

(No Model.)

O. TERP.

COMPOSITION FOR BORING OR DRILLING TOOLS.

No. 515,698.

Patented Feb. 27, 1894.

FIG. 1.

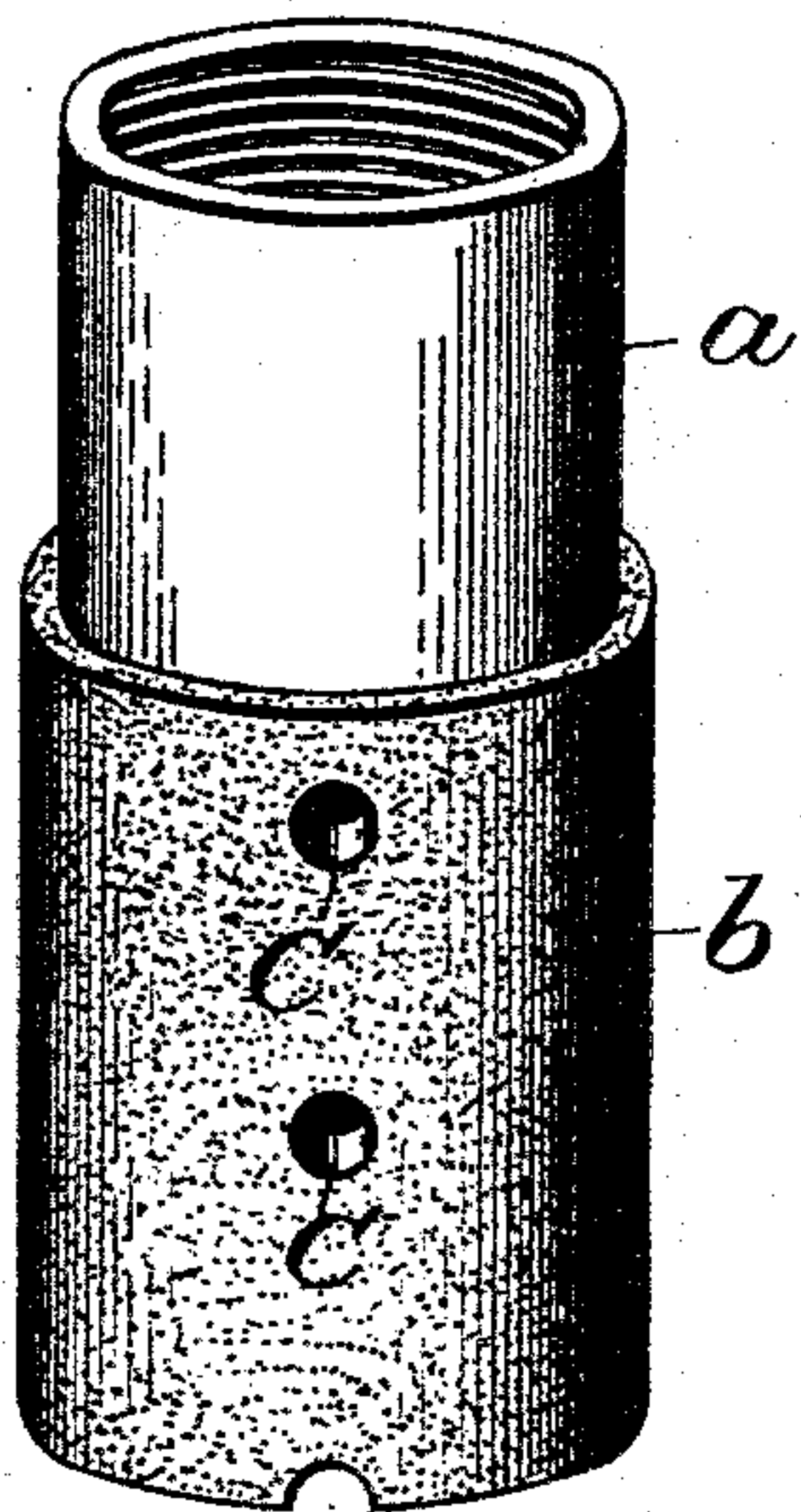


FIG. 2.

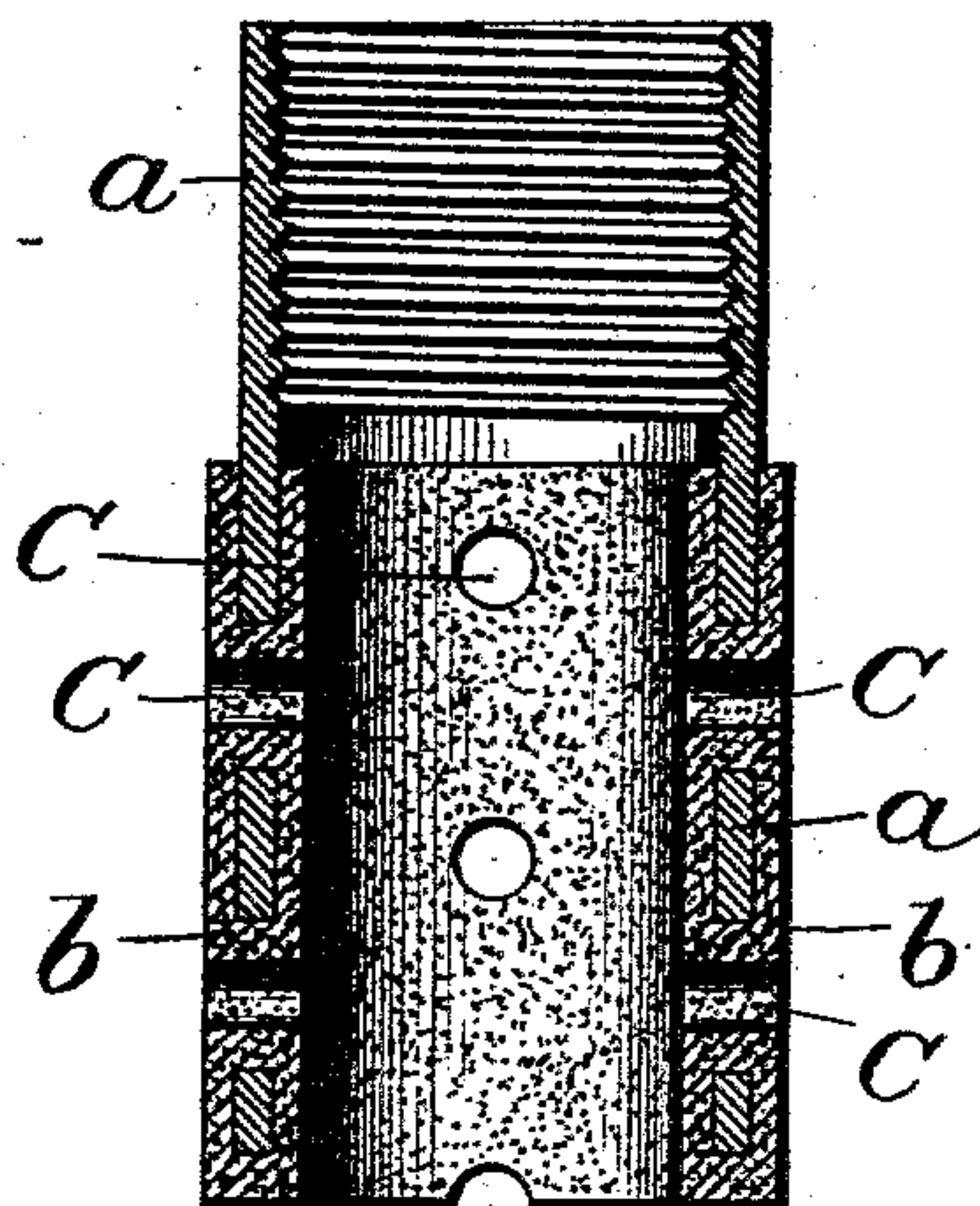


FIG. 3.

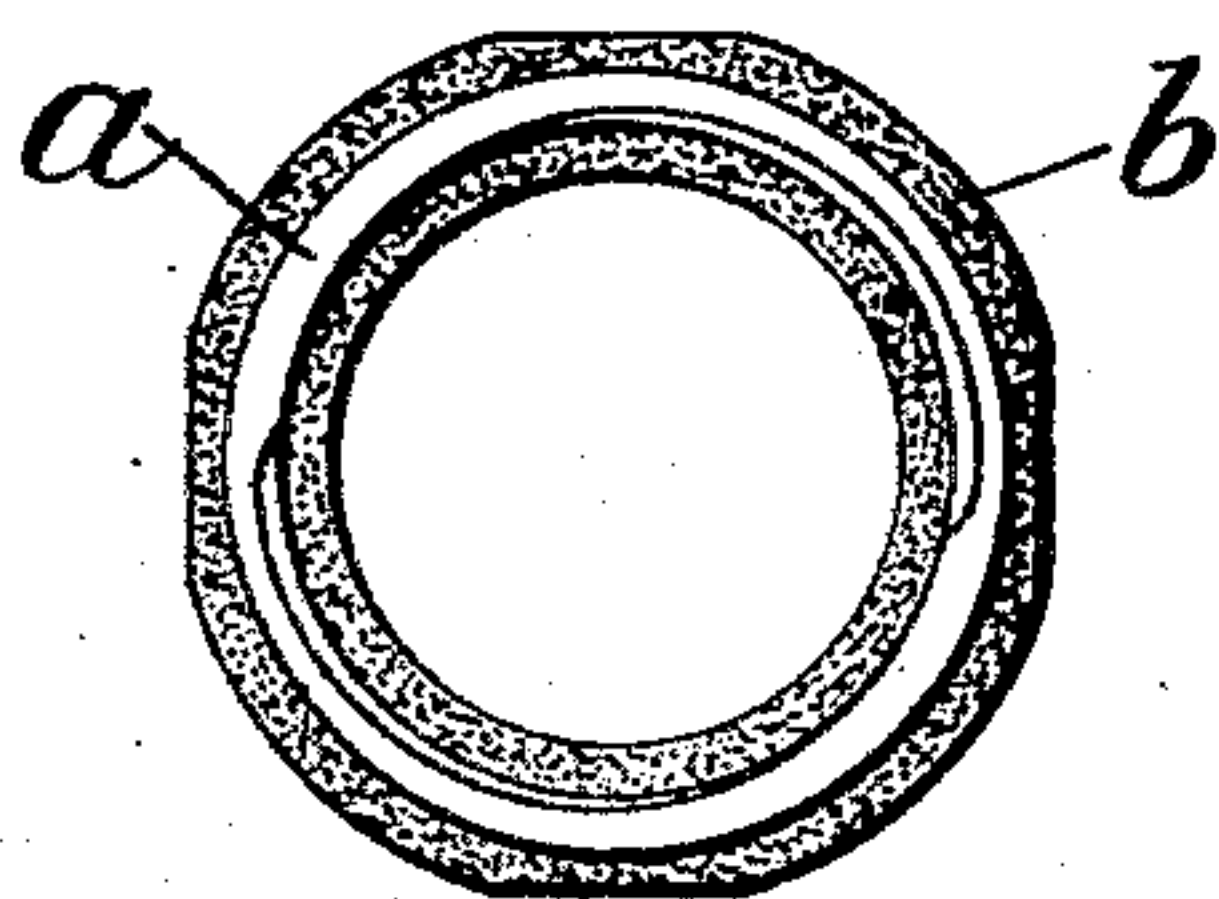
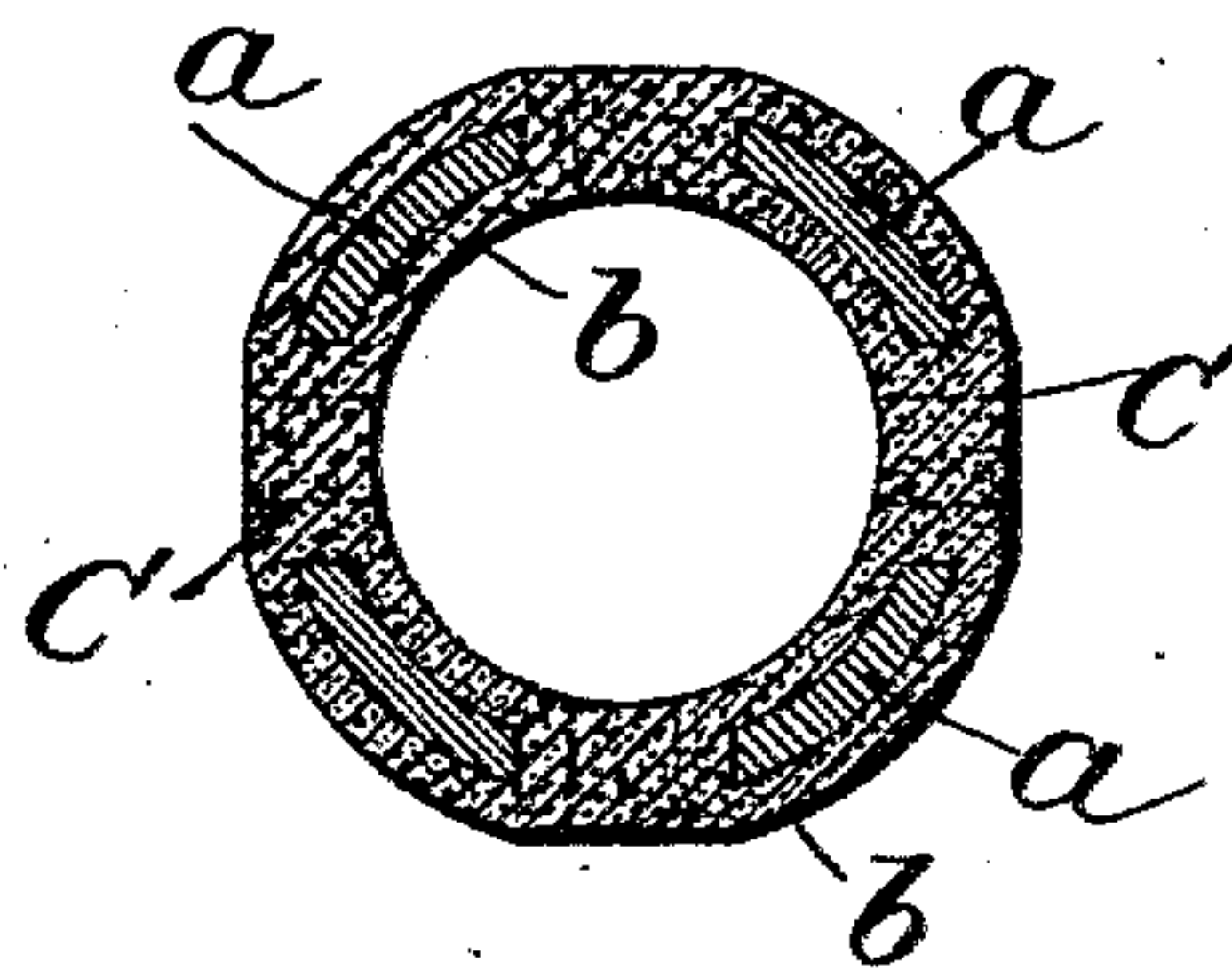


FIG. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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COMPOSITION FOR BORING OR DRILLING TOOLS.

SPECIFICATION forming part of Letters Patent No. 515,698, dated February 27, 1894.

Application filed February 17, 1893. Serial No. 462,785. (No specimens.)

To all whom it may concern:

Be it known that I, OLAF TERP, engineer, a subject of the King of Denmark, residing at London, in the county of Middlesex, England, have invented certain new and useful Improvements in Composition for Boring or Drilling Tools; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

For boring holes in hard rocks, for blasting or tunneling, it has heretofore been customary to use diamond drills. The hardness of diamond being taken at 10, the relative hardness of corundum or the best Naxos emery, is about 9, while that of the different hard rocks which it is ordinarily required to drill is considerably less, so that such emery forms the best material to use instead of diamond, where the cost of the latter is too great. It is however necessary that the emery should be used in small pieces or grains, and the difficulty of attaching such grains sufficiently firmly to an ordinary boring bar or tool, has formed a great obstacle to its use for the required purpose.

The drilling or cutting tool is claimed in my application filed September 12, 1893, Serial No. 485,334, and the present invention relates to the composition of a novel cement which I use for the purpose of carrying the emery, by means of which a cutting mass is obtained which is very durable and economical, and is equally effective in cutting stone or rock and metal.

The accompanying drawings illustrate a boring tool for boring holes in hard rock, the cutting part being composed of grains of emery in combination with the improved cement hereinafter described.

Figure 1 is a side view of a drilling tool. Fig. 2 is a vertical section, and Fig. 3 a top view, and Fig. 4 a horizontal section of the same.

The same letters of reference indicate the same parts in the different figures.

a is a metal cylinder or tube (preferably of iron or steel) which is screw threaded at its upper part to connect it with the lower end of the revolving boring bar. The lower end is open, and round it is cast a coating b consisting of a compound of the corundum or emery in grains of suitable size with the cem-

ent hereinafter described. This compound in a sufficiently fluid state, is cast round the end of the tube a in the following way: A hollow mold, preferably of iron, having an internal diameter similar to the external diameter of the boring tool, is prepared, and I insert and hold centrally in it the lower end of the metal tube a , which has through it a number of transverse perforations at c, c . A core, which may also be of metal, is also adjusted centrally in the mold, its diameter being equal to the interior diameter of the cutting mass b . The fluid composition of emery and cement is then poured into the mold until the latter is filled, the transverse holes in the tube allowing the inner and outer coatings of the compound to be united and thus insuring greater stability. When the compound has become hard, or after about ten hours, the tube coated inside and outside is removed from the mold and is allowed to dry for about ten hours more and is afterward painted several times with linseed oil and it is then, after about two or three weeks further drying, ready for use, the cement containing the emery adhering so firmly to the tube as practically to form a part of the latter.

In order that passages for water may be left through the tube and the compound, pieces of cork or other suitable material of sufficient length are fitted into some of the transverse holes through the tube. These form cores round which the compound is cast, and they are removed after the latter has become hard. The exterior of the coating is provided with vertical grooves or flat sides with which the transverse holes communicate, so that a stream of water forced down the tubular drill from above, as in the ordinary diamond drill, passes through the holes and through transverse notches at the bottom of the tool, and carries away the debris. The improved drill cuts freely in the rock exactly like the diamond drill, and leaves a core in the tube which from time to time is brought up from the bore in the rock to ascertain its exact character. While the size of such a rock drill may be considerable, equally effective small rock drills of from half an inch to two inches diameter for use in blasting, or large ones of several feet diameter for tunneling or shaft sinking may be used.

The cement or compound with which I mix the grains of emery as described, is composed as follows:

(1.) Magnesium chloride crystals are mixed with water in the following proportions:

66 parts magnesium chloride,

34 parts water,

100.

(2.) Carbonate of magnesia is burned or calcined and is then reduced to powder. It is then burned a second time at a temperature of about 1,500° centigrade, and is mixed with about ten to fifteen per cent. of carbonate of magnesia less highly calcined, the result being a nearly perfectly white powder. The above materials are then mixed together in about the following proportions:—fifty parts of the chloride of magnesium solution (No. 1), fifty parts of the burned carbonate of magnesia (No. 2), to which is added about seventy-five per cent. of large grained emery. While liquid this composition is poured into the mold as above described.

The drilling or boring apparatus described may be applied not only to the purpose of drilling holes in rocks but also to that of boring and finishing metal cylinders of any size, a cylindrical tool being used of a kind similar to those already described, consisting of a mixture of the cement above described and emery, the front part of the cylinder being made somewhat conical and being provided with the largest pieces of emery, such conical part first entering the cylinder which is to be bored and removing the hard skin of the casting, while then by degrees the entire cylindrical surface of the tool comes into operation, the grains of emery being of gradually increasing fineness, until the last or finest part serves to finish and polish the bore of the cylinder. Very great simplicity is also thus obtained in the method of boring such

a cylinder, as it is no longer necessary to adjust and fix the heavy cylinder upon a lathe, but it can be allowed to remain upon the ground and is then bored and polished by means of a strong ordinary boring bar and corundum tools as described acting automatically.

The tool, as in the drill first described and shown, must have water supplied to it, in the first place to remove the borings, and in the second place to keep the tool and the cylinder cool. This is effected by means of water supplied under pressure into the hollow bar, and through passages and openings in the cutting surface of the tool.

Although I have described fragments or grains of emery as mixed with the cement, fragments of diamond may be used.

I do not confine myself to the precise form and details of construction, or to the exact proportions of the composition described, which may be varied more or less to suit different circumstances, but

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

1. A composition of matter for use in tools of the character described consisting of a mixture of chloride of magnesium carbonate of magnesia, and water, and grains of abrading material.

2. A composition of matter for use in tools of the character described consisting of a mixture first of chloride of magnesium and water, second, calcined carbonate of magnesia and third, grains of abrading material, in or about the proportions described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

OLAF TERP.

Witnesses:

ARTHUR E. EDWARDS,
FREDK. J. NAYLOR.