will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the means illus-

trated in the accompanying drawings, in which—

Figure 1 is a side elevation of a drill which embodies a preferred form of my invention, the major portion of the tube being broken off in this and in the other longitudinal views; Fig. 2, a central longitudinal vertical section through said drill; Fig. 3, a bottom plan of the abutting parts shown in the preceding views; Fig. 4, a front end elevation of the drill; Fig. 5, a front end elevation showing a slight modification of the cutting tip; Fig. 6, a central longitudinal vertical section through a modified form of the drill as a whole; Fig. 7, a similar section through still another modified form; Fig. 8, a front end elevation of the drill shown in the preceding view, and, Fig. 9, an end elevation of the tube of the first construction, such elevation being taken on lines 9—9, looking in the direction of the associated arrow, in Fig. 1.

Similar reference numerals refer to similar parts throughout the several views.

The cutting tips of deep-hole drills in common use are provided with tail-pieces or shanks that fit into the forward ends of the tubes, and such tips, being of a material that can be bored longitudinally, have oil passages therein which extend through the tips from end to end. During the boring or drilling operation the oil is forced through the tube and tip of such a drill, and passes backward with the chips through exterior longitudinal grooves in said tip and tube. I may or may not provide the aforesaid shank, but in any event remove a portion of the side of the tip which is approximately diametrically opposite to that in which is located the cutting lip of said tip or the groove in said tip provided for the backward flooding of the oil, to form an oil-way to the cutting end or head, special provision being made when necessary to connect such oil-way with the interior of the tube to which said tip is attached. The wall of that part of the boring machine which supports the tip, at the beginning of its operation, and the wall of the bore made by said tip in the rifle barrel or other object being bored, complement this exterior oil-way and convert or transform it into a complete passage for the oil supply, in the absence of a bored filling in said oil-way.

The oil bore in the old type of cutting tip

is too small in diameter to admit of the passage of as large a volume of oil as is necessary for the best results, and such tip on account of such bore is very difficult and expensive to manufacture, disadvantages that may be entirely eliminated by forming and locating the oil-way along one side of the tip, since in that event it is feasible to provide a very much larger passage in diameter or cross-section than when such passage is wholly within the body of the tip, and the tip can be manufactured much more easily and economically. Herein are found, therefore, very important and valuable features of my invention.

It is very evident both from the drawings and the nature of the case, that considerable latitude must be allowed in details of construction, wherefore I do not restrict my invention to any one form of construction or in other respects, so long as the scope of my claims be not exceeded.

Referring now to the drawings and first to Figs. 1, 2, 3, and 4, it will be observed that I there show a drill comprising a tube 1 and a tip 2, although only the terminal of said tube to which said tip is attached appears, such tube in reality and necessarily being long enough to enable said tip to pass clear through a rifle barrel or other object being bored. The cutting end or head and the cutting lip of the tip 2 are represented at 3 and 4, respectively, and there is the usual groove 5 in said tip, through which groove the used oil and the chips escape. The tube 1 and tip 2 have practically the same superficial dimensions in cross-section and are substantially the same shape exteriorly in cross-section, so that there is also the usual groove 6 in said tube to receive and convey away the used oil and the chips after they leave the groove 5, said tube and tip being connected with said grooves in line with each other and therefore continuous. In this case the tip 2 has no tail-piece or shank, but is simply butted against the tube 1, with the rear end of the former against the forward end of the latter, and permanently secured in place by welding together the parts which abut. Instead of welding the parts together, the joint between the tube and the tip may be made by soldering or brazing said parts together, or by sweating in the shank when present, this last being the common practice up to the present time.

The tip 2 may be made out of high-speed steel, but I prefer to make said tip of material that is so hard it can be machined only by grinding, the same being true with regard to all tips which enter into the construction of the different forms of my drill. Formed in the tip 2 lengthwise, in the side which is approximately diametrically opposite to the groove 5, by grinding if the

preferred material be used, is a groove or oil-way 7. The oil-way 7 can be of considerable size so as to permit quite a large stream of oil to flow through it. A notch or recess 8 is milled or otherwise cut in the forward end of the tube 1 to open the way from the interior tube passage 10 into the oil-way 7, such recess being approximately diametrically opposite to the groove 6.

It is now clear that oil pumped into the rear end of the passage 10 in the tube 1, flows through said passage and out of the recess or opening 8 into the oil-way 7. The oil thus forced into the oil-way 7 passes through the same and out of the front end thereof to lubricate the head 3 and the lip 4, and such oil flows back through the grooves or channels 5 and 6, carrying with it the chips produced by the tip.

The oil-way 7 may be in the form of a groove, as clearly shown in Fig. 4, or the tip may be simply chamfered, as indicated at 11 in Fig. 5, to form or produce such oil-way.

It will be seen upon referring to Fig. 6, that a shorter tip as 12 may be employed, that is, shorter than the tip 2, and an extension as 13 provided for said tip 12, the two members being butt-welded or otherwise united at their contiguous ends. The tip 12 is made of high-speed steel, or preferably, as before stated, of other material that can not be bored or drilled, but only ground, for the formation of the oil-way 7 (or 11), like the tip 2, and said tip 12 is similar to said tip 2 in other respects. The extension 13 may be made of soft machine steel, or tool steel, and can be case or otherwise hardened. An oil passage 14 is drilled through the extension 13, and a notch or recess 15 is milled or otherwise cut in the forward end of said extension, in line with the oil-way 7 in the tip 12, to open free communication with said oil-way. The extension 13 has a shank 16 at the rear end to fit into the contiguous terminal of the tube 1, and permanent connection between said extension and tube is produced by sweating or otherwise. The passage 14 extends through the shank 16 and so opens at the rear end into the tube passage 10. The oil is, therefore, forced from the passage 10 into the passage 14, through the latter and the recess 15 into the oil-way 7, and then out and back through the channels 5 and 6 in substantially the same manner as in the other case, it being understood, of course, that the tip 12 and the extension 13 have connecting channels 5, and that the transverse contours of both members 12 and 13 are substantially alike. In the Fig. 6 construction less of the hard material is used, which may have some economical advantage, but, in the particular or specific construction shown in said view, wherein the oil for the head 3 must pass

through the interior passage 14, said construction may not be so capable or efficient as that wherein the exterior oil-way of the tip communicates directly with the oil passage in the tube 1.

In the event it be desired to locate the oil-way entirely within the tip, substantially as it has been common to do heretofore, and at the same time to make use of the hard material, a groove 17 is ground in the tip 2 and filled with some soft metal, composition, or alloy which is bored or drilled, as represented in Figs. 7 and 8, wherein the filling is indicated at 18 and the bore at 19. The bore or passage 19 is the oil-way and is actually a part of the groove 17 which corresponds with the oil-ways denoted by the numerals 7 and 11. The tip 2 is here again provided with a shank 16, and the groove 17, filling 18, and passage 19 are located in the shank as well as in the tip proper. Necessarily the oil-way in this construction is rather small in diameter, but it is wholly within the tip, or within the tip and the shank when the latter member is present, so that the drill resembles more nearly the old type.

The shank 16 might be omitted from either the short tip construction or the construction having the internal passage, that is, the construction last described, and, on the other hand, such shank might be included in the first-described construction.

Any form of my drill operates in a similar manner to that of the old drill, except for the greater cutting speed which the former is capable of sustaining, when the larger oil-way is provided, and the increased capacity generally of my drill, due to the presence of the hard cutting member preferably used.

It is readily conceivable that the cutting tip might be made with more than one cutting lip and the exterior oil passages multiplied accordingly so as to provide for each lip a passage for the oil supply to the head

and a return passage for the used oil and chips.

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

1. A deep-hole drill comprising an exterior longitudinally grooved tubular member having an interior oil passage, and an exterior longitudinally grooved tip secured to said member and supplied with an exterior open-sided oil-way to communicate with said passage, said oil-way being straight and approximately diametrically opposite to the groove in said tip.

2. A deep-hole drill comprising an exterior longitudinally grooved tubular member having an interior oil passage opening at one end through one side of said member, and an exterior longitudinally grooved cutting tip secured to said member and having an exterior open-sided oil-way with one end of which said passage communicates through the side opening thereto or therefrom, said oil-way being straight and approximately diametrically opposite to the groove in said tip.

3. The combination, in a deep-hole drill, with a tubular member having an exterior waste groove and an interior oil passage, of a tip comprising a member secured to said first-mentioned member and having an exterior waste groove and an interior oil passage which respectively communicate with said first-mentioned groove and passage, and a member secured to said first-mentioned tip member and having a waste groove in line with the other waste grooves and an exterior open-sided oil-way which opens at one end into the adjacent end of the oil passage in said first-mentioned tip member, said oil-way being straight and approximately diametrically opposite to said waste groove in the same member therewith.

J. OAKLEY.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."