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DRILL POINT AND METHOD OF MAKING THE SAME

Filed Aug. 17, 1927

Fig. 3

Fig. 1

Fig. 2

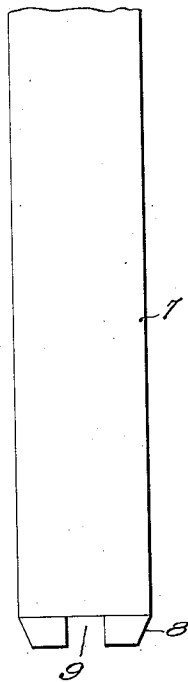
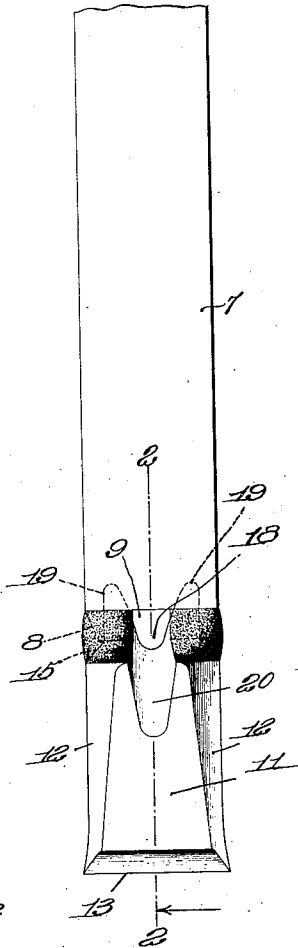
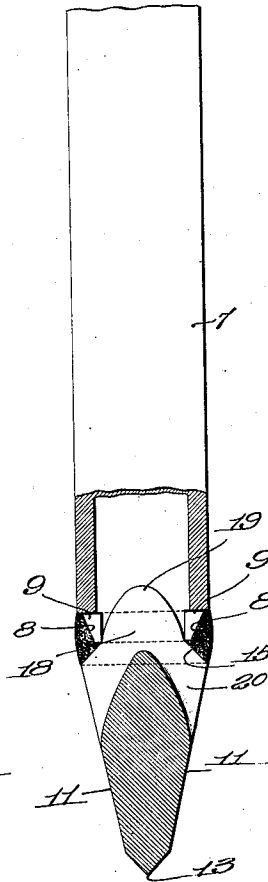
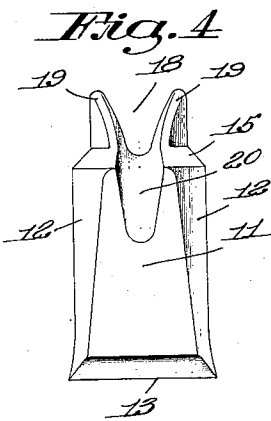
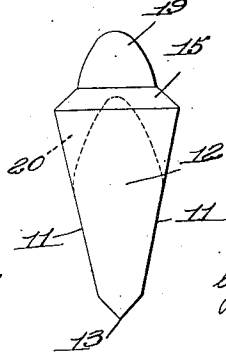
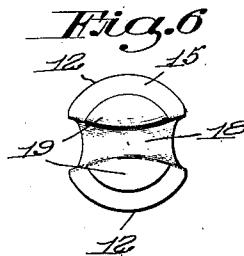


Fig. 5



Witness

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DRILL POINT AND METHOD OF MAKING THE SAME

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The present invention relates to drill points and the methods of making the same, and more particularly to that type of point having provision for the delivery of a fluid adjacent the advancing end of the point.

It is a common practice in certain classes of work to provide for the delivery of a fluid adjacent the advancing end of the drill, for example, of water to carry away the cuttings where rock or similar material is being penetrated, or to loosen the earth in advance of the drill where a pipe is being sunk for an artesian well or similar purpose, or to thaw frozen ground preparatory to excavation for mining or other operation.

The object of the present invention is to devise a drill point of the above type and a method of making the same, which will be simple, economical, and efficient.

With these objects in view the present invention consists of the drill point and method of making the same hereinafter described and particularly defined in the claims.

In the accompanying drawings which illustrate what is now considered the preferred form of the present invention, Fig. 1 shows the drill point complete in front elevation; Fig. 2 is a longitudinal sectional view of the complete drill point looking from the right of Fig. 1 in the direction of the arrow 2—2; Fig. 3 is a front elevation of the hollow shank and Fig. 4 is a corresponding front elevation of the tip, these parts being separated from one another but aligned preparatory to assembling; Fig. 5 is a side elevation looking from the right; and Fig. 6 is a top plan view of the tip shown in Fig. 4.

The improved drill point shown in the drawings comprises a hollow or tubular shank portion and a tip portion. The shank and tip are formed with cooperating notches and grooves which, when the parts are assembled, form passages for discharging the fluid from the hollow shank to the outer face of the tip. The tip is secured at one end to the shank by welding, while the other end of the tip is formed with a cutting chisel edge.

Referring to the drawings, the tubular shank is shown detached in Fig. 3, and con-

sists of a short length of extra heavy steel pipe bevelled at its lower end at 8 and provided in the bevelled portion with two diametrically opposed notches 9.

The tip portion shown detached in Fig. 4, is formed by drop forging from a steel blank. This blank is preferably formed of two types of steel. The lower portion which carries the cutting edge, is of high carbon steel, to withstand the wear of the drilling through stones, etc. The upper portion is preferably of such composition as may be easily welded to the tubular shank by any of the well known methods of autogenous welding. A low carbon steel is suitable for this purpose.

This composite steel construction of the tip is of importance, for while high carbon steel can be welded to low carbon steel by forging methods, satisfactory welds of such steels are very difficult, if not practically impossible, to make, by autogenous methods. Forged welding, however, has the serious disadvantage that during such process more or less distortion of the parts being welded is certain to take place with the result that the passages are more or less closed thereby. While these may be opened up by forcing a punch through them while the metal is hot, this forms a sharp burr on the inside which is left and cannot easily be removed. Such burrs are objectionable as they tend to catch any foreign matter, such as rootlets or other stringy material, which may be carried in the water, and gradually become plugged thereby. By making the weld between the tip and the shank by autogenous methods, distortion of the parts is avoided and the smooth surfaces of the passages are retained.

The tip may be completely and economically made in the following manner: A slug of high carbon steel and a slug of low carbon steel of proper weights to form a finished tip are butt welded together autogenously. The composite slug thus formed is then heated to forge temperature and drop forged between two dies into the shape shown in Fig. 4. During this forging operation the butt weld previously made is consolidated and strengthened. Any irregu-

larities, fins, etc. may be easily removed by grinding or other methods, giving a finished tip with smooth water passages.

As shown in Figs. 4 and 5, the tip is of general wedge shape configuration, having plane opposed converging faces 11 and round sides 12. The lower end of the tip is provided with the usual chisel cutting edge 13, which in the drawings is shown as about 90°, this being in accordance with the usual rock drill practice. The length of the cutting edge or "gage" is slightly greater than the diameter of the rest of the point and of the shank, in order to give clearance. Where the drill point is used for thawing frozen ground, this gage may be made less than is usual in rock drill practice. This cutting edge may be resharpened by hand methods or by means of the well known drill sharpener.

The opposite ends of the tip from the chisel edge is reduced so that it will fit tightly within the lower end of the tubular shank 7, a bevelled shoulder 15 being formed between such reduced portion and the body of the tip. When the parts are assembled the bevelled shoulder 15 of the tip and the bevelled end 8 of the shank form an annular V-groove at the point of connection to receive the welding material which secures the tip and shank together in a firm and permanent manner.

In order to facilitate the delivery of the fluid or liquid from the interior of the tubular shank to a point adjacent the cutting edge of the drill, the reduced portion of the tip, which enters the lower end of the shank, is bifurcated to form the chamber or passage 18 between the two upstanding lugs or ears 19. From this chamber or passage grooves 20 extend downwardly and outwardly and terminate in the upper portion of the plane faces 11 of the tip.

The parts are assembled with the ears or lugs extending into the interior of the shank and with the grooves 20 in register with the notches 9. Care is taken in the welding operation not to close or restrict the notches or grooves by the welding material, so that two free and unobstructed openings or ports are provided, formed partly by the notches 9 and partly by the grooves 20 through which the fluid or liquid from the interior of the pipe can be discharged, suitable connection being had at the top of the hollow shank or of an extension thereof with the source of supply in the well known manner.

The bifurcated reduced upper end of the tip not only serves to support and hold the tip in the shank, but also to prevent the formation of dead spaces and sharp edges inside the shank close to the tip, which would tend to collect any foreign matter present in the water and increase the liability of plugging of the passageways. The method of forming these passageways enables them to be made

with larger cross-section and with the smooth sides or walls, thereby insuring the discharge of large streams of water and reducing the liability of becoming closed.

It will be noted that as shown in Fig. 1 a straight, transverse passage is formed diametrically across the drill point adjacent the point of juncture of the tip and shank. This is a feature of advantage since it permits the wire nail or other implement to be passed directly through the drill point to clear away or remove any dirt or material which may tend to collect at the bottom of the shank and to plug the water passages.

The operation of the improved drill is the same as of other drills of this general type. When used for drilling wells, or for sinking water pipes in frozen ground, the drill point will be rotated and forced downwardly while a stream of water or other fluid or liquid is discharged through the openings or ports of the drill. Blows may be struck on the upper end of the shank or extensions thereof to facilitate its downward movement, and if a rock or other obstruction is found, this may be penetrated by repeated blows and slight rotations of the drill in the usual manner, the water or other liquid washing away the fine chips and powder as fast as they are formed.

The drill point herein shown and described is simple in construction and inexpensive to manufacture since the tip may be conveniently formed by drop forging while the ordinary steel or iron pipe may be used for the shank. The parts may be easily assembled and united at small expense in a strong and permanent manner, and by the provision of large ports, the water or the liquid may be discharged freely from the interior of the shank in large quantities and under high pressure if desired. As the cutting edge becomes worn or dulled, it may be re-shaped and sharpened in the ordinary manner just as in the case of an integral tip and shank drill, and when worn down as far as practicable, may be cut off and another tip welded onto the shank.

Having thus described the invention, what is claimed is:

1. A drill point comprising a tubular shank and a tip, the shank having an end wall substantially at right angles to the axis of the shank and a notch in said wall and the tip having a groove in its side, the tip being secured to the shank with the groove and notch in register to provide a passage from the interior of the shank to the exterior of the tip.

2. A drill point comprising a tubular shank and a tip, the shank having a notch in its end wall, the tip having a portion fitting closely within the end of the shank in engagement therewith, such portion being provided with a passage therein, and means for securing the shank and tip together with the passage and notch in register.

3. A drill point comprising a tubular shank

having a bevelled end with a notch therein, a tip having a cutting end and a reduced portion extending from the body of the tip at the opposite end and received within the shank in engagement with the inner face thereof, and with a bevelled shoulder adjacent the reduced portion and forming with the bevelled end of the shank an annular V-groove, the tip being provided with a longitudinal groove in the body of the tip extending through the shoulder and reduced portion, and welding material located in the annular V-groove for securing the tip and shank together with the longitudinal groove and notch in register to form a passage from the interior of the shank to the exterior of the tip.

4. A drill point comprising a tubular shank with an internal cylindrical face and having notches in its end and a wedge-shaped tip having plane, opposed, converging faces, the tip being provided with a cutting edge at one end and a portion of reduced cross-section at the other end, said reduced portion engaging the internal cylindrical face at the end of the tubular shank, the tip also being provided with grooves extending from said faces of the tip into the reduced portion in register with the notches and in communication with the interior of the tubular shank, and means for securing the tip to the shank.

5. A drill point comprising a tubular shank with a bevelled end having diametrically disposed notches therein, a wedge-shaped tip having plane, opposed, converging faces and rounded sides, and a chisel cutting edge at one end, the opposite end being reduced in cross-section and bifurcated to form two ears, the tip having a bevelled shoulder adjacent the reduced portion to form with the bevelled end of the shank an annular V-shaped groove, the tip also having oppositely disposed, longitudinal, open grooves extending from the bifurcation and terminating in the plane faces, and welding material in the annular V-groove for securing the tip and shank together with the notches in register with the longitudinal grooves.

6. A drill point tip comprising a wedge-shaped body having opposed, plane, converging faces and rounded sides, the faces at their converging ends being formed into a cutting edge, the body being of reduced cross-section at the opposite end and terminating in a plurality of members spaced apart from one another, the body being formed with open, longitudinal grooves extending from the spaces between said members to said plane faces.

7. The method of making a drill point which consists in forming a drill tip with an open groove in its side and extending to one end thereof, and securing said end in the end

of a tubular shank by welding at each side of the groove.

8. The method of making a drill point which consists in forming a drill tip having a reduced bifurcated portion and grooves extending from the bifurcation into the outer faces of the tip, forming notches in the end of a tubular shank, assembling the tip and shank with the reduced end portions of the tip within the tubular end of the shank and with the grooves in register with the notches, and welding the tip and shank together at the end of the shank and intermediate the notches.

9. The method of making a drill point which consists in drop forging a wedge-shaped tip with open grooves extending divergently from one end of the tip to the sides of the tip, and securing the tip in the end of a hollow shank by welding.

10. The method of making a drill point which consists in welding high carbon steel to low carbon steel to form a blank, drop forging the blank to form a wedge-shaped tip with open grooves extending divergently from one end of the tip to the sides of the tip, and securing the tip in the end of a tubular shank by autogenous welding.

11. The method of making a drill point which consists in forming a drill tip with a cutting end, and with the opposite end of reduced cross-section, and with a bevelled shoulder adjacent such reduced end portion, and with an open groove in the side of the body portion extending through the bevelled shoulder and reduced end portion, forming a tubular shank with an oppositely bevelled shoulder and securing the end portion of the tip in the end of the tubular shank by welding material on the bevelled shoulders.

12. A drill point comprising a tubular shank having a pair of diametrically disposed notches in its end wall, a tip having a pair of oppositely disposed open grooves with closed bottom, means for securing the tip in the shank with the grooves in register with the notches, the bottom of the grooves merging and terminating below the line of the bottom of the notches to form with the notches an open transverse passage through the drill point adjacent the line of juncture of the tip and shank.

13. A drill point comprising a tubular shank, a tip having a portion extending into the end of the shank in engagement therewith, the tip being provided with a pair of oppositely disposed open grooves extending from the shank end divergently to the sides of the tip, the end of the tubular shank opposite said grooves being positioned on the line above the merging and termination of the bottom of the grooves to form an open transverse passage through the drill point adjacent the juncture of the tip and shank.

14. A drill point comprising a tubular

shank having a cylindrical end portion, a tip having a portion extending into the cylindrical end portion of the shank in engagement with the inner cylindrical face thereof, the
5 tip having an open groove with a closed bottom in the portion extending into the shank and adjacent thereto, the tip being welded directly to the shank.

15. A drill point comprising a tubular
10 shank having a cylindrical end portion, a tip having a reduced bifurcated end located within the cylindrical end of the shank, and in direct engagement with the internal cylindrical face thereof, oppositely disposed
15 separated grooves in the tip extending from the bifurcation lengthwise of the tip, the tip being secured directly to the cylindrical end portion of the shank by welding.

16. A drill point comprising a tubular
20 shank having a cylindrical end portion with a bevelled end and an internal cylindrical face, a tip having a reduced end fitting within the end of the shank in engagement with the cylindrical face and also having a bevelled
25 shoulder adjacent the reduced portion, the bevelled end of the shank and the bevelled shoulder of the tip forming a V-groove when the tip and shank are assembled, the tip being provided with two oppositely disposed separated open grooves with closed bottoms extending from the reduced end portion lengthwise of the tip, and welding material in the
30 V-groove for securing the tip directly to the shank.

35 In testimony whereof I have signed my name to this specification.

FRED S. MULOCK.

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