

No. 741,600.

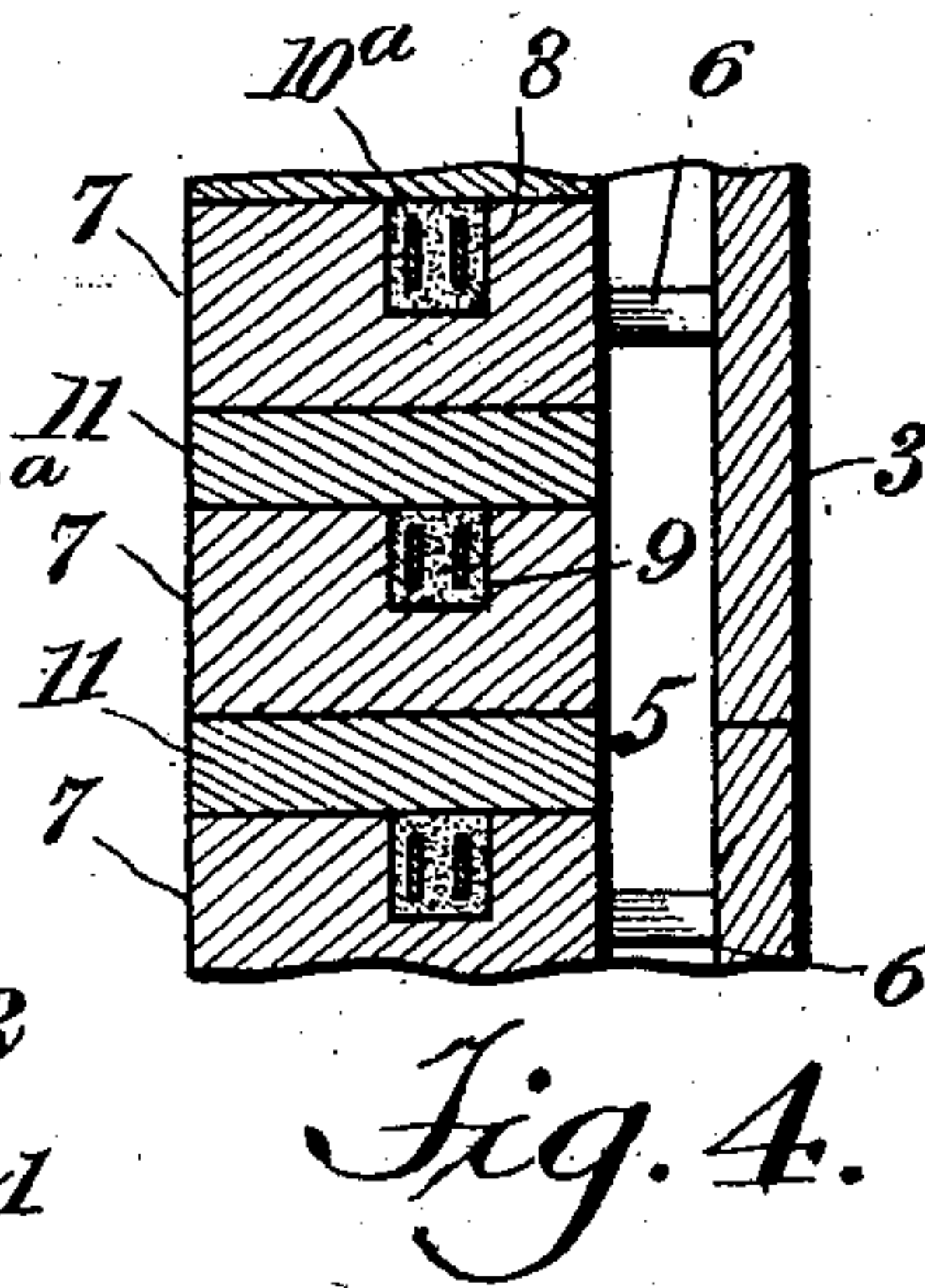
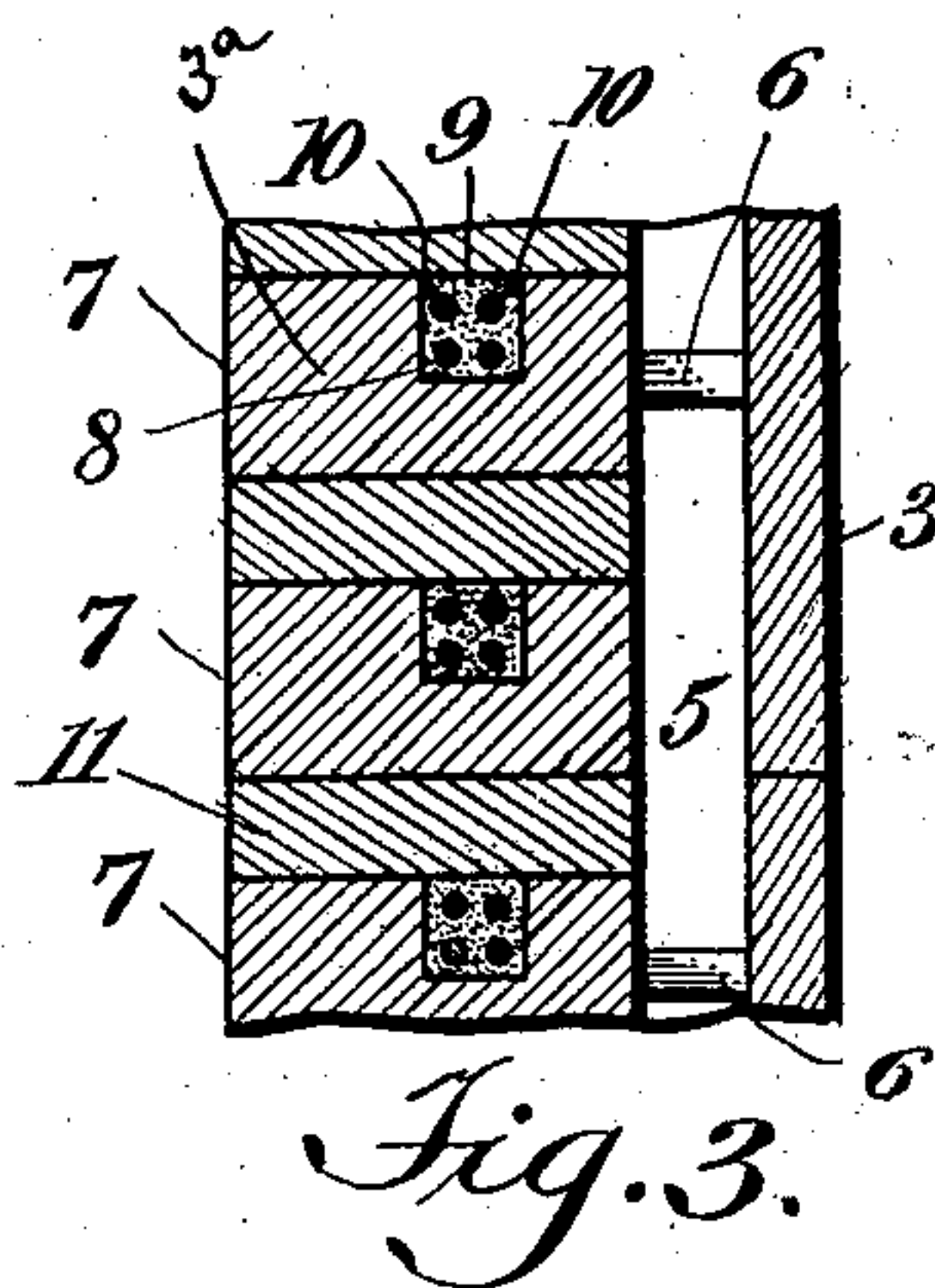
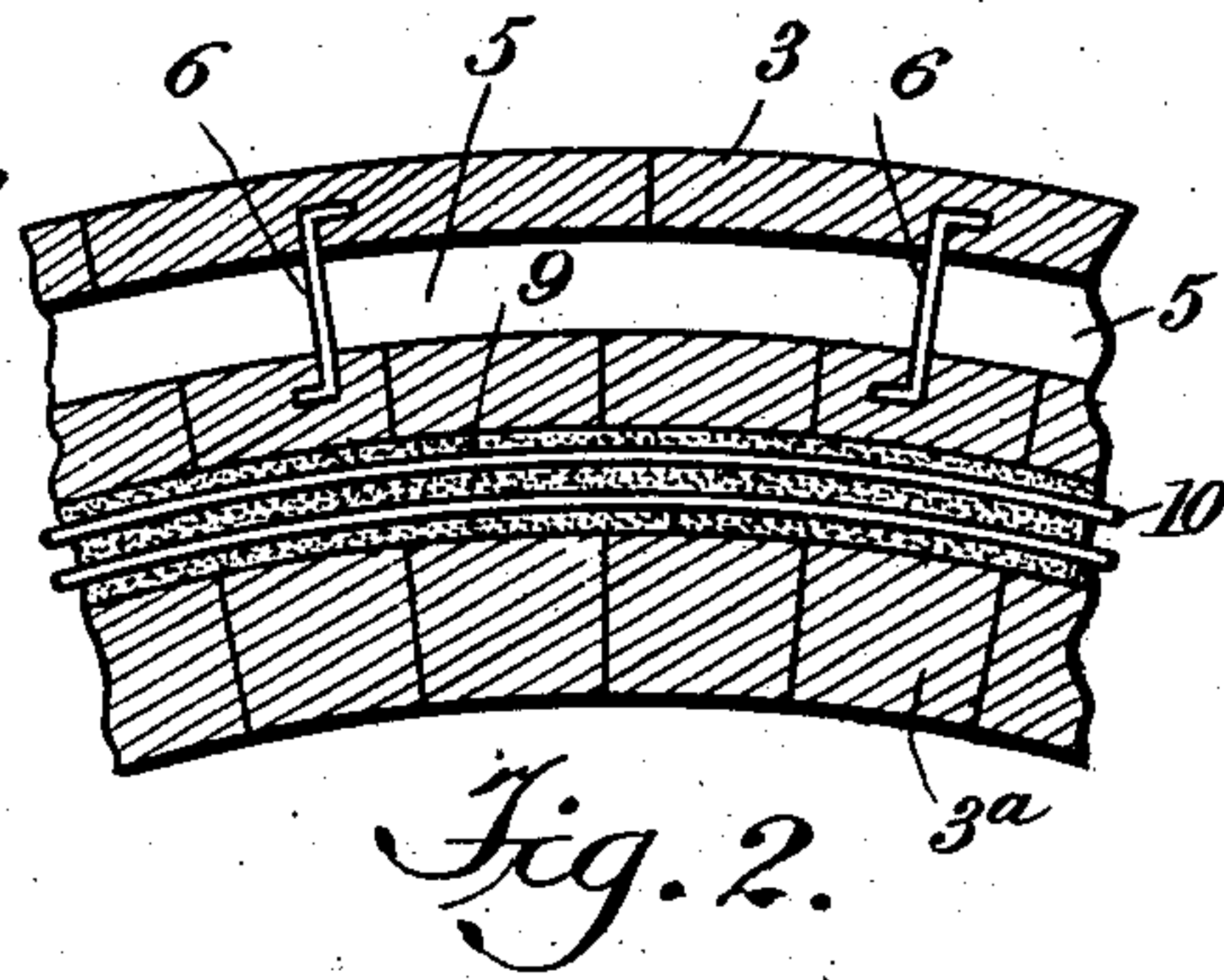
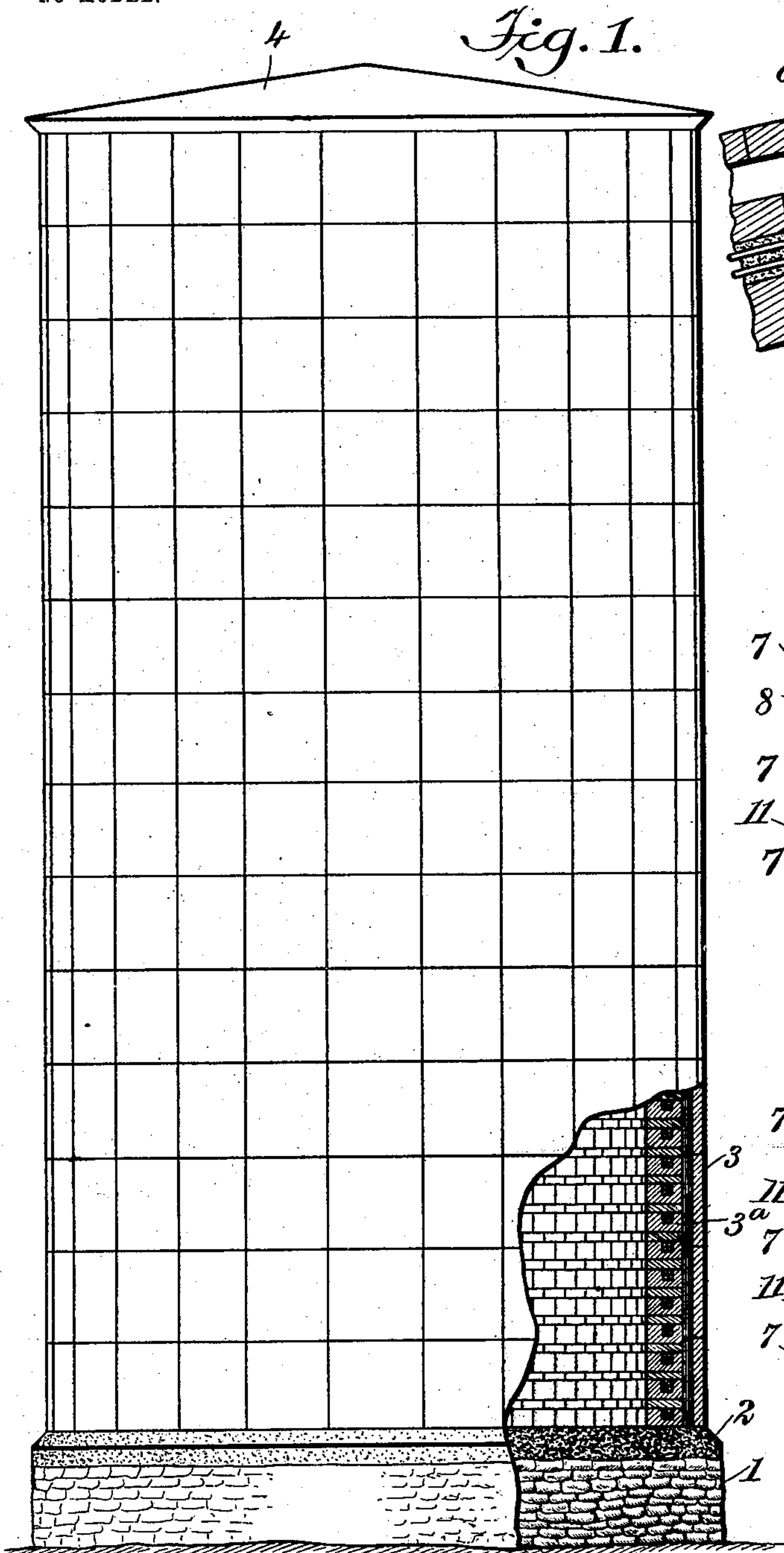
PATENTED OCT. 13, 1903.

G. H. WARREN & S. FONTAIN.

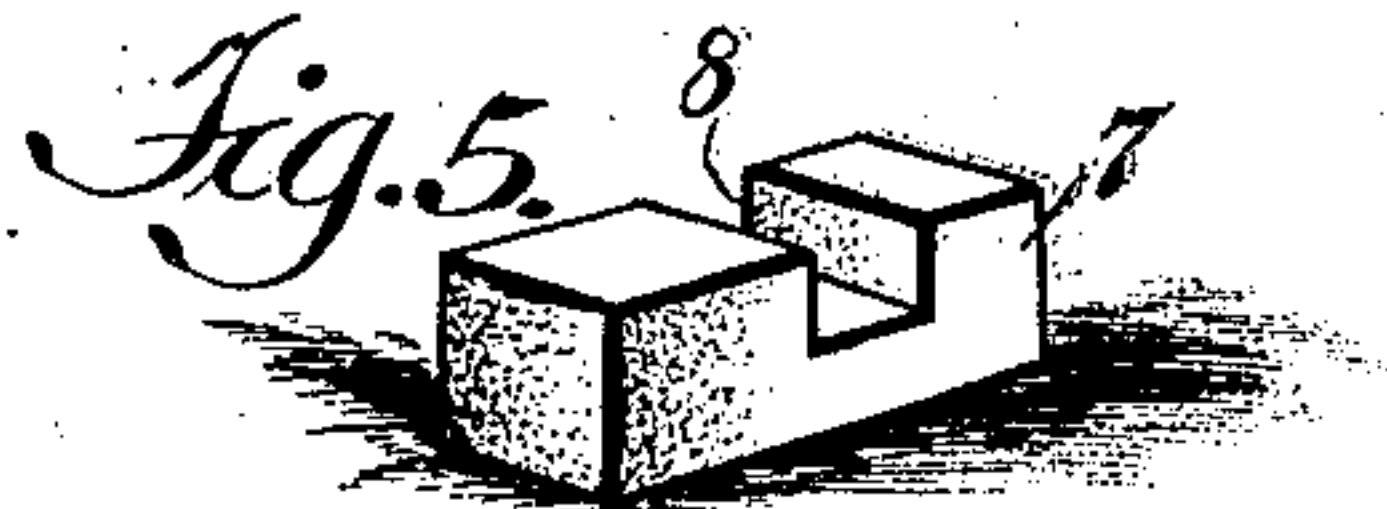
GRAIN STORAGE TANK.

APPLICATION FILED DEC. 13, 1902.

NO MODEL.



WITNESSES:
A. R. Appleman
R. B. Caranagh



INVENTORS
George H. Warren
Samuel Fontain
BY *M. W. W. Go*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE HENRY WARREN AND SAMUEL FONTAIN, OF MINNEAPOLIS,
MINNESOTA.

GRAIN-STORAGE TANK.

SPECIFICATION forming part of Letters Patent No. 741,600, dated October 13, 1903.

Application filed December 13, 1902. Serial No. 135,063. (No model.)

To all whom it may concern:

Be it known that we, GEORGE HENRY WARREN and SAMUEL FONTAIN, both citizens of the United States, and residents of Minneapolis, in the county of Hennepin and State of Minnesota, have invented new and useful Improvements in Grain-Storage Tanks, of which the following is a full, clear, and exact description.

The present invention relates to certain novel and useful improvements in the construction of grain-storage tanks, silos, and the like. In this connection we have particularly in view a storage-tank which will be fireproof and the parts of which are composed of such material that all danger of the contents being ruined or damaged from dampness will be obviated.

It is also an object of our invention to form the improved storage-tank of a plurality of casings or walls built one around the other, the walls being so connected or bound together by ties that the structure will be greatly strengthened.

With these and other objects of a similar nature in view our invention consists in the peculiar construction, combination, and arrangement of parts, as will be hereinafter described in this specification, delineated in the accompanying drawings, and set forth in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a view in side elevation, showing a storage-tank constructed in accordance with our improvements, a portion of the wall of said tank being broken away and sectioned to show the construction thereof. Fig. 2 is a horizontal sectional view taken through a portion of the walls of the tank. Fig. 3 is a vertical sectional view, also taken through the walls of the tank. Fig. 4 is a view similar to Fig. 3, showing a modified arrangement of the binding bands or ties; and Fig. 5 is a detail view of one of the channeled bricks used in connection with our improved tank.

Referring now to the accompanying drawings, wherein an embodiment of our inven-

tion is delineated, 1 designates the base of the structure, which may be composed of any suitable material—such as stone, brick, cement, or the like. In the present instance the said base is shown approximately circular in form, and on top of the base portion, as at 2, is arranged the bottom of the tank, which may be of asphalt, cement, or any like fireproof and damp-proof material. Mounted upon this bottom portion 2 is the bin or tank proper, which we will now proceed to describe in detail. As will be seen in particular on reference to Figs. 1 and 2, it consists of an outer wall and an inner shell. The outer wall 3 may be of any material, either of stone, brick, or metal. In the present instance we have illustrated the tank as approximately cylindrical in form and surmounted by a cap or top portion 4, which is preferably composed of metal. Within this outer casing 3 is arranged an inner shell 3^a, of less diameter in cross-section than the outer wall, so that an air-space 5 is left between the inner wall of the outer surface and the outer surface of the interior shell or wall. In order to insure the necessary rigidity and strength of the parts, binding or tie bars 6 extend across the space and have one end embedded in the inner shell, the other end being held by the outer wall. The inner shell is preferably composed of a series of blocks or bricks of concrete, cement, or other suitable material, the bricks of each alternate row being relatively larger or wider than the bricks immediately above and beneath, and such large wide bricks, which we have shown at 7, are provided with channels or grooves arranged centrally, as at 8, which grooves are adapted to register, so that a circular channel is formed in the wall when the bricks are cemented or laid in position. The channels or grooves in the brick are filled with cement or like binding material, as shown at 9, and embedded in the cement are a number of cables or strands of wire, as at 10, which extend entirely around the wall of the inner shell and assist in securely holding and binding the bricks of the row, thereby greatly strengthening the shell. As hereinbefore stated, between each row of channeled blocks is arranged a layer of ordinary bricks 11, which

may be held in the structure by the ordinary binding-mortar.

In Fig. 4 we have shown slightly-different binding devices, in this case making use of
5 flat circular metallic bands 10^a, which are embedded in the mortar in the same manner as hereinbefore described with reference to the wires 10.

From the above description, taken in connection with the drawings, it will be evident
10 that we have devised a silo or grain-storage tank which possesses many advantages over the ordinary type of storage-chamber. It is constructed of such material that the possibility of the contents being destroyed by fire
15 is entirely obviated, and it is further evident that such a tank will last for a very long period of years without requiring repairs. The parts may be readily and quickly assembled,
20 and on the whole the construction is one which embodies the essential features of convenience and cheapness.

While we have shown and herein described one particular embodiment of our invention,
25 it is of course to be understood that we do not wish to be considered as limiting ourselves to the precise details of the construction illustrated herein, as it will be evident that there can be modifications and variations
30 in some respects without departing from the

spirit of the invention or sacrificing any of the advantages thereof.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. A storage-tank having an outer casing and an inner casing spaced apart, said casings being formed of fireproof material, metallic binding-strands embedded in the walls of the inner casing, and tie-braces connecting the
40 walls of the inner casing with the walls of the outer casing.

2. A storage-tank having an outer casing and an inner casing spaced apart, the inner casing being formed of fireproof blocks or
45 bricks, each alternate layer of bricks having channels formed therein, plastic binding means in said channels, binding-bands embedded in the plastic binding means in the channels, and braces between the inner and
50 outer casings, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GEORGE HENRY WARREN.
SAMUEL FONTAIN.

Witnesses:

C. H. MEYER,
N. A. BOEHM.