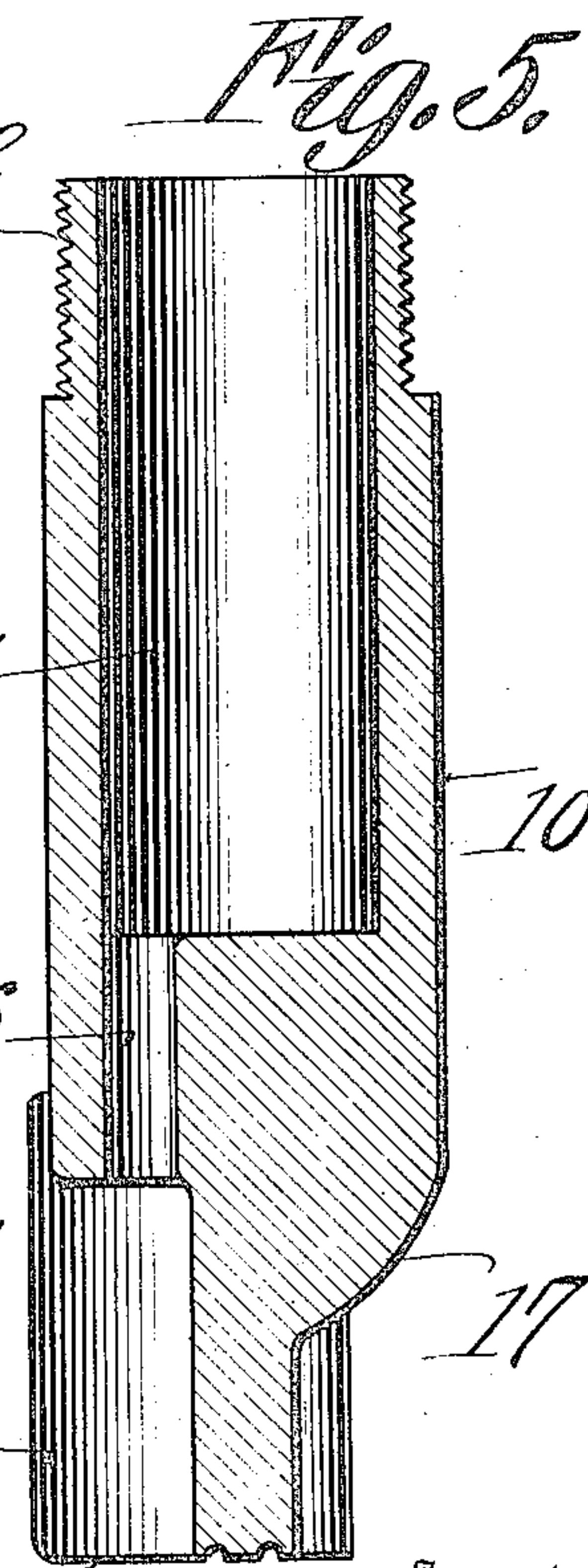
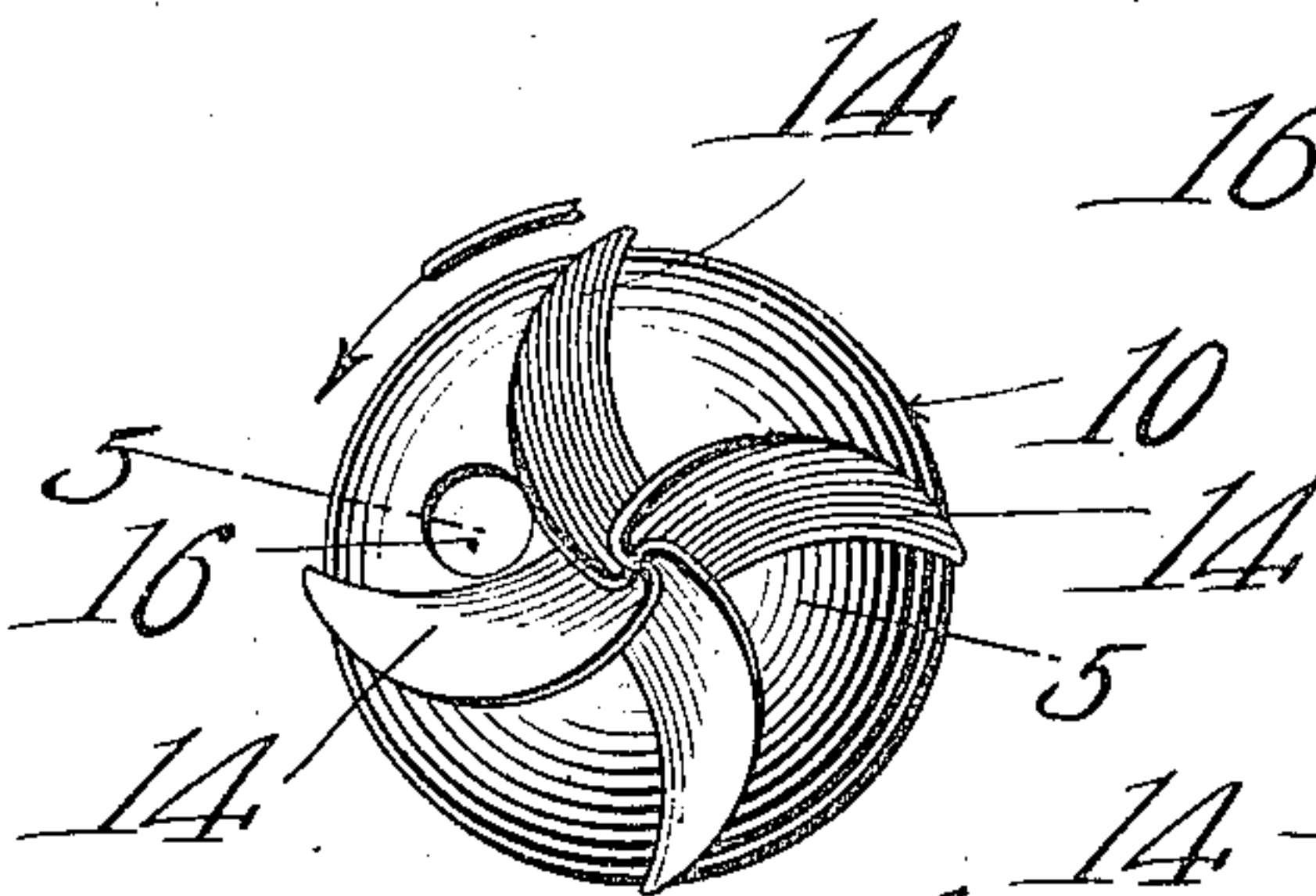
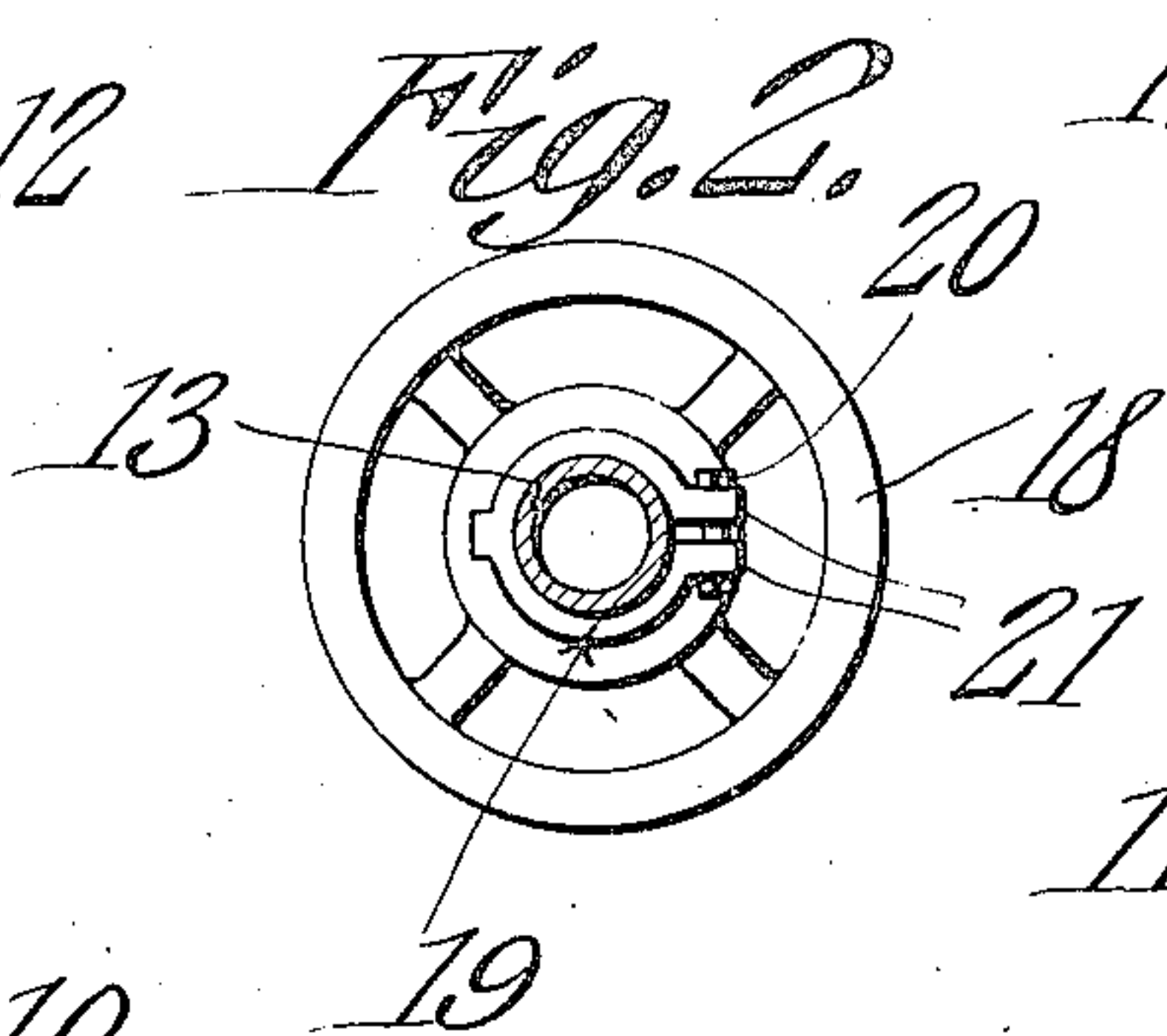
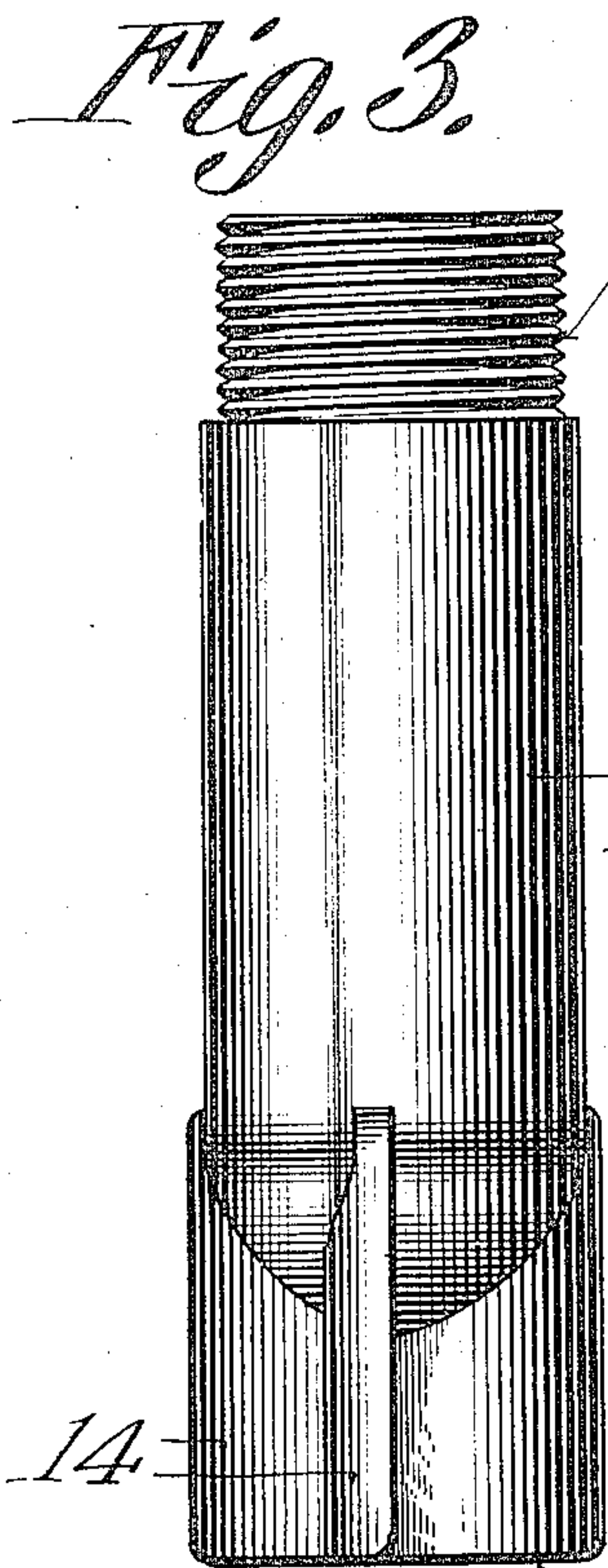
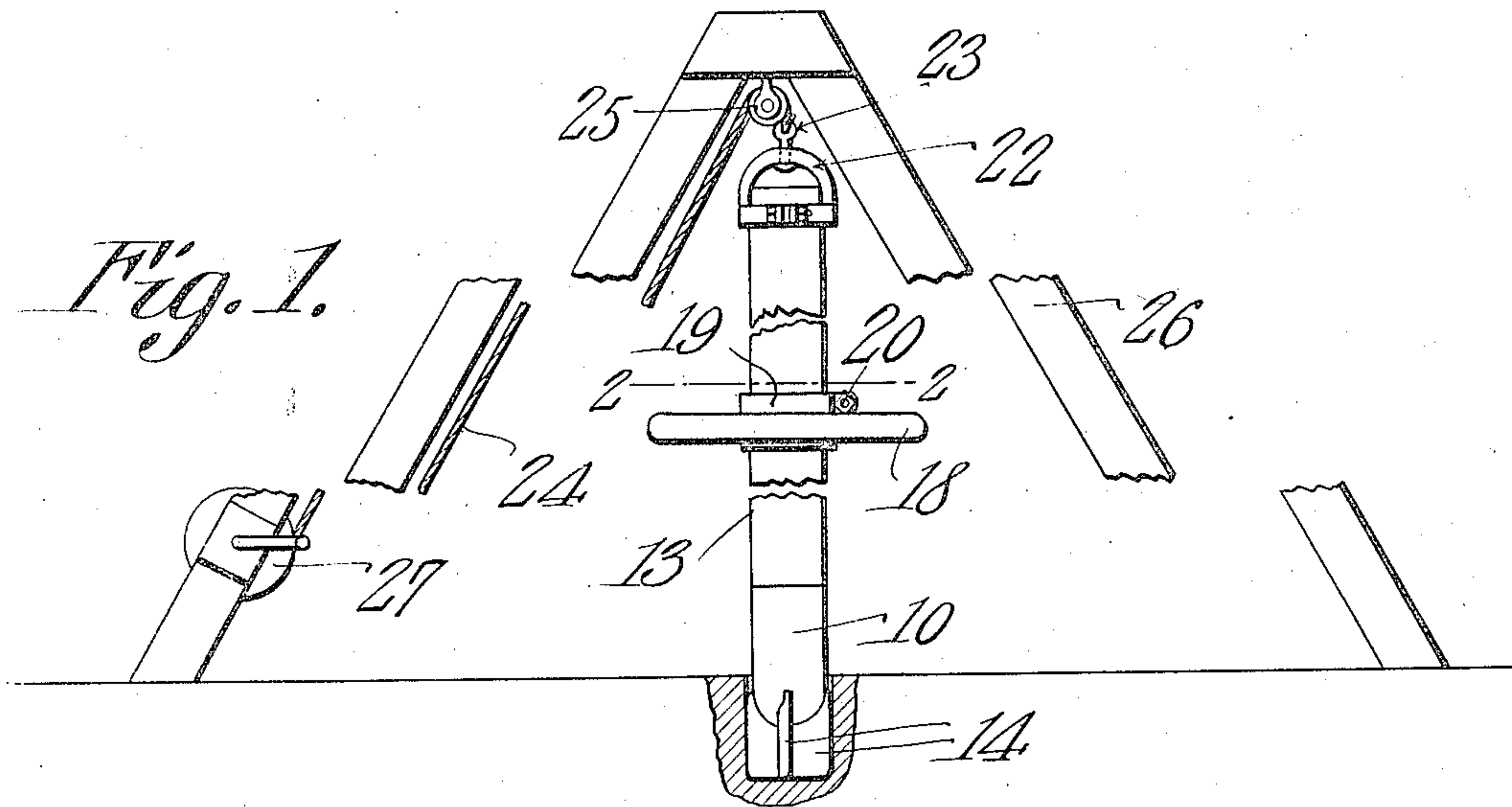


J. D. COPLEN.  
EARTH DRILL.  
APPLICATION FILED OCT. 28, 1909.

975,020.

Patented Nov. 8, 1910.



Witnesses

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# UNITED STATES PATENT OFFICE.

JOHN D. COPLEN, OF GLOBE, ARIZONA TERRITORY.

## EARTH-DRILL.

975,020.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed October 28, 1909. Serial No. 525,108.

*To all whom it may concern:*

Be it known that I, JOHN D. COPLEN, a citizen of the United States, residing at Globe, in the county of Gila and Territory of Arizona, have invented a new and useful Earth-Drill, of which the following is a specification.

This invention has for its object to provide an earth-drill especially adapted for drilling wells for irrigation and other purposes, in certain arid sections of the United States in which the soil possesses certain characteristics which preclude its being bored by an ordinary earth auger or drill; and also to provide a simple, inexpensive and easily operated drill for drilling deep or shallow holes in soil, clay, coal deposits, sand, gravel, shale, sandstone, soapstone, or other soft deposits.

Another object of the invention is to provide a drill which may be used for prospecting purposes.

With the herein stated objects in view, the invention consists in a novel construction and arrangement of parts to be hereinafter described and claimed, reference being had to the drawing hereto annexed in which—

Figure 1 is an elevation of the drill in position for use. Fig. 2 is a transverse section on the line 2—2 of Fig. 1. Fig. 3 is an elevation of the drill bit. Fig. 4 is a bottom plan view of the bit. Fig. 5 is a section on the line 5—5 of Fig. 4.

Referring to the drawing, the drill-bit comprises a cylindrical body 10 which is tubular for a portion of its length, the bore 11 opening through its upper end. This end of the bit also has a portion which is reduced in thickness, and exteriorly screw-threaded as indicated at 12 for connection of an operating rod or stem 13. The lower end of the bit body is made solid, and formed with curved wings 14 radiating from a common center, the latter being the axis of the bit. The tip of the wings project slightly beyond the circumference of the bit body to provide a proper clearance for the bit, and they are brought to an edge, the latter extending parallel to the bit axis. The lower ends of the wings are also brought to an edge, as indicated at 15, said edges lying in a common plane, and joining the vertical edges or tips of the wings by a slight curve.

In the lower end of the bit body is an

opening 16 extending from the bore 11, into the space between two of the wings. The function of this opening will be presently made clear. The lower end of the bit body, between the other wings, is rounded off as indicated at 17 to form a taper.

In operation, the bit is connected to a tubular drill rod or stem 13 which is screwed on the upper screw-threaded end 12. To the drill rod is clamped a hand wheel 18 for rotating the bit. In the hub of the hand wheel is secured by a spline, or otherwise, a split sleeve 19 which encircles the drill rod, and is clamped thereonto by a bolt 20 passing through opposite ears 21 on the split ends of the sleeve. To the upper end of the drill rod is fastened a yoke 22 to which is connected by means of a swivel 23 a hoisting line 24 passing over a pulley 25 suspended from a tripod 26, and wound on a drum 27 carried by the latter. The hoisting line is provided for raising and lowering the drill rod and bit. As the bit descends into the ground, the split sleeve 19 is loosened to readjust the hand wheel 18, and other drill rod sections are added as needed. The bit is rotated in the direction of the arrow displayed in connection with Fig. 4 of the drawing, so that the convex surface of the wings is presented in the direction of rotation. It will be noted that by rotating the bit in this direction, there is no cutting action by the vertical edges or tips of the wings, but that the soil is pressed outwardly from the axis of the drill, and compacted or compressed to form the wall of the drill hole. The lower edges 15 of the wings loosen up the soil by a scraping action, and the soil then passes up into the spaces between the wings, to be forced outwardly by the convex curved surfaces thereof, as well as by the tapered lower ends 15 of the bit body. The opening 16 is provided for supplying water to the drill hole, which is essential in some cases by reason of the characteristics of the soil, the latter by being moistened more readily lending itself to the herein described operation. As the drill rod sections are tubular, water may be poured down the same into the bore of the bit body, from which it finds its way into the drill hole through the opening 16. The drill bit, upon being rotated in the opposite direction, is also adapted for prospecting, the soil or mineral matter passing



into the bore 11 through the opening 16, from which it may be removed by an ordinary sand pump or bailer.

The principal uses for which the drill is adapted are sinking for water, or oil, sampling soils, and for testing the quality and quantity of mineral deposits, and also for drilling post holes, etc. The drill bit operates by compressing the matter displaced by the wings, so that there is nothing to hoist up except samples that may be required, and the compression of the wall of the drill hole renders a better and safer hole and it will be less liable to cave in. The bit settles or lowers by its own weight, it always being rotated in the direction stated, except at the time of taking a sample.

Instead of being manually operated by the hand wheel 18, the drill may be operated by a motor, or by horse-power.

If the drill is used in sinking for water, it may be desirable to leave the bit as well as the tubular drill rods stand, using the latter as a well casing, into which the water flows through the opening 16. The drill hole may also be cased in the ordinary manner.

What is claimed is:

1. In an earth drill, a bit comprising a hollow body having an opening at its lower end, and provided at said end with curved radial wings, the aforesaid opening communicating at one end with the space between said wings, and at the opposite end communicating with the bore of the bit

body, tubular operating rods connected to the bit body, and means for rotating the bit in either direction, rotation of the bit with the convex surface of the wings presented in the direction of rotation compressing the wall of the drill hole, and rotation in the opposite direction forcing the drillings into the bore of the bit through the aforesaid opening.

2. In an earth drill, a bit comprising a hollow body having an opening at its lower end, and provided at said end with curved radial wings, the aforesaid opening communicating at one end with the space between a pair of said wings, and at the opposite end communicating with the bore of the bit body, and the end of the bit body between the other wings being tapered, tubular operating rods connected to the bit body, and means for rotating the bit in either direction, rotation of the bit with the convex surface of the wings presented in the direction of rotation compressing the wall of the drill hole, and rotation in the opposite direction forcing the drillings into the bore of the bit through the aforesaid opening.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN D. COPLEN.

Witnesses:

WILLIAM MILLER,  
C. E. DOYLE.