No. 829,633.

PATENTED AUG. 28, 1906.

H. R. DECKER.

DRILL.

APPLICATION FILED NOV. 11, 1905.

3 SHEETS—SHEET 1.

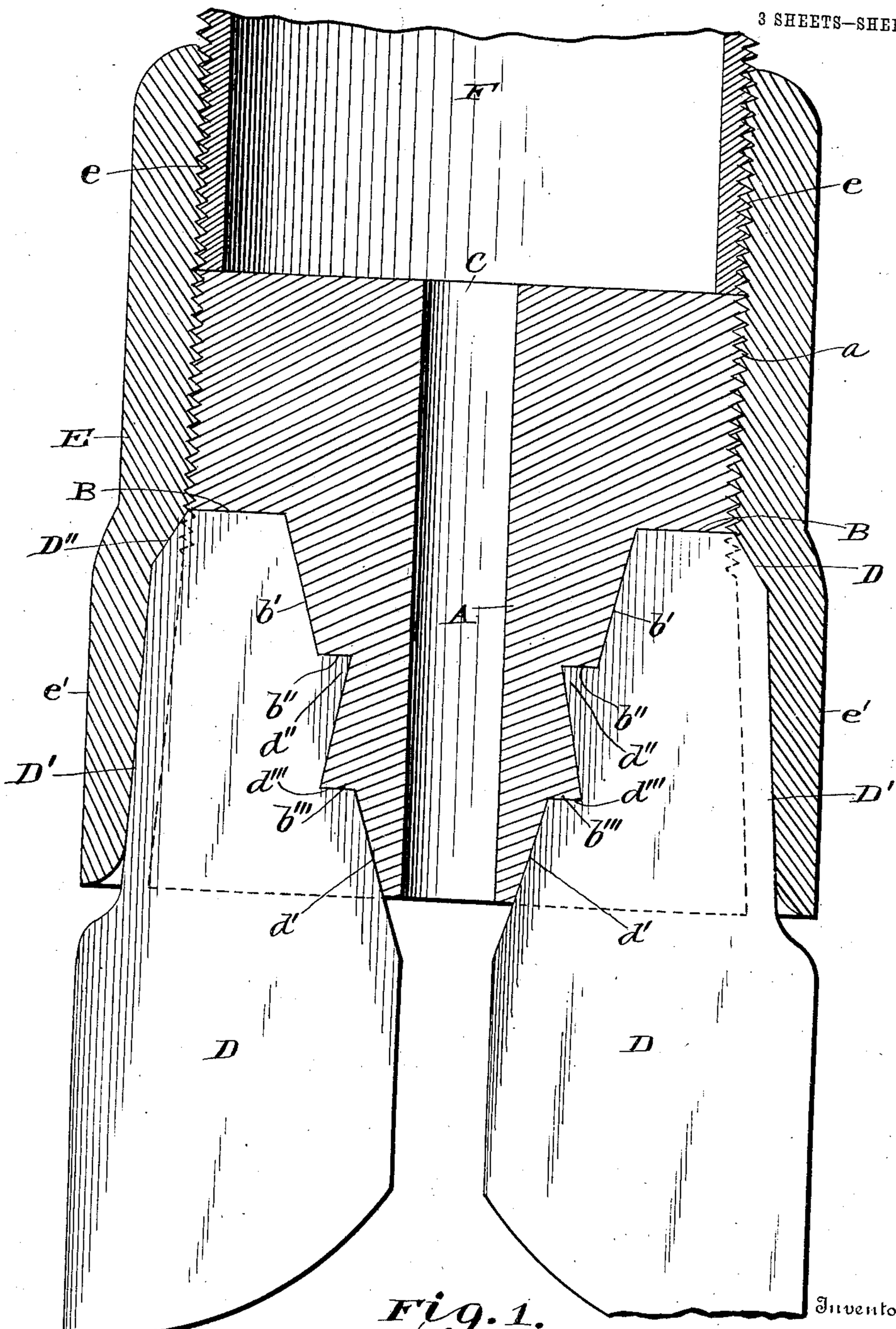

Fig. 1.

Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

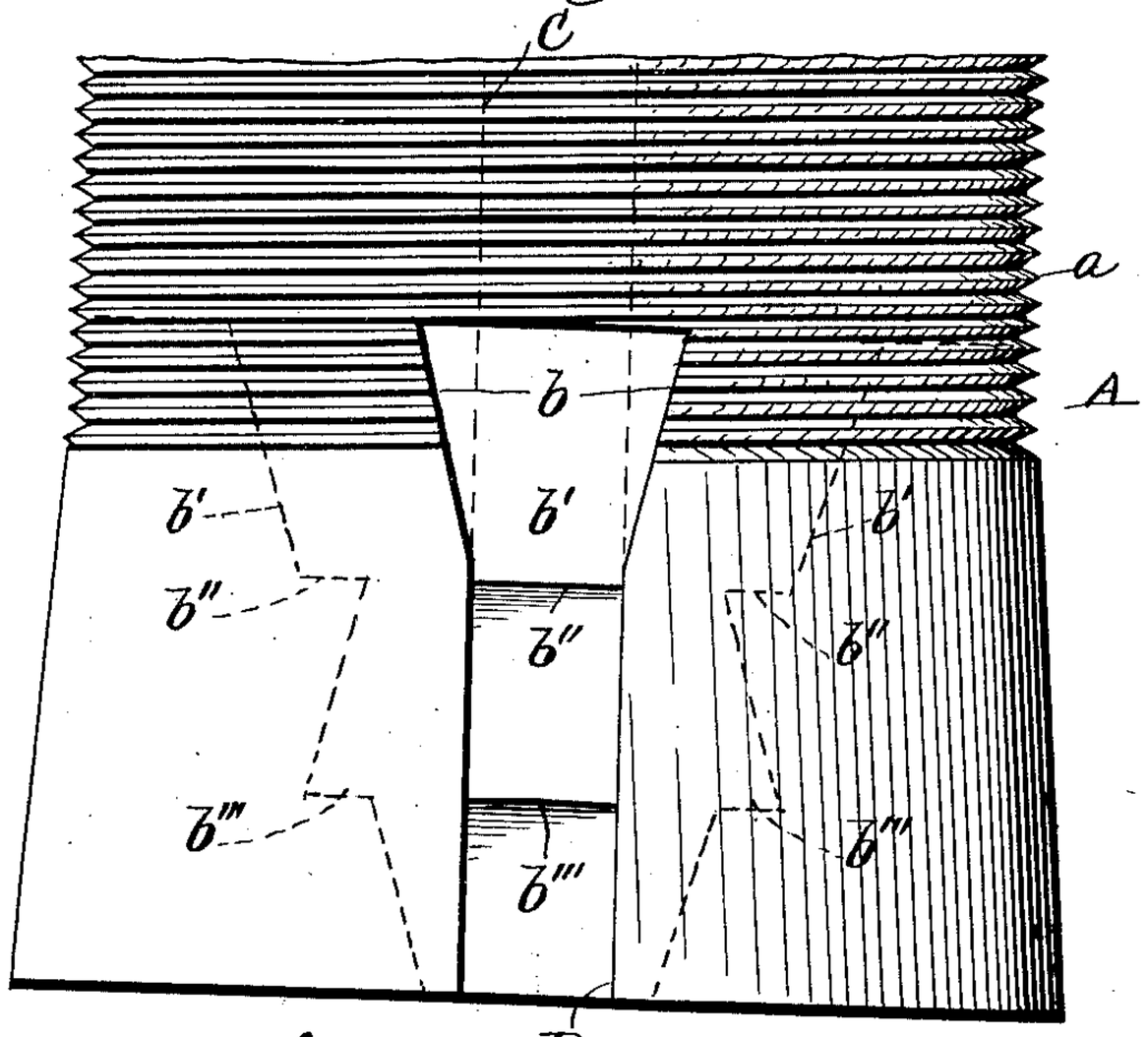


Fig. 3.

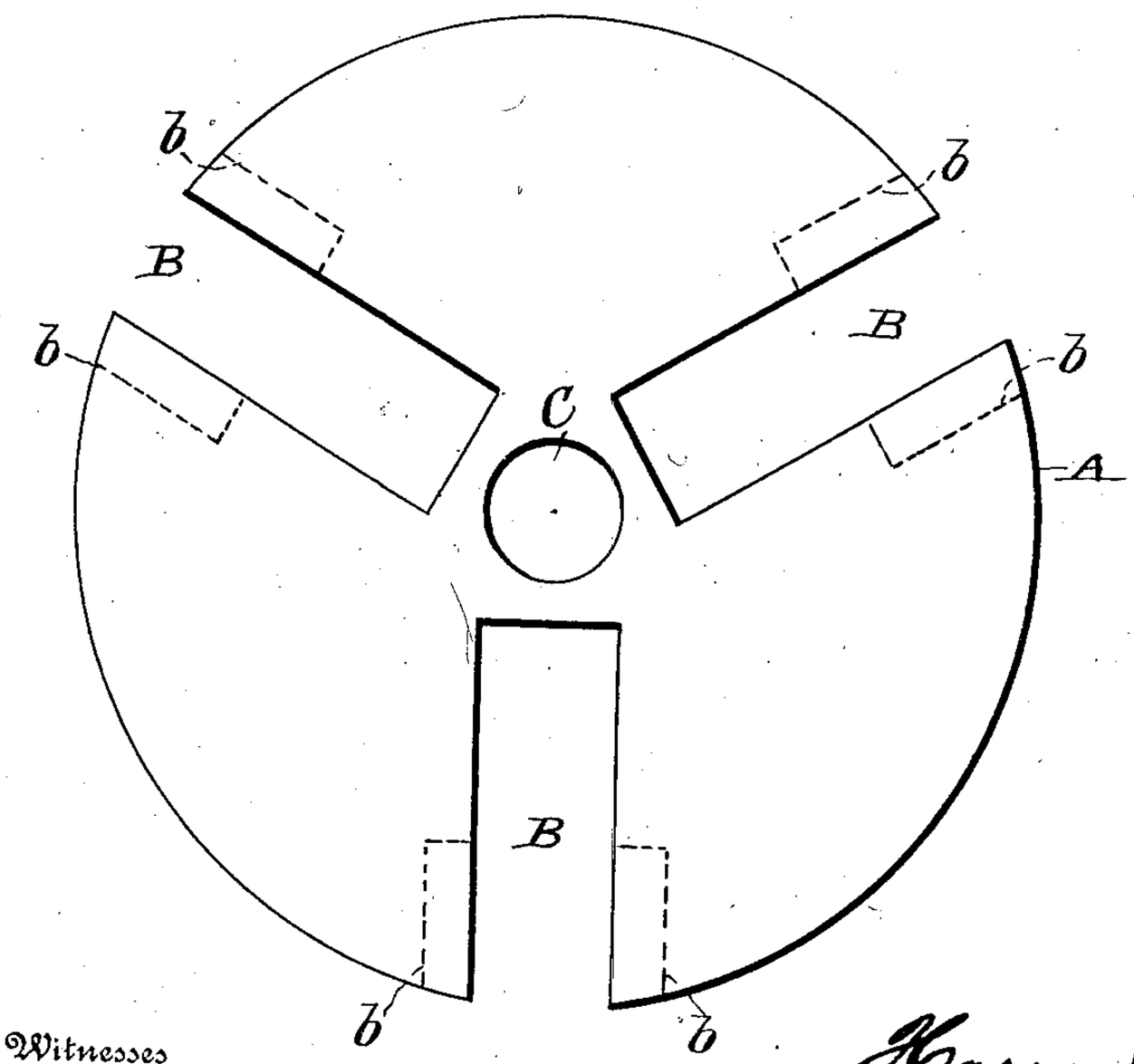
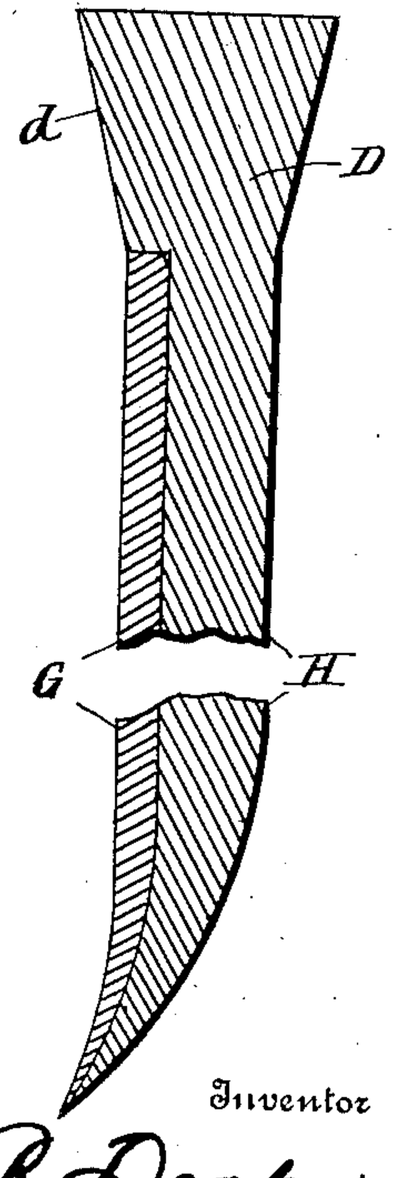


Fig. 4.



Witnesses

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3 SHEETS—SHEET 3.

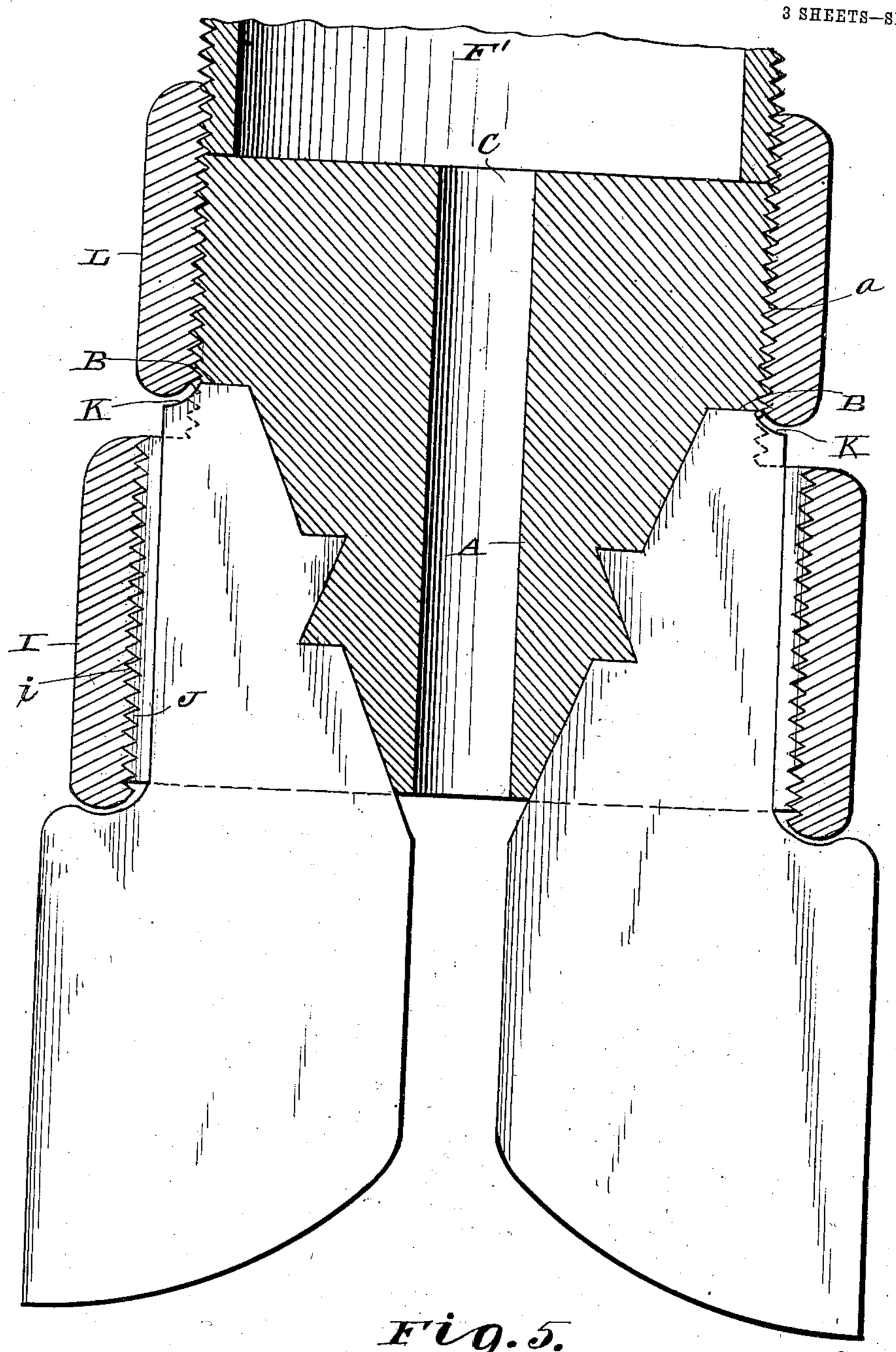

Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

HARRY R. DECKER, OF HOUSTON, TEXAS.

DRILL.

No. 829,633. Specification of Letters Patent. Patented Aug. 28, 1906.

Application filed November 11, 1905. Serial No. 286,918.

To all whom it may concern:

Be it known that I, HARRY R. DECKER, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Drills, of which the following is a specification.

My invention relates to drills for use in drilling Artesian and oil wells.

Heretofore the preferred forms of bits for use in drilling Artesian and oil wells have been either a rotary shoe, a heavy piece of pipe having a serrated edge and a cross blade or blades, or what are known as "fish-tail" bits, because of their shape. The latter are the ones commonly used, because of their effectiveness; but because of the fact that they soon become dulled and have to be removed to be sharpened and as the ordinary fish-tail bit is too large to be effectively tempered the sharpening has to be done so often as to make it a source of great expense. Another disadvantage is that each sharpening shortens the blades, which soon become too short to drill a straight hole, and as a consequence the drill-head is rendered useless and must be discarded.

My invention consists in making the drill head and bits separable, so that the bits may be tempered, if desired; but in its complete form my invention contemplates the construction of a bit of two metals of unequal hardness, so that the softer metal wearing faster than the harder part automatically sharpens the cutting edge and makes it unnecessary to remove the drill-bit to sharpen it.

My invention also includes improvements by which the bits are automatically kept tightly secured in the drill-head, so that it is not necessary to remove the drill-rod to tighten up the blades.

The construction of my invention will be described in detail hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of my improved drill-head with the drill-blades in position and showing my improved device for tightening the bits in the head. Fig. 2 is a side view in elevation of the drill-head; Fig. 3, a bottom plan view; Fig. 4, a view in cross-section of one of the bits, and Fig. 5 a sectional view of a modification of my invention.

In the drawings similar reference characters indicate corresponding parts throughout the several views.

A represents my improved form of drill-head, having a reduced screw-threaded upper portion *a* and its lower portion formed with a plurality of radial slots B, having their upper end formed wedge-shaped, as shown at *b*, and their inner surface *b'* formed with an angular depression *b''* and a correspondingly-shaped projection *b'''*. The center of the head A has a bore C therethrough for the passage of water.

The drill-bits D have their upper ends shaped to fit the slots B, having a wedge-shaped portion *d* to fit the wedge-shaped portion *b* of said recess, and the edge *d'* formed with a projection *d''* to fit into angular depression *b''*, and a depression *d'''* to receive projection *b'''*, the surfaces from *b''* to *b'''* and from *d''* to *d'''* forming correspondingly-beveled surfaces, as shown, which when the outer edge D' of the bit-blade is pressed inwardly forms a wedge-lock, together with the wedge-shaped portions *b* and *d*, that securely holds the bit in place. The outer edge D' is tapered upwardly, as shown, and has a beveled shoulder D'' at its upper end.

E represents the coupling-ring, having its upper end *e* interiorly threaded to receive the threaded portion *a* of the drill-head and the end of the tubular drill-rod F. The lower end is formed with a bell-shaped portion *e'* to fit the tapered edges D' and shoulders D'' of bits D. By this construction the constant tendency of the coupling is to turn in the direction of the threads on the drill-head, which is also the direction of the rotation of the drill-rod F, so that any loosening of the bits is immediately counteracted, the pressure on the tapered portion D' being inward, so as to form with the beveled surfaces from *b''* to *b'''* and *d''* to *d'''* a wedge-lock, and the pressure on the shoulder D'' driving the wedge portions *d* into the wedge-recesses *b*.

As shown in Fig. 4, the bit is formed of two layers of metal of unequal hardness, G being a plate of steel and H iron or other metal softer than steel, the two being joined together by riveting, fusing, or in any other desired manner. It will be understood from this construction that as the softer metal part H will wear more rapidly than the steel plate G the blade always retains a cutting edge.

In Fig. 5 is shown a modification of my improved drill-bit in which instead of the bell-shaped lower portion *e'* of the coupling E to clamp the bits a ring I is provided, having

left hand interior screw-threads *i*, while the surface of the drill-head is provided with threads J to engage the threads *i*. The upper end of the bit is also provided with a shoulder K, which is adapted to be engaged by the threaded coupling-ring L and pressed downwardly as the drill rotates. It will be understood from this construction that as the drill-rod F′ rotates the tendency is to force the coupling-ring L downward, and its lower edge bearing against the shoulder K the bit is always forced downwardly and any loosening thereof counteracted. At the same time the outer surface of the ring I contacting with the sides of the boring is also driven downward, throwing the lower end of the bit D inwardly and clamping it more tightly.

Having thus described my invention, what I claim is—

1. In a drill, a head having a number of radial slots, bits formed to fit into said slots, a drill-rod and a coupling-ring to connect said drill rod and head, said coupling-ring being provided with means to hold the drill-bits in the head, substantially as shown and described.

2. In a drill, a head having its upper end screw-threaded and its lower portion provided with a number of radial slots extending to its outer surface, bits formed to fit into said slots, a drill-rod, a coupling-ring to fit the threaded portion of said head and secure the drill-rod thereto, and a bell-shaped portion integral with said coupling-ring to engage the outer edges of the drill-bits, substantially as shown and described.

3. In a drill, a head having a number of radial slots with enlarged wedge-shaped portions, bits formed to fit into said slots, a drill-rod, and a coupling-ring to secure said rod and head together and provided with means to hold said bits in position in the head, substantially as shown and described.

4. In a drill, a head having its upper end screw-threaded and its lower portion provided with a number of radial slots extending to its outer surface and formed with enlarged wedge-shaped portions, bits shaped to fit into said slots, a drill-rod having its lower end screw-threaded, a threaded coupling-ring to fit the threads on said head and rod, and a bell-shaped portion integral with said coupling-ring to engage the outer edges of the drill-bits, substantially as shown and described.

5. In a drill, a head having a number of radial slots with downwardly-beveled interior walls having angular depressions and projections therein joined by a surface beveled oppositely to the bevel of the inner walls, bits shaped to fit in said slots, and means to secure the bits therein, substantially as shown and described.

6. In a drill, a head having a threaded portion and a plurality of radial slots having enlarged wedge-shaped portions, bits shaped to fit into said slots and having a beveled shoulder on its outer edge, and a coupling-ring to engage said threaded portion and having a beveled portion to fit said beveled shoulder, substantially as shown and described.

7. In a drill, a head comprising a threaded portion and a plurality of radial slots having downwardly-beveled interior walls provided with angular depressions and projections joined by a surface beveled oppositely to the bevel of the inner walls, bits shaped to fit in said slots having their outer edges beveled, and a coupling-ring to engage said threaded portion and having a bell-shaped portion to engage the edges of the bits, substantially as shown and described.

8. In a drill, a head comprising a threaded portion and a plurality of radial slots having enlarged wedge-shaped portions and downwardly-beveled interior walls provided with angular depressions and projections joined by a surface beveled oppositely to the bevel of the inner walls, bits shaped to fit in said slots having their outer surface beveled and formed with a beveled shoulder, and a coupling-ring to engage said threaded portion and having a bell-shaped portion to engage the outer edges of the bits, substantially as shown and described.

In testimony whereof I hereto affix my signature in the presence of two witnesses.

HARRY R. DECKER.

Witnesses:
J. R. MORSE,
WM. CLARK.