

No. 654,471.

Patented July 24, 1900.

H. S. MAXIM.
POWDER GRAIN.

(Application filed June 26, 1899.)

(No Model.)

Fig. 1.

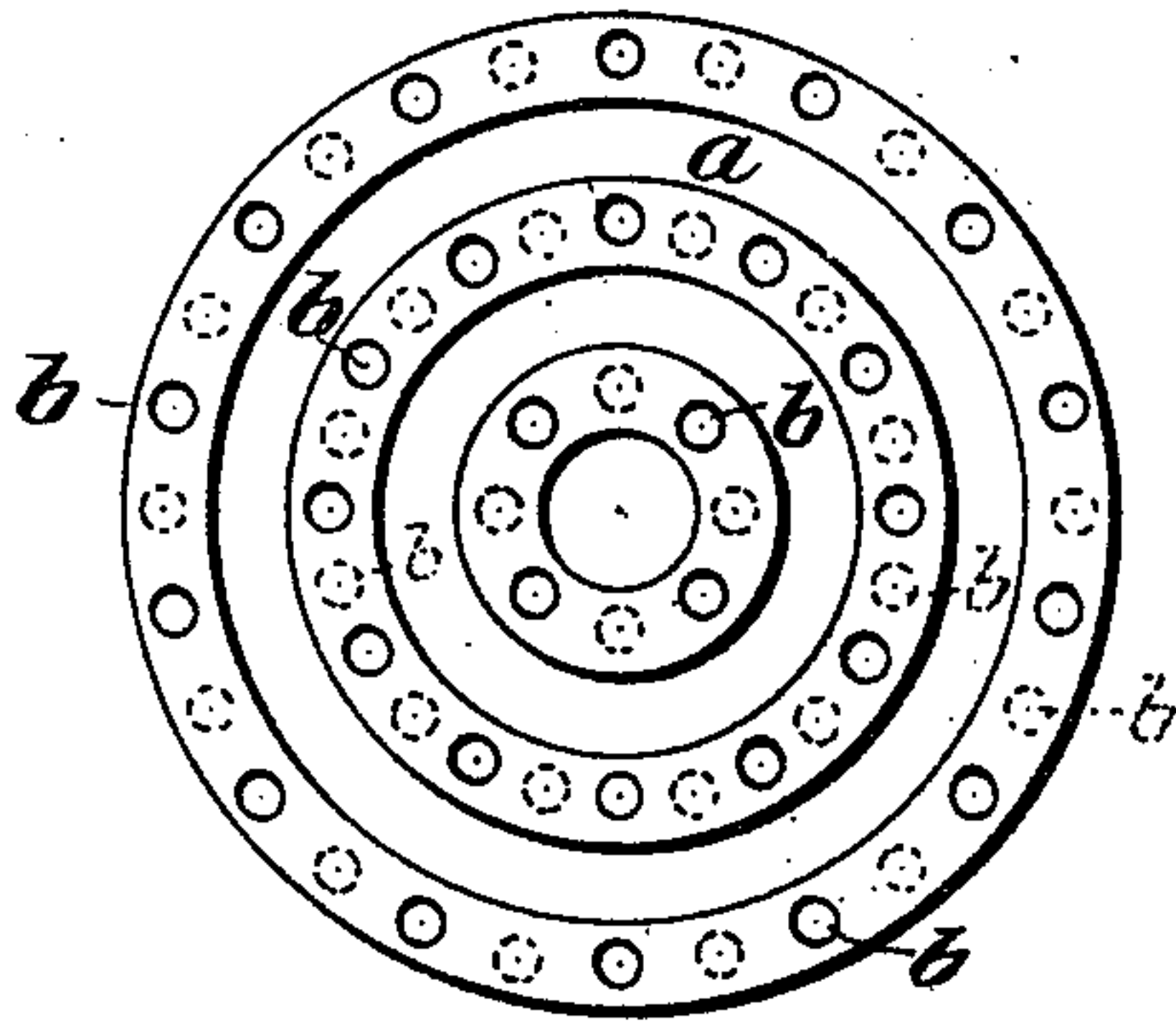
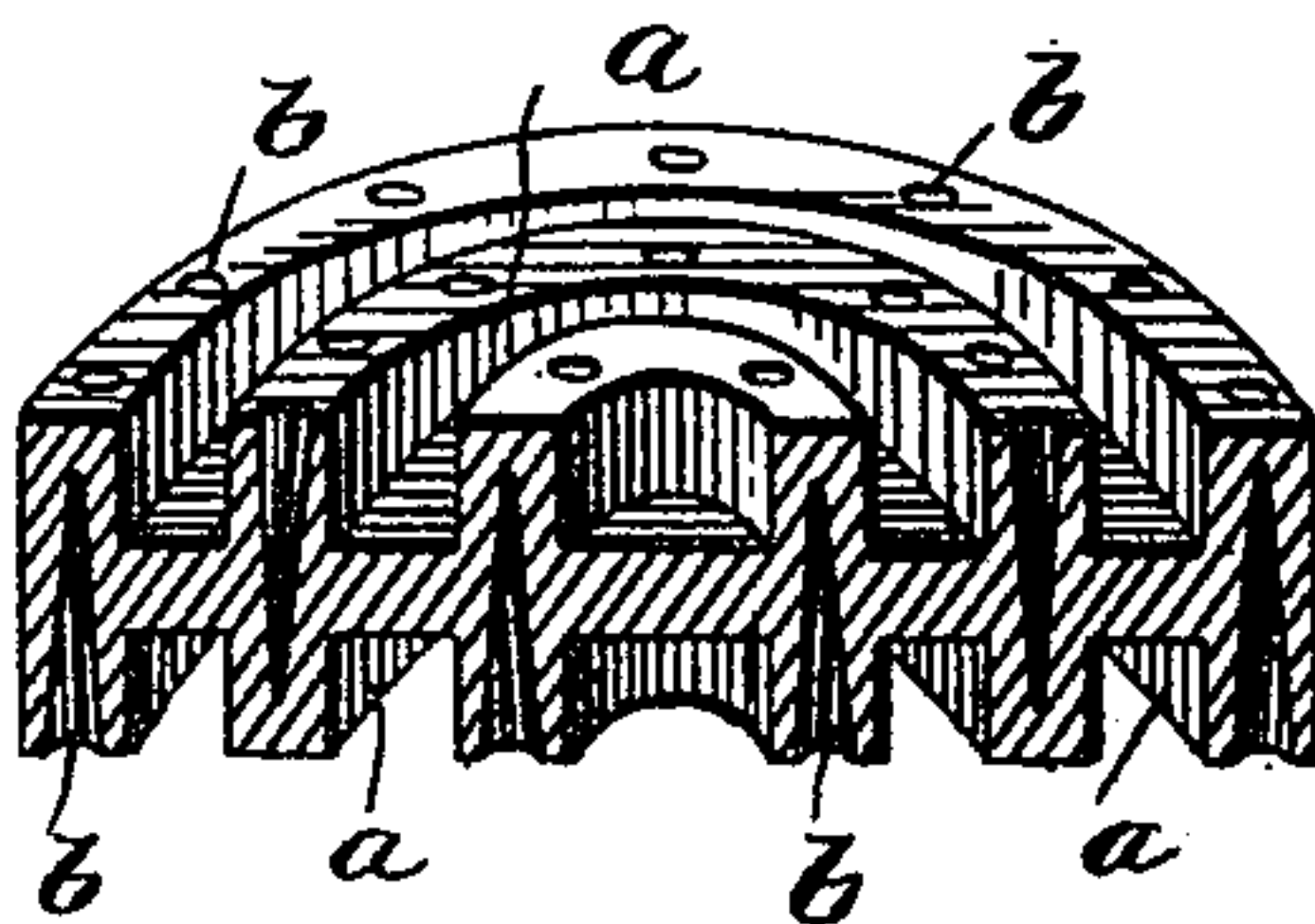


Fig. 2.



Witnesses:
C. D. Hesler,
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UNITED STATES PATENT OFFICE.

HIRAM STEVENS MAXIM, OF LONDON, ENGLAND, ASSIGNOR TO THE VICKERS, SONS & MAXIM, LIMITED, OF SAME PLACE.

POWDER-GRAIN.

SPECIFICATION forming part of Letters Patent No. 654,471, dated July 24, 1900.

Application filed June 28, 1899. Serial No. 721,915. (No specimens.)

To all whom it may concern:

Be it known that I, HIRAM STEVENS MAXIM, chevalier of the Legion of Honor, civil and mechanical engineer, a citizen of the United States, residing at 18 Queen's Gate Place, London, in the county of Middlesex, England, have invented certain new and useful Improvements in the Manufacture of Explosives, of which the following is a specification.

10 This invention has reference to the manufacture of explosives for artillery.

It is well known that the products of combustion of cordite and ballistite used in some of the naval and military services consist 15 largely of carbon dioxide, a very heavy and dense gas, which by reason of its great heat erodes the barrels of guns much more rapidly than carbon monoxide. It is therefore advantageous to have as little as possible of the 20 carbon dioxide present in the products of combustion. In fact, it is better to produce a little smoke than to erode the gun too much. It is possible to prevent or diminish the erosion of the gun by making one of the constituents of the explosive of some resinous or 25 other hydrocarbonaceous substance that will cause the evolution of carbon monoxide instead of carbon dioxide when the explosive is fired. The resinous material I prefer to 30 use is American resin mixed with about one-seventh part of its weight of oil, such as that used for lubricating engine-cylinders. I do not, however, wish to confine myself to these substances.

35 Many nations object to the use of nitro-glycerine as a constituent of their smokeless explosives for artillery purposes and prefer to make them from guncotton, (trinitro-cellulose.) When, however, a smokeless explosive is made altogether from gun-cotton by 40 dissolving the latter in the well-known manner, the explosive in its finished condition is liable to be very hard and to burn too slowly for artillery purposes. If, on the other hand, 45 the explosive be made from pulped guncotton—that is to say, with the cotton in a fibrous condition—it is found that the explosive burns too rapidly.

50 According to my invention the required progressive action of the explosive may be best obtained by making each particular block, grain, or tablet of the explosive compound in

several pieces—that is to say, one or more exterior shells of an extremely-slow-burning character and great density and an interior disk 55 made of a quick-burning character and fibrous nature. The several pieces being put together in a mold and pressed are converted into a single block or tablet the exterior part of which is slow-burning and the interior quick-burning. 60 In some cases the blocks may be subjected to comparatively-light pressure while wet and then dried and heated and subjected to further compression after the drying, or the further compression may be effected after 65 the blocks or the fibrous portions thereof have been submitted to the action of solvents in a vacuum or otherwise.

In the accompanying drawings, Figures 1 and 2 are respectively a plan and a transverse 70 section of a tablet of the explosive made in disk form.

Referring to Figs. 1 and 2, the tablet is made in the shape of a disk, with a series of concentric annular depressions *a a* in each face thereof, the portions between the said annular depressions being formed with tapered cavities 75 or indentations *b b*. The indentations in one face preferably break joint with those in the other, as shown. This form of the blocks or 80 tablets permits their having a large area of burning-surface without the liability that exists with ordinary multiple-perforated blocks of accumulating sufficient pressure when the powder is fired in the gun to blow the blocks 85 into atoms.

What I claim is—

A nitro-compound explosive composed of the described ingredients and formed into the shape of a block having concentric annular 90 depressions in each face thereof with tapered cavities formed in the walls separating said depressions, the said cavities on one side of the block breaking joint with those on the other side, substantially as and for the purpose 95 specified.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 15th day of June, 1899.

HIRAM STEVENS MAXIM.

Witnesses:

J. COLLINS,

WALTER J. SKERTEN.