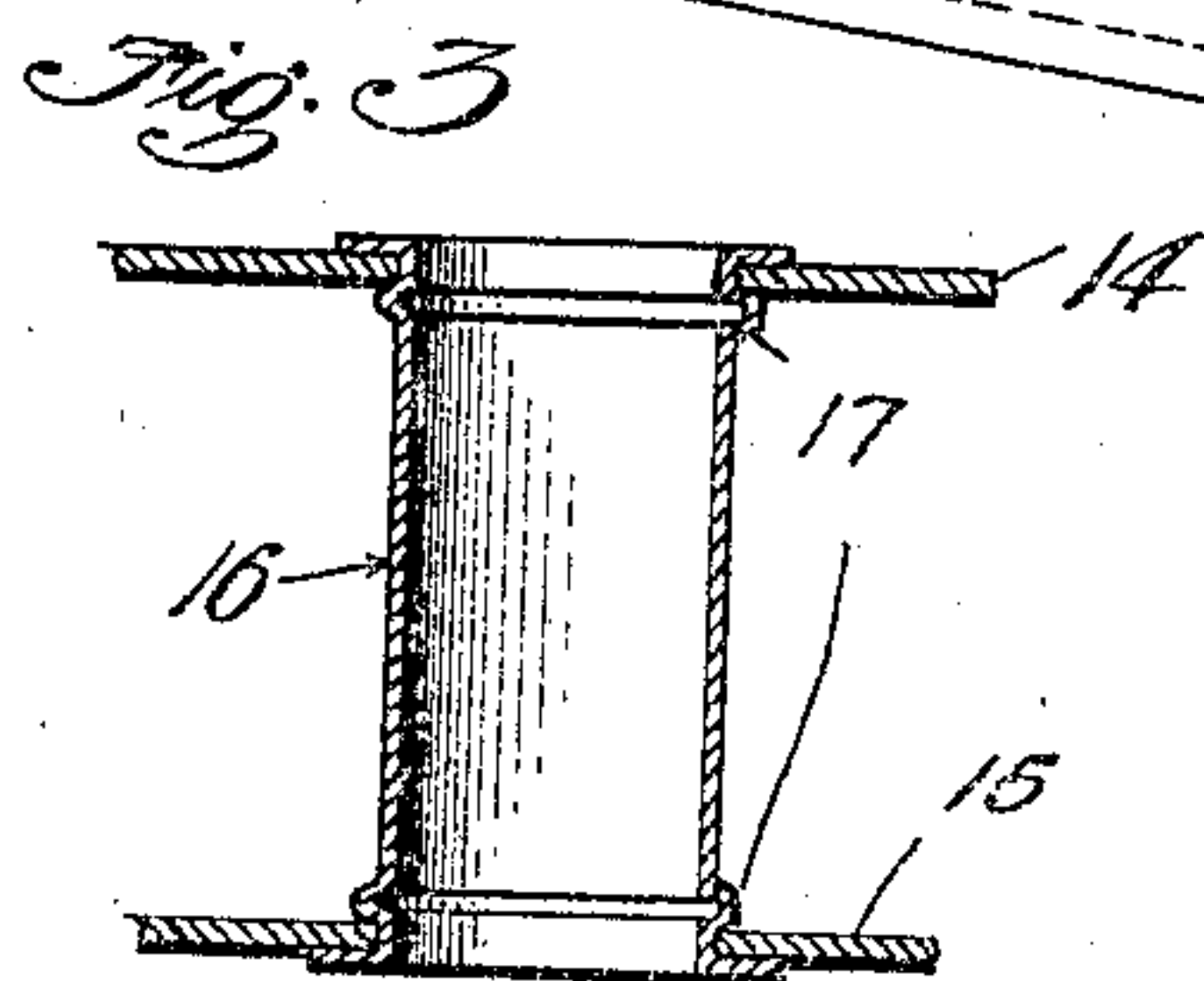
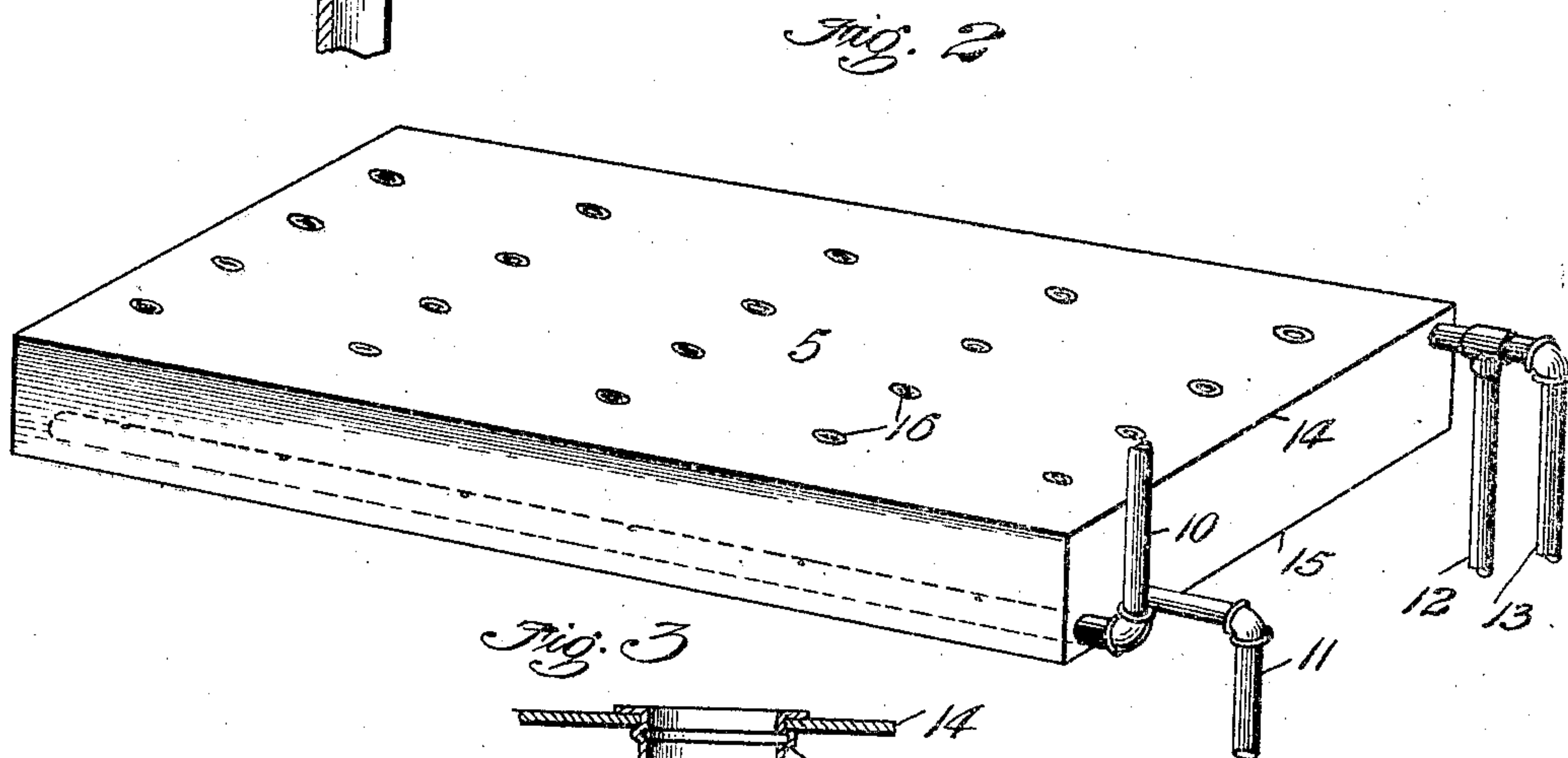
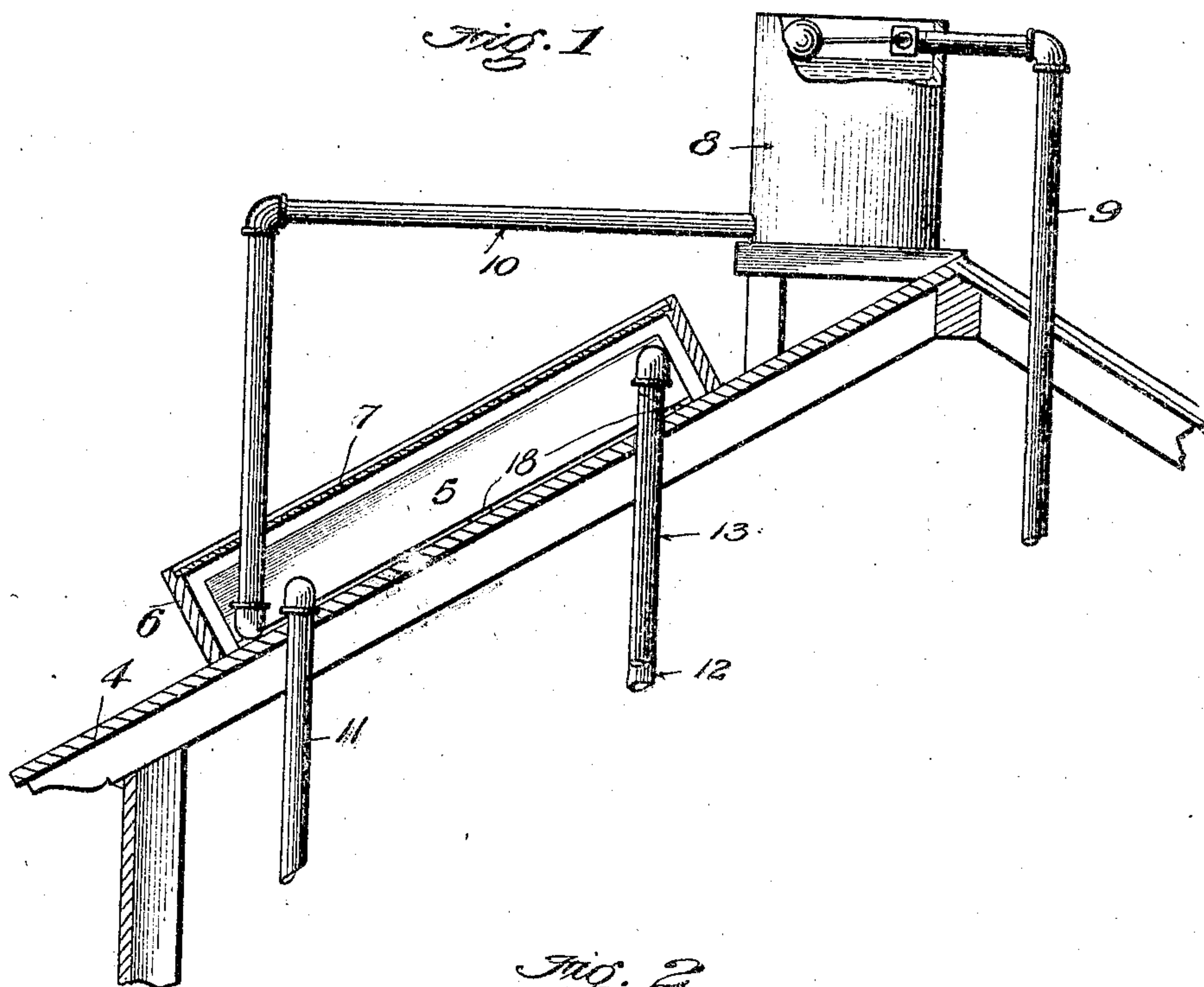


No. 819,342.

PATENTED MAY 1, 1906.

M. T. CUNNIFF.  
SOLAR WATER HEATER.  
APPLICATION FILED OCT. 25, 1904.



Witnesses

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# UNITED STATES PATENT OFFICE.

MICHAEL T. CUNNIFF, OF RIVERSIDE, CALIFORNIA.

## SOLAR WATER-HEATER.

No. 819,342.

Specification of Letters Patent.

Patented May 1, 1908.

Application filed October 25, 1904. Serial No. 229,996.

To all whom it may concern:

Be it known that I, MICHAEL T. CUNNIFF, a citizen of the United States, residing at Riverside, in the county of Riverside and State of California, have invented new and useful Improvements in Solar Water-Heaters, of which the following is a specification:

The object of my invention is to provide a tank which provides a large heating capacity and of compact form and of great strength.

I accomplish this object by the mechanism described herein and illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation with the inclosing structure which surrounds the tank partly in section and the pressure-regulating tank partly broken away. Fig. 2 is a perspective view of my improved tank, showing portions of the connecting-pipes. Fig. 3 is a vertical section of one of the tubes in the central portion of the tank, showing how it is connected to the top and bottom plates of the tank.

In the drawings, 4 is the roof of the building upon which my improved heating-tank 5 is located.

6 is the usual air-tight inclosing case, which is provided with a transparent cover 7, that surrounds the tank at the sides and top.

8 is a pressure-regulating tank into which the water-supply is received from the pipe 9, which is connected to the pressure-supply. (Not shown.) A pipe 10 runs from the pressure-regulating tank to the lower side of the heating-tank and runs across the same, as shown in dotted lines in Fig. 2. A pipe 11 runs from the heating-tank to a source of artificial-heat supply, preferably the kitchen-stove, (not shown,) and pipe 12 connects with pipe 11 and leads the water as it becomes heated from said artificial-heat supply to the top of the tank. A pipe 13 connects with pipe 12, as shown in Fig. 2, and leads the hot water to its place of use. (Not shown.) As shown in Fig. 2, the heating-tank is rectangular in form and consists of a broad narrow tank of considerable length. The top plate 14 and the bottom plate 15 are strengthened and connected together by a considerable number of hollow tubes 16.

These tubes are preferably provided with grooves 17, which are just below the top plate and just above the bottom plate, and when the tubes are placed in the plates the tops and bottoms of the tubes are expanded outwardly and flattened upon the top and bottom plates, as best shown in Fig. 3, and are then soldered thereto in the usual manner. The tubes are preferably of copper, and the top of the tank is preferably blackened and may be made of copper, if desired. The tank is preferably rectangular, but may be of any other shape. By this construction it will be seen that these tubes greatly strengthen the top and bottom plates, to prevent them from buckling and at the same time provide means for the air to circulate through the tubes within the inclosing case, thereby enabling the water therein to be subjected to a more uniform temperature and also provide a greater tank area subjected to the warm air than if the tank were not provided with these tubes. The tank is slightly elevated, as shown in Fig. 1, to permit such circulation, being supported by blocks 18, placed at suitable intervals under the tank.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a solar water-heater, a heating-tank provided with a plurality of hollow stiffening and air-circulating tubes connected to the top and bottom plates of said tank.

2. In a solar water-heater, a heating-tank of rectangular shape provided with a plurality of hollow stiffening and air-circulating tubes connected to the top and bottom plates of said tank by being expanded at the top and bottom and then soldered thereto, said tubes having outwardly-extending grooves just below the top plate and just above the bottom plate of the tank.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

M. T. CUNNIFF.

Witnesses:

THOMAS T. PATEOUS,  
D. A. HIBBARD.