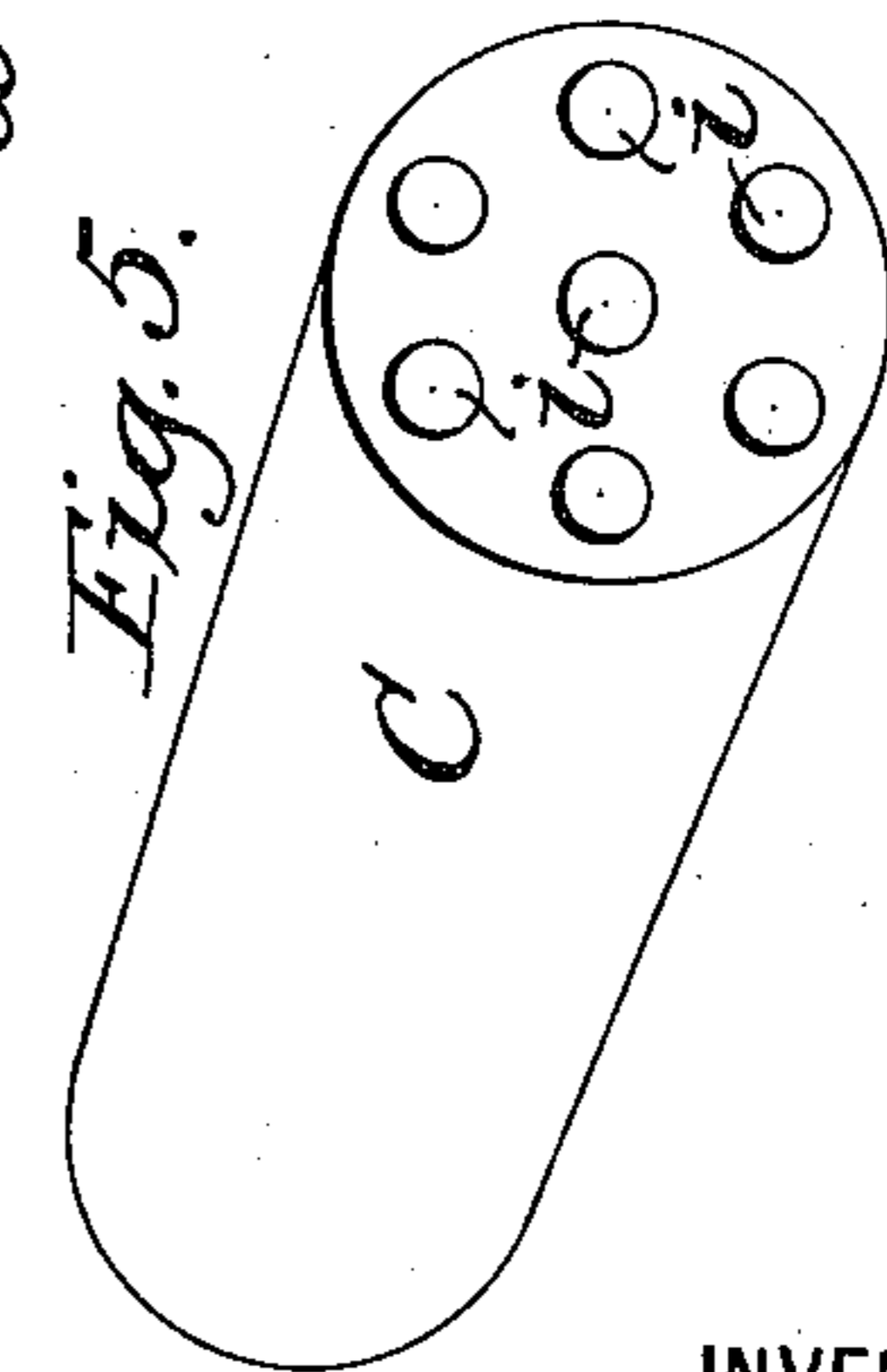
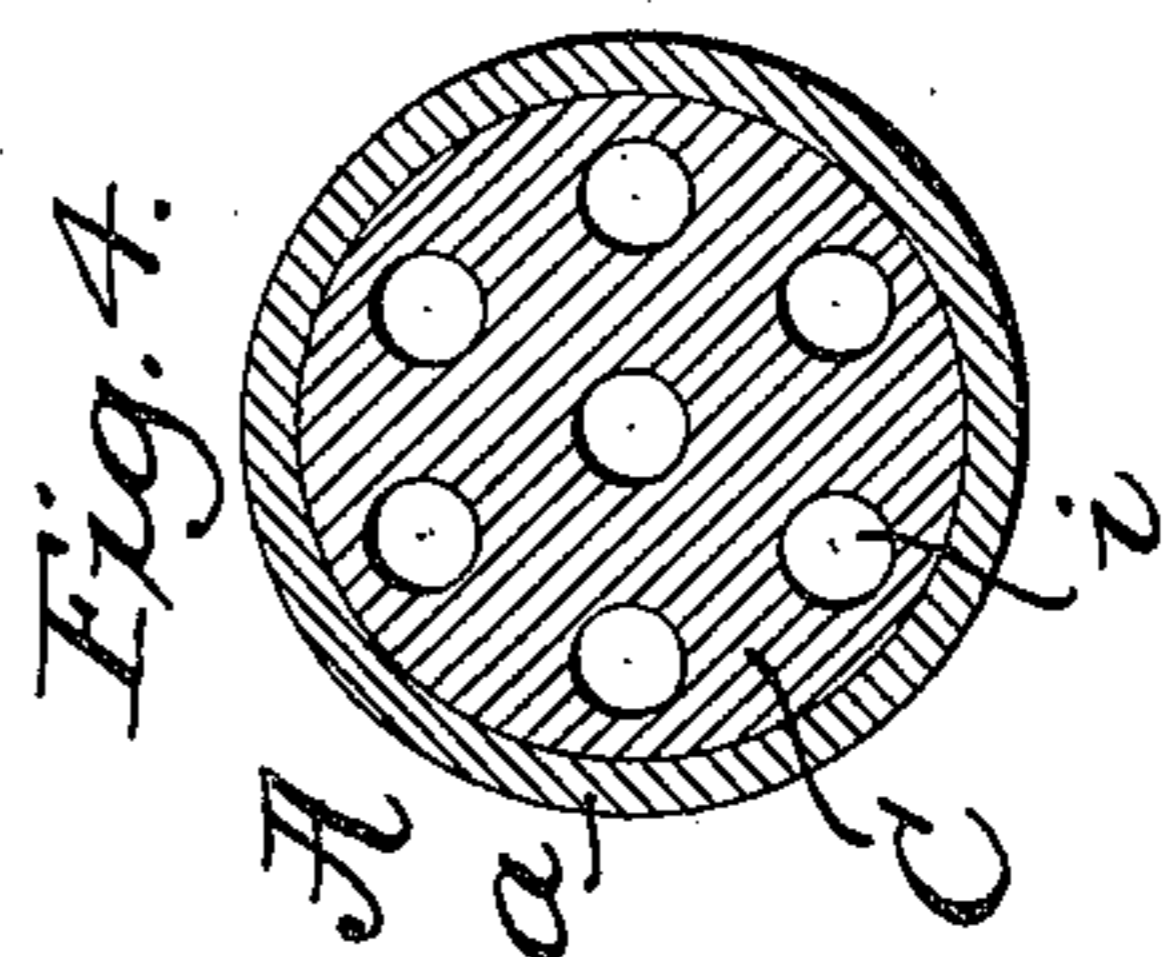
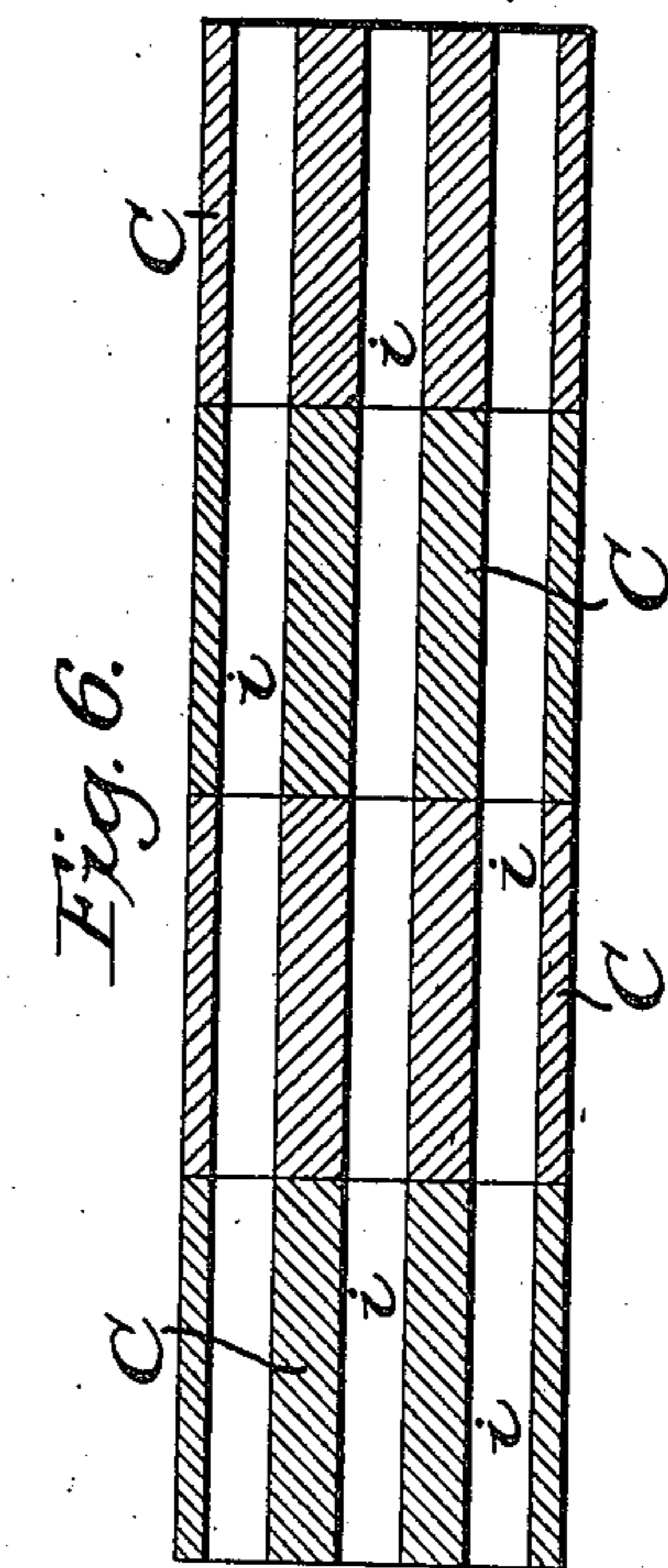
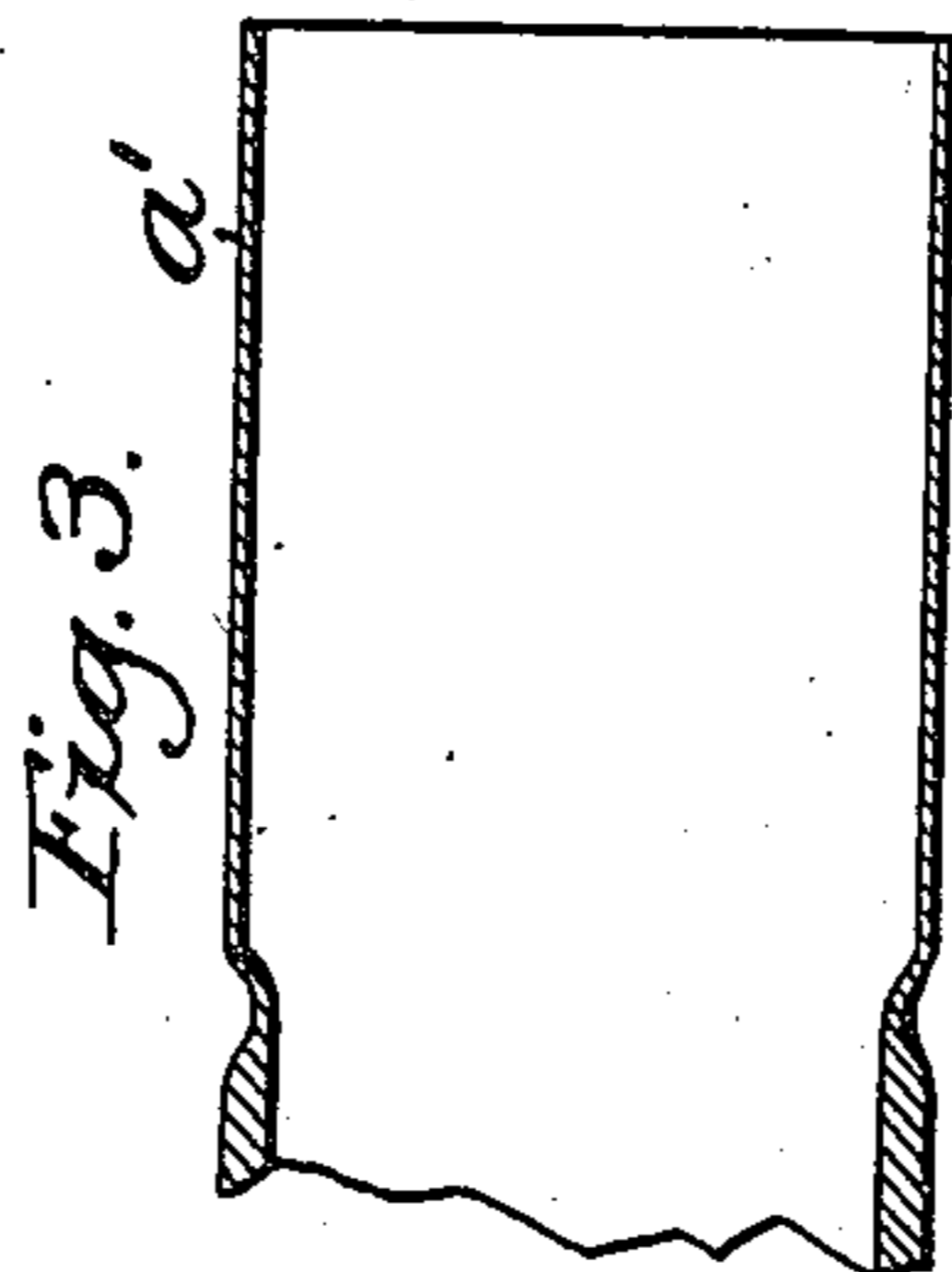
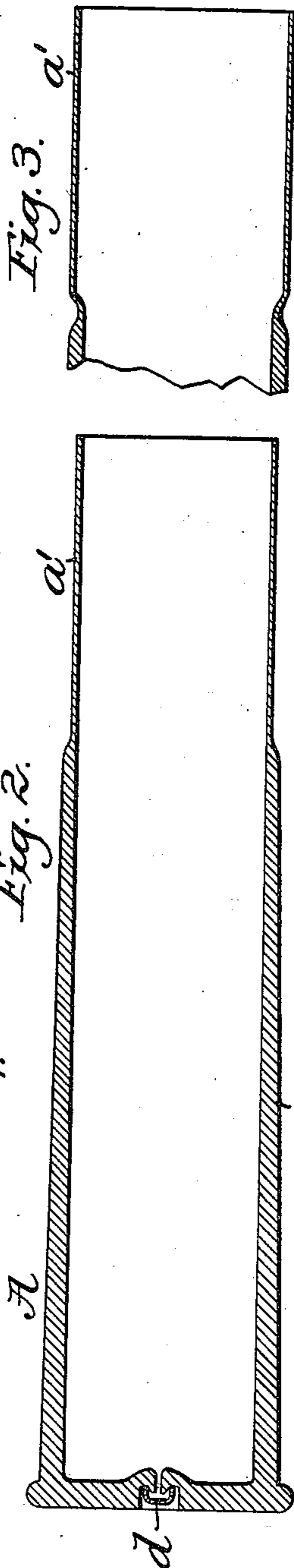
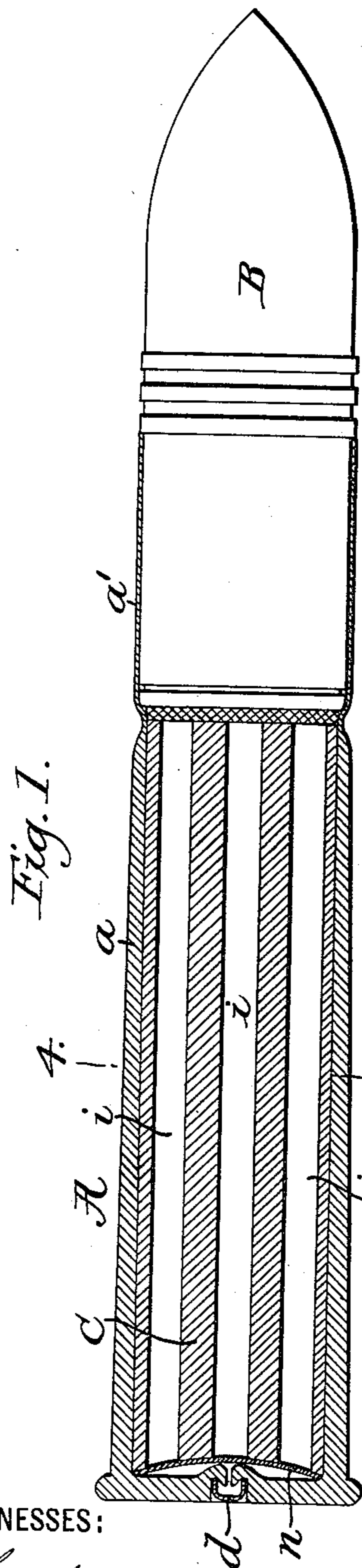


(No Model.)

H. MAXIM.
CARTRIDGE AND CHARGE THEREFOR.

No. 540,328.

Patented June 4, 1895.



WITNESSES:

H. Graham.
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UNITED STATES PATENT OFFICE.

HUDSON MAXIM, OF NEW YORK, N. Y.

CARTRIDGE AND CHARGE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 540,328, dated June 4, 1895.

Application filed January 31, 1894. Serial No. 498,617. (No model.)

To all whom it may concern:

Be it known that I, HUDSON MAXIM, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Cartridges and Charges Therefor, of which the following is a specification.

This invention relates generally to cartridges for small arms or rapid fire guns, and more particularly is directed to the powder charge and the shell and their relations to each other and to the projectile.

My improvements contemplate the use of a powder charge of an impervious nature, that is to say, impervious to the gases of combustion as distinguished from charges which are granular in structure though in compressed or cake form, such impervious powder being, for instance, of the character described in my Letters Patent No. 411,127, dated September 17, 1889, which consists of an impervious colloid of pyroxylin made by means of a volatile solvent of the pyroxylin with or without an admixture of nitro-glycerine, constituting an amorphous solid or mass which, while in a plastic condition, is capable of being shaped, molded or pressed to any desired form.

In carrying out my invention this impervious powder charge is formed preferably in long cylindrical rods having a plurality of longitudinal perforations extending from end to end of the rod, which rod of the required diameter may be cut into lengths adapted to the cartridge shells or cases to be charged; or such rods may be made or molded in the first instance of the proper length for the shells. Such an explosive charge, when combined with the shell, may be ignited at the end by any suitable means, such as a fulminate cap in the base of the shell, and an ignition disk interposed between the cap or primer and the body of the main explosive charge. This ignition disk is preferably made of the fulminating compound set forth in my pending application, Serial No. 486,978, filed October 2, 1893, consisting of an agglutinated mass of a fulminate and an explosive base. The detonation of the cap and combination of the ignition disk communicate a flame to and throughout the said longitudinal perforations of the explosive charge and the combustion of the latter will begin on the inte-

rior walls or surfaces of the perforations, and, on account of the impervious character of the charge as already mentioned, proceeding radially outward from each perforation in what may be termed a gradual manner no faster than the combustion and consumption of the surface presented to the flame uncovers succeeding portions of the charge. There is thus presented to the flame a gradually increasing surface of explosive material whereby the gases of combustion are evolved in a degree continuously increasing up to a certain limit, and the projectile propelled with an accelerating speed.

The cartridge shell is made slightly tapering exteriorly from the head or base to the forward end of what may be termed its main portion, and from such point forward the shell is preferably made with an extension of about one-half the thickness which it has at the end forward of said main portion, so that when the base of the projectile is forced into the thin front end of the shell the latter will be expanded to the same exterior diameter as the forward end of said main portion. Interiorly the shell is cylindrical, its walls being somewhat thicker at the rear than at the front end, and in it the powder charge in the form of a rod or solid body as aforesaid, of uniform cross-section, fits neatly, occupying practically all of the interior space. The shell is thus enabled to act as an efficient restraining means to prevent disruption of the explosive rod or solid under the pressure of the interiorly generated gases.

An important advantage of this improvement is that from the small transverse dimension of the powder chamber much higher pressures may be had in the gun without danger of straining such chamber or the mechanism of the gun. The gun will not have to be made so heavy at the base to stand the strains, neither will the breech mechanism require to be so heavy.

A further important advantage is that the cartridges made in this way being of practically uniform diameter, or straight, can be much better packed in magazines than those having a neck and projectile of much less diameter than their main portion, and a larger number of them can be carried by a man. The recoil from a gun charged with my im-

proved cartridge will not be nearly so much as that caused by the usual form of cartridge.

While I prefer to make my improved explosive charge in a single piece, such form is not necessary, and for some purposes it may be desired, especially for large or long cartridges, to make the charge in separate pieces or sections which may be united together to form a charge of any required strength or may be loaded successively into the shell in the required number.

It will be understood that certain important advantages of my invention reside in the powder charge independent of any particular form of shell.

Such being in general the leading features of my invention, I have, in order to make the same more clearly understood, shown in the accompanying drawings means for carrying it into practical effect, without limiting the improvements in their useful applications to the particular construction which, for the sake of illustration, I have delineated.

In said drawings, Figure 1 is a longitudinal sectional view of a cartridge embodying my invention. Fig. 2 is a similar view of the shell before the insertion of the explosive charge and ball. Fig. 3 is a similar view of the forward portion of the shell, showing its ultimate form. Fig. 4 is a transverse sectional view on line 4-4, Fig. 1. Fig. 5 is a perspective view of the described explosive charge in the form of a rod or solid independent of the shell. Fig. 6 is a sectional view showing such rod as composed of a plurality of sections. In the drawings some of the proportions are slightly exaggerated for greater distinctness of illustration.

Referring to the drawings, A indicates a cartridge shell of suitable material such as brass or copper, having a body or main portion α , which exteriorly is somewhat tapering to facilitate insertion into and removal from the gun, but which is interiorly of uniform diameter so that it may be entirely occupied by the explosive, which is shown at C in the form of a rod or solid consisting of an impervious colloid of pyroxylin formed with a plurality of longitudinal perforations λ . At its forward end the shell is formed with an extension α' of less external diameter than that of the forward end of the main body, but of uniform internal diameter with said body. The thickness of the wall of this extension is consequently less than that of the said forward end of the body α , as best seen in Fig. 2. The base of the shell has the usual or any preferred form of priming and igniting devices, such as a fulminate cap d , and wafer n , made of the compound hereinbefore referred to.

In the manufacture of the shell the explosive rod or solid C is inserted into the shell, either in a single piece or in sections (Fig. 6), and will fit therein so as to be held by the walls of the shell from disruption by the gases generated within the perforations λ . The ball or projectile, shown at B, is then inserted. Such projectile is of a diameter at its base greater than the interior diameter of the extension α' , and equal, together with twice the thickness of the wall of the extension, to the exterior diameter of the forward end of the main body α . The forcible insertion of the projectile will, therefore, cause the extension α' of the shell to stretch somewhat; bringing it ultimately to the form illustrated in Fig. 3, with the exterior dimension of the extension uniform with that of the forward end of the body α .

I claim—

1. A cartridge shell having a contained explosive charge of cylindrical rod form of the diameter of the shell and adapted to be inserted in the shell in such rod form, said rod having an inner concaved end with a disk of fulminate seated at said concaved end, as set forth.

2. The herein described cartridge consisting of a shell tapering exteriorly, having the interior of its main body of uniform diameter and having a forward portion or extension of slightly greater interior diameter than said main portion and adapted to hold a projectile.

3. The herein described cartridge consisting of a shell tapering exteriorly, having the interior of its main body of uniform diameter and having a forward portion or extension of slightly greater interior diameter than said main portion, a projectile held in said extension, and a powder charge in the form of a rod or solid fitting the interior of the main body of the shell, substantially as set forth.

4. The herein described cartridge consisting of a shell tapering exteriorly, having the interior of its main body of uniform diameter and having a forward portion or extension of slightly greater interior diameter than said main portion and of an exterior diameter uniform with that of the forward end of said main body, a projectile held in said extension, and a powder charge in the form of a rod or solid fitting the interior of the main body of the shell, substantially as set forth.

In testimony whereof I have hereunto signed my name in the presence of two witnesses.

HUDSON MAXIM.

Witnesses:

E. L. TODD,
H. N. LOW.