

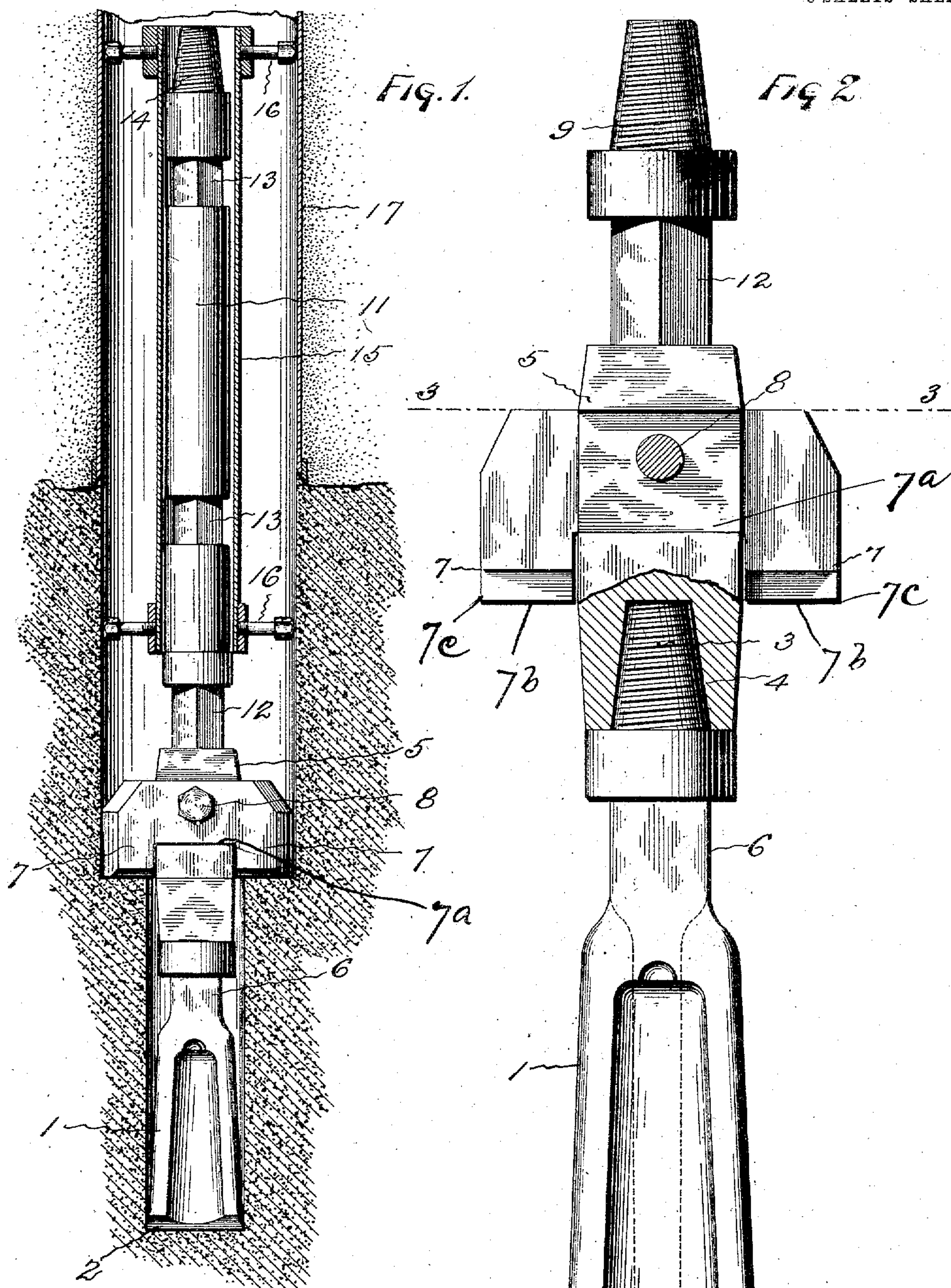
No. 886,704.

PATENTED MAY 5, 1908.

H. B. KING.
WELL DRILL.

APPLICATION FILED OCT. 13, 1906.

3 SHEETS—SHEET 1



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Fig. 3.

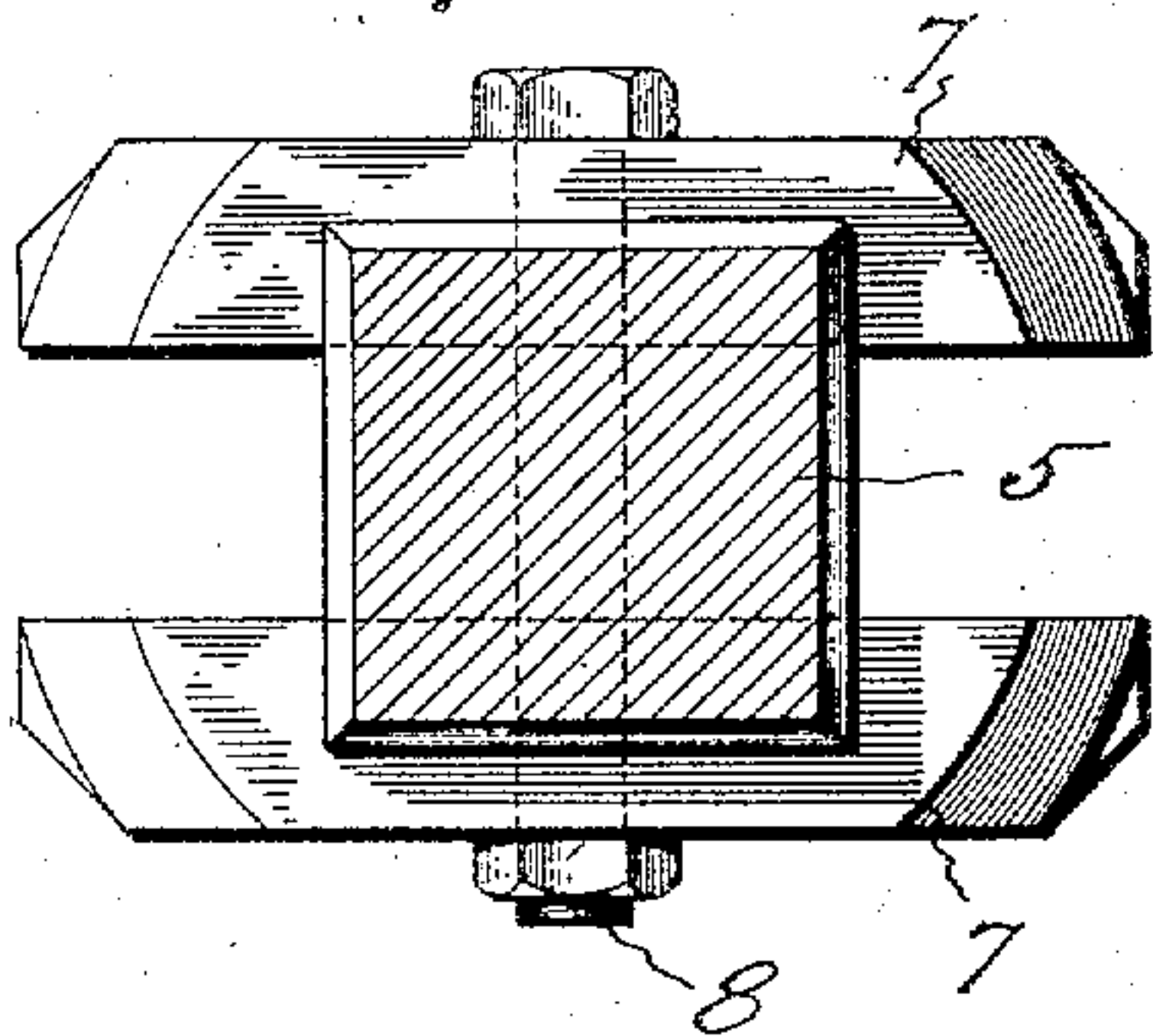
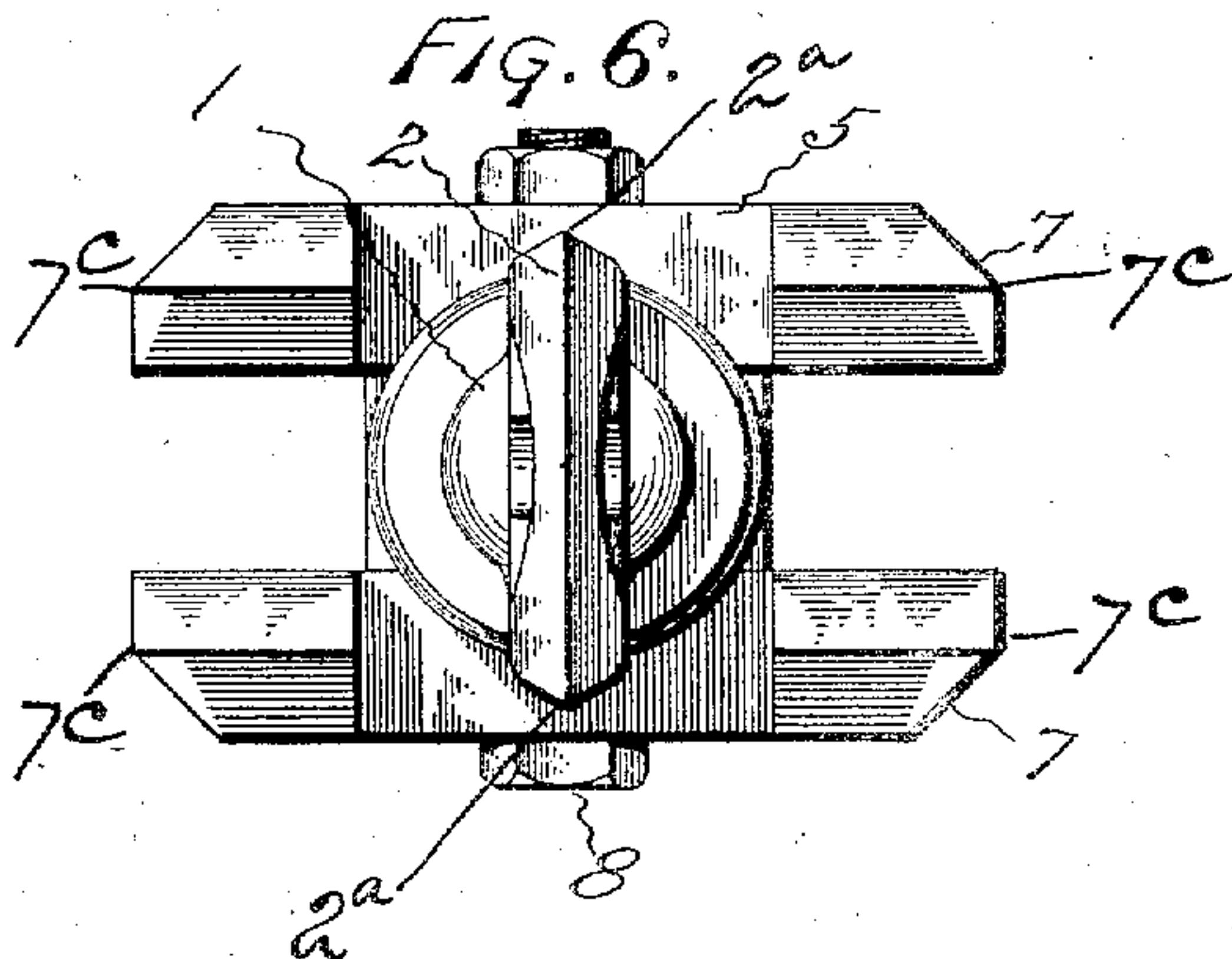
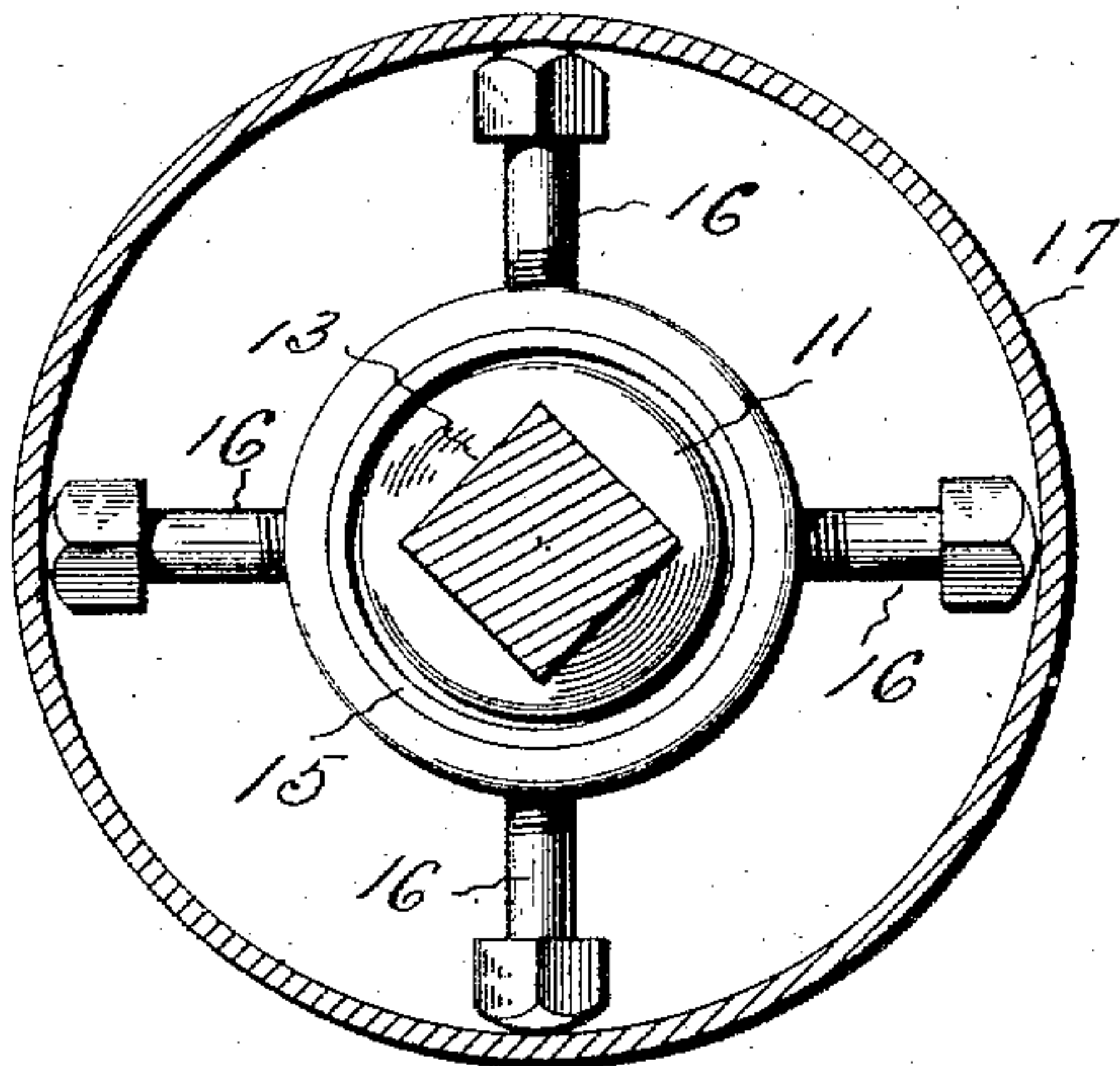


Fig. 5.

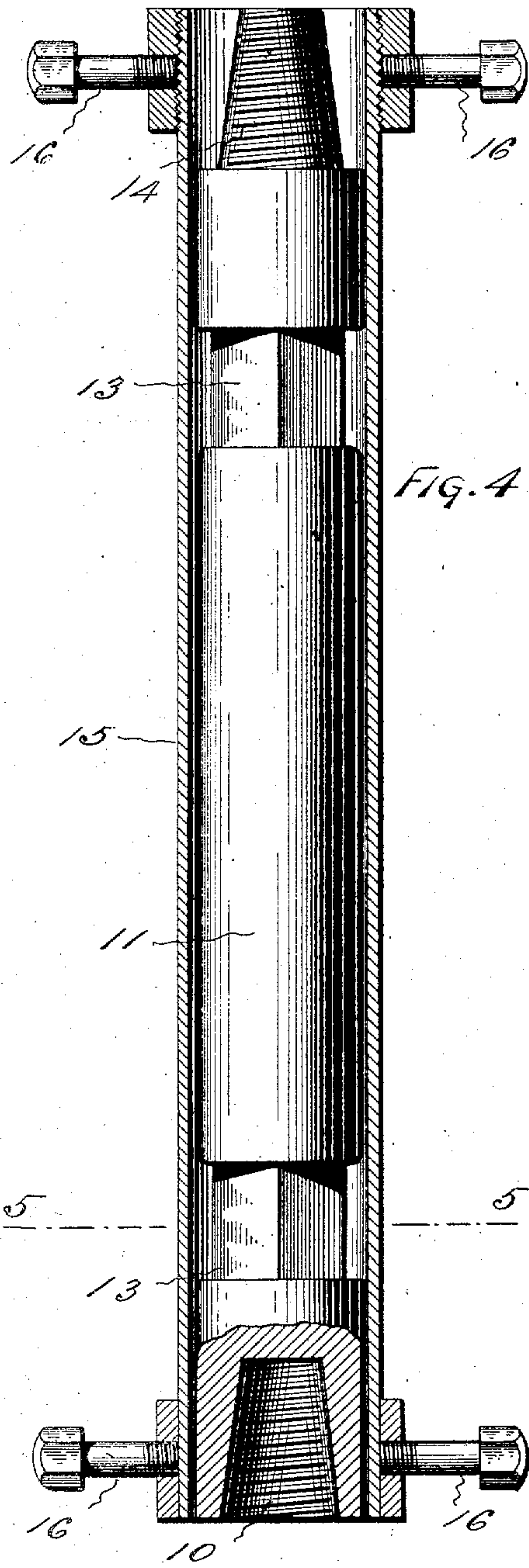


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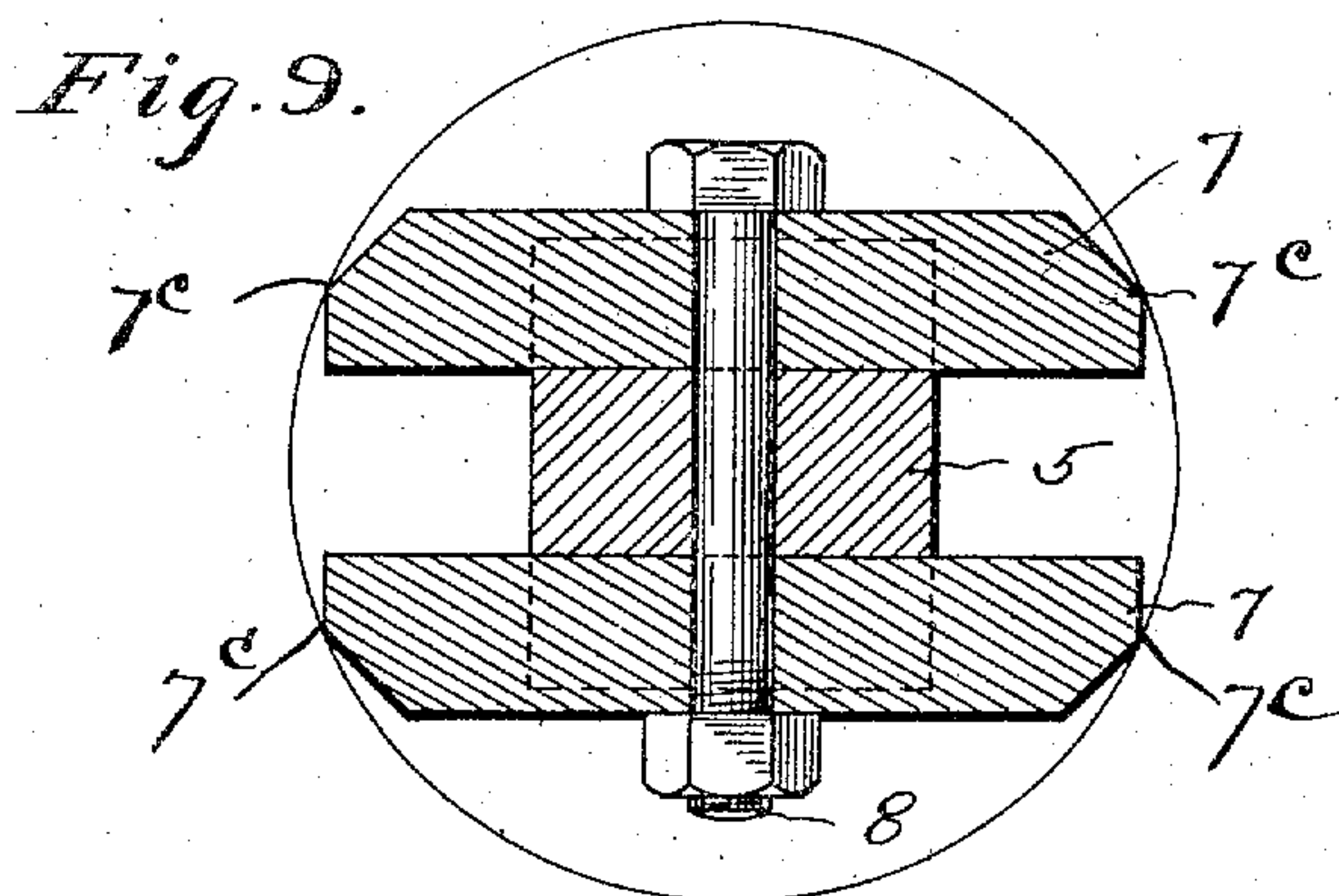
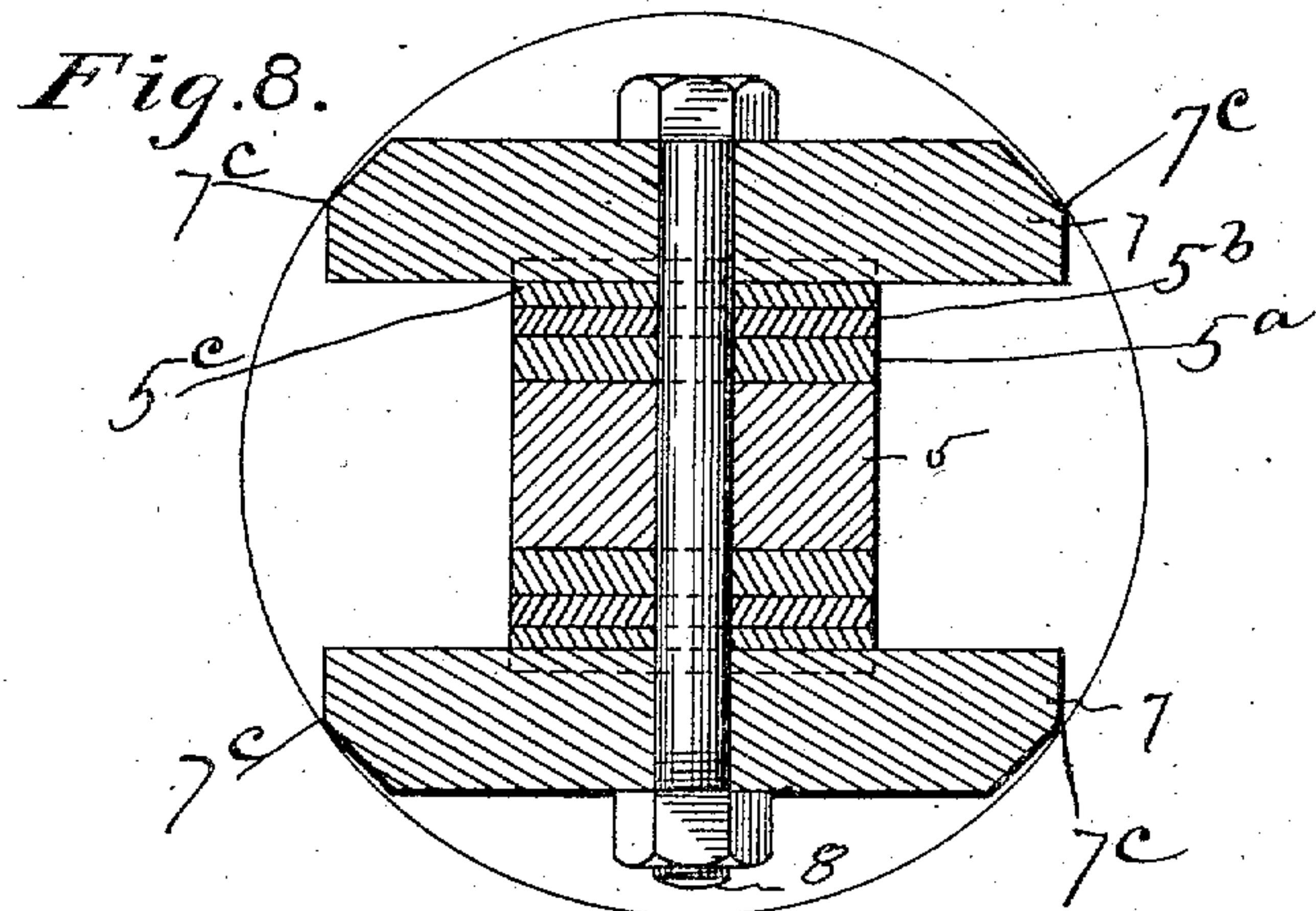
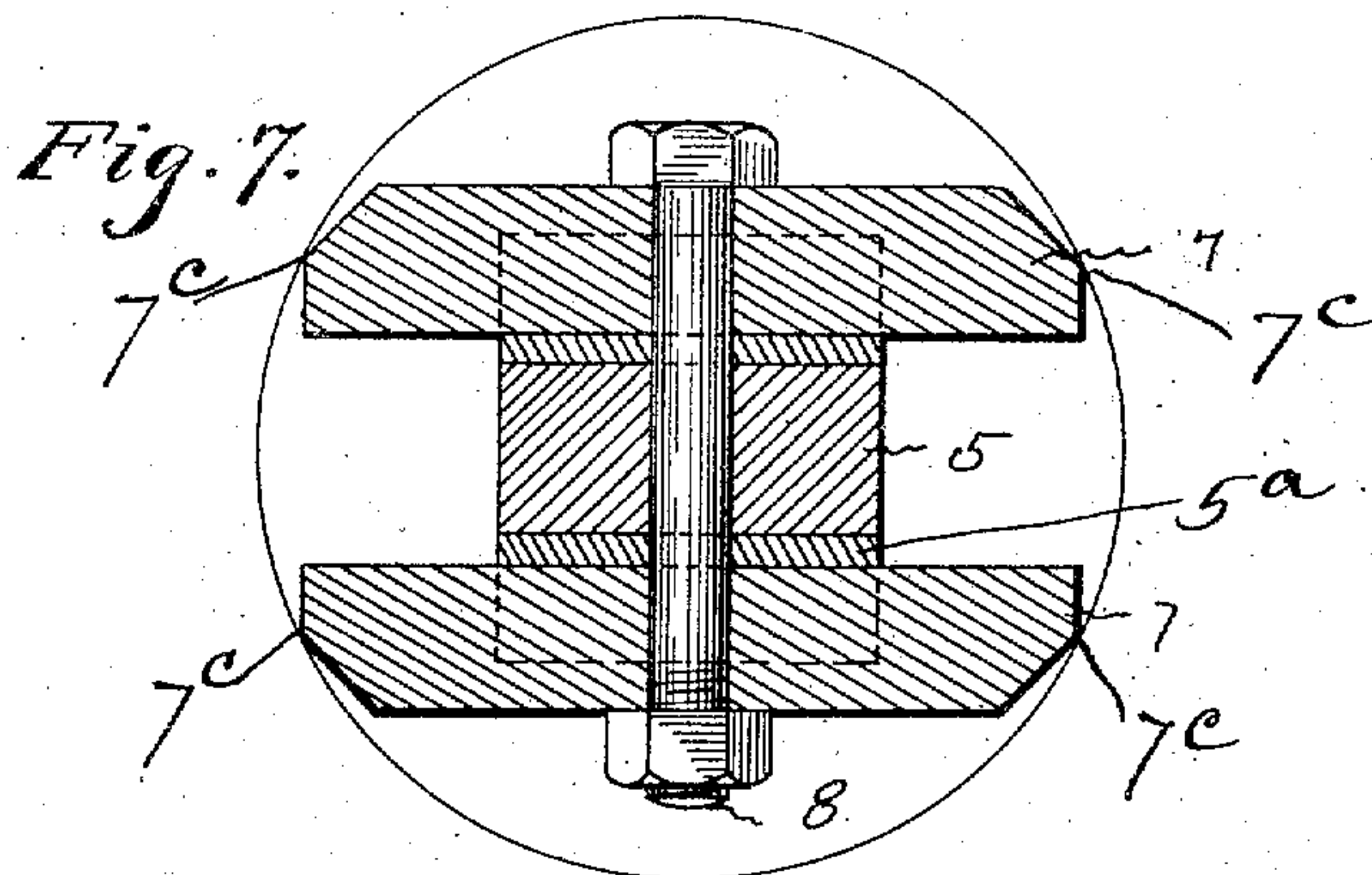
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HARVEY B. KING, OF HARTFORD, CONNECTICUT, ASSIGNOR TO FRANK J. KNOX, OF HARTFORD, CONNECTICUT.

WELL-DRILL.

No. 886,704.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed October 13, 1906. Serial No. 338,747.

To all whom it may concern:

Be it known that I, HARVEY B. KING, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Well-Drill, of which the following is a specification.

This invention relates to a tool which is employed for sinking well holes and while it is useful for drilling ordinary Artesian wells through any formation of sand, clay, gravel, or rock, for water, oil, gas, or minerals, which holes are of comparatively small diameter, it is more particularly designed for drilling holes for plunger elevators and the like through solid rock, which holes are much larger and sometimes quite deep and which must be uniform in diameter and perfectly straight and vertical.

The object of the invention is to provide a tool for drilling comparatively large holes in solid rock which is cheap to construct, easy to handle, repair and sharpen, and readily kept to gage and in the proper condition to accomplish efficient work, and which will bore the desired hole to exact size, round, straight and vertical, in a relatively short time. This tool has a drill of comparatively small size at the lower end that forms an advance central cut of ordinary area in the usual manner, and drills a little distance up from the lower end that project laterally and cut beyond the sides of the central advance cut and greatly increase the area of the hole, and that at the same time guide the tool so the drills cannot glance off from specially hard places into softer medium and crook the hole or cause a deviation from plumb, which upper drills are substantially supported so that as they wear away they may be easily adjusted to keep the size of the hole accurate, or may be set to vary the size of the hole, without being reformed and sharpened. To further prevent the string of tools from swaying and running out of true in the hole and thus causing the drills to deviate, a sleeve provided with means for holding it centrally in the hole is arranged about the stem. The internal diameter of this sleeve is of such size that the tools are free to be reciprocated vertically to accomplish the drilling but cannot move any way but vertically and centrally.

Figure 1 of the accompanying drawings shows a portion of a string of well drilling

tools that embody this invention. Fig. 2 shows on larger scale a side elevation with parts in section of the advance and following drills. Fig. 3 shows a horizontal section taken on the plane indicated by the line 3—3 on Fig. 2. Fig. 4 shows a sectional view of the guiding sleeve and stem of the string. Fig. 5 shows a horizontal section taken on the plane indicated by the line 5—5 on Fig. 4. Fig. 6 is a view looking up at the drills. Fig. 7 is a horizontal section showing the following drills arranged to cut a hole of one diameter. Fig. 8 shows the same arranged to cut a hole of greater diameter, and Fig. 9 shows the same arranged to cut a hole of less diameter.

The advance drill 1 which is formed of the usual steel has its lower cutting edge 2 shaped as common with rock drills and provided with cutting corners 2^a. It also has the ordinary tapering threaded shank 3 which is screwed into the tapering threaded socket 4 in the lower end of the drill holder 5, and preferably has a squared section 6 for the application of the wrench by means of which it is screwed and unscrewed.

The drill holder has a mortise 7^a, see Fig. 2, on each side for receiving the following drills 7 which have a cutting edge on the lower side near each end. These drills are formed of suitable steel and are desirably held in place in the mortises 7^a in the sides of the holder by a bolt 8. The holder has a tapering threaded shank 9 which is adapted to be screwed into the tapering threaded socket 10 in the lower end of the stem 11 and preferably has a squared section 12 for the application of a wrench.

As an example, it may be stated that the advance drill may be shaped to cut a central 6-inch hole, and the following drills may be of such size that they will cut an 18-inch hole. In drilling rock the cutting edges 7^b and corners 7^c of these drills rapidly wear away. If the following drills wear on the ends and are not dull enough to really require sharpening they may be set out a little on the roller by placing washers 5^a, 5^b, and 5^c back of them (Fig. 8) so that the size of the hole will remain to gage and not gradually become smaller in diameter. Or, if it is desired, the following drills may be set further in (Fig. 9) so that the hole will be smaller in diameter.

The stem is of the usual diameter and

length and has the common squared sections 13 for the application of a wrench and a tapered shank 14 for connection with the usual drill jar or rope clamp. This string of tools is reciprocated and rotated by the ordinary apparatus for the purpose of causing the drills to chip the rock.

The advance drill may be arranged so that its greatest width will extend in a plane transversely to the planes of the following drills as shown in Fig. 6, so that the following drills will tend to keep the advance drill central and in perfect alinement and the advance drill will tend to hold the following drills in correct position to produce a straight vertical hole.

To further assist in keeping the bore straight and plumb a sleeve 15 is arranged about the small drill stem. The interior diameter of this sleeve loosely fits the stem so that the stem will reciprocate up and down freely but cannot wobble or tip from side to side in the hole which has been cut. Studs 16 extend outwardly from opposite sides of the sleeve so as to keep the sleeve central in the tube 17 which is dropped down through the earth of the boring or central in the hole which is drilled in the rock as the case may be. This sleeve does not clog the opening and it is lowered into or removed from place by an ordinary rope wire or chain and does not interfere with the movement up and down of the tool.

This tool cuts very rapidly for the advance drill does its work in the usual way and the following drills which only have to increase the size of the cut chip away the rock very rapidly. There are six corners as clearly shown in Fig. 6, the four cutting corners 7^c of the drills 7 and the two cutting corners 2^a of the drill 1, these cutting the circle instead of two as in the ordinary drill, insuring faster cutting and an absolutely round hole. This construction permits the use of a small advance drill which is easily repaired or re-gaged and sharpened by any blacksmith. And, the following drills which make the hole large are comparatively light and can be quickly removed and easily repaired, reset and sharpened by any blacksmith.

This tool obviates the employment of a single large drill which cuts a full size hole and which is very heavy to handle and transport when it is desired to reset and sharpen it, a task which cannot be accomplished by every blacksmith on account of its size and weight.

Holes bored by these tools are very accurate for the drills guide each other; they

are sunk very rapidly, and they are perfectly plumb and straight.

The invention claimed is:

1. A well drilling tool, having a drill holder, a centrally advanced drill removably fixed to the holder and a plurality of following drills, each of which is provided with oppositely disposed cutting edges, means for removably securing said following drills to the holder, said following drills being so disposed relative to the advanced drill, as to cut back of and beyond the area of the hole made by said advanced drill.

2. A well drilling tool having a drill holder, a centrally advanced drill removably fixed to the holder, a pair of following drills arranged on opposite sides of the drill holder, each of which is provided with oppositely disposed cutting edges, and means for removably securing said following drills to the holder, said following drills being so disposed relative to the advanced drill, as to cut back of and beyond the area of the hole made by said advanced drill.

3. A well drilling tool having a drill holder, a central advance drill removably fixed to the holder and a pair of plates removably fixed to the sides of the holder above the advance drill, each plate having two cutting edges on its lower side that extend outwardly and are arranged to cut back of and beyond the area of the opening formed by the advance drill, substantially as specified.

4. A well drilling tool having a drill holder, a central advance drill removably fixed to the holder and a plurality of following drills removably fixed to the sides of the holder, each of said following drills being provided with oppositely disposed cutting edges that cut beyond the area of the hole made by the advance drill, the advance drill having its cutting edge extending in a plane transversely to the planes of the cutting edges of following drills, substantially as specified.

5. A well drilling tool having a drill holder, a central advance drill, removably fixed to the holder, a plurality of following drills removably fixed to the sides of the holder, each of said following drills being provided with oppositely disposed cutting edges that cut beyond the area of the hole made by the advance drill, a stem, and a sleeve loosely surrounding the stem and holding it true and central in the hole formed by the drills, substantially as specified.

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Witnesses:

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ETHEL M. LOWE.