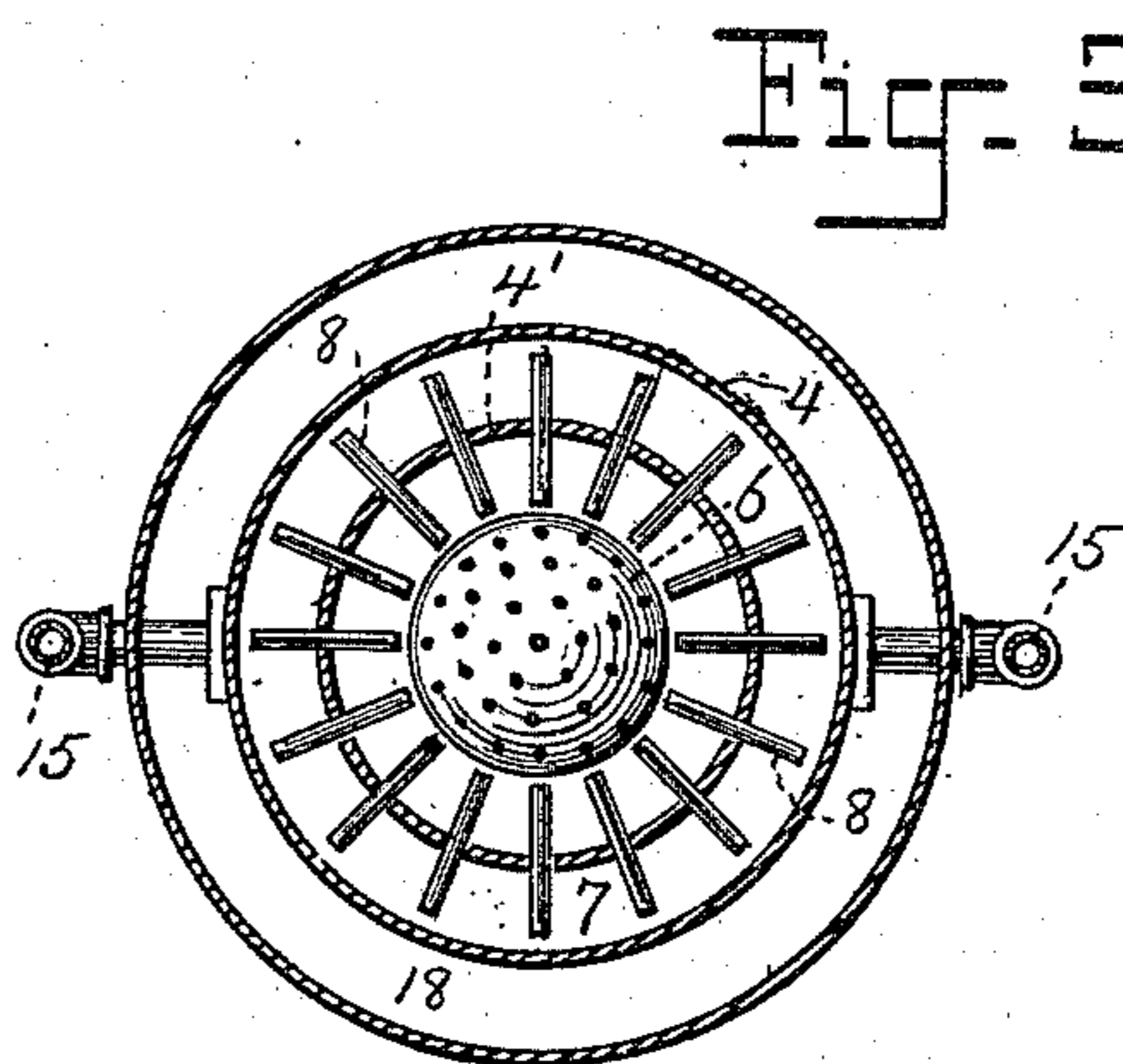
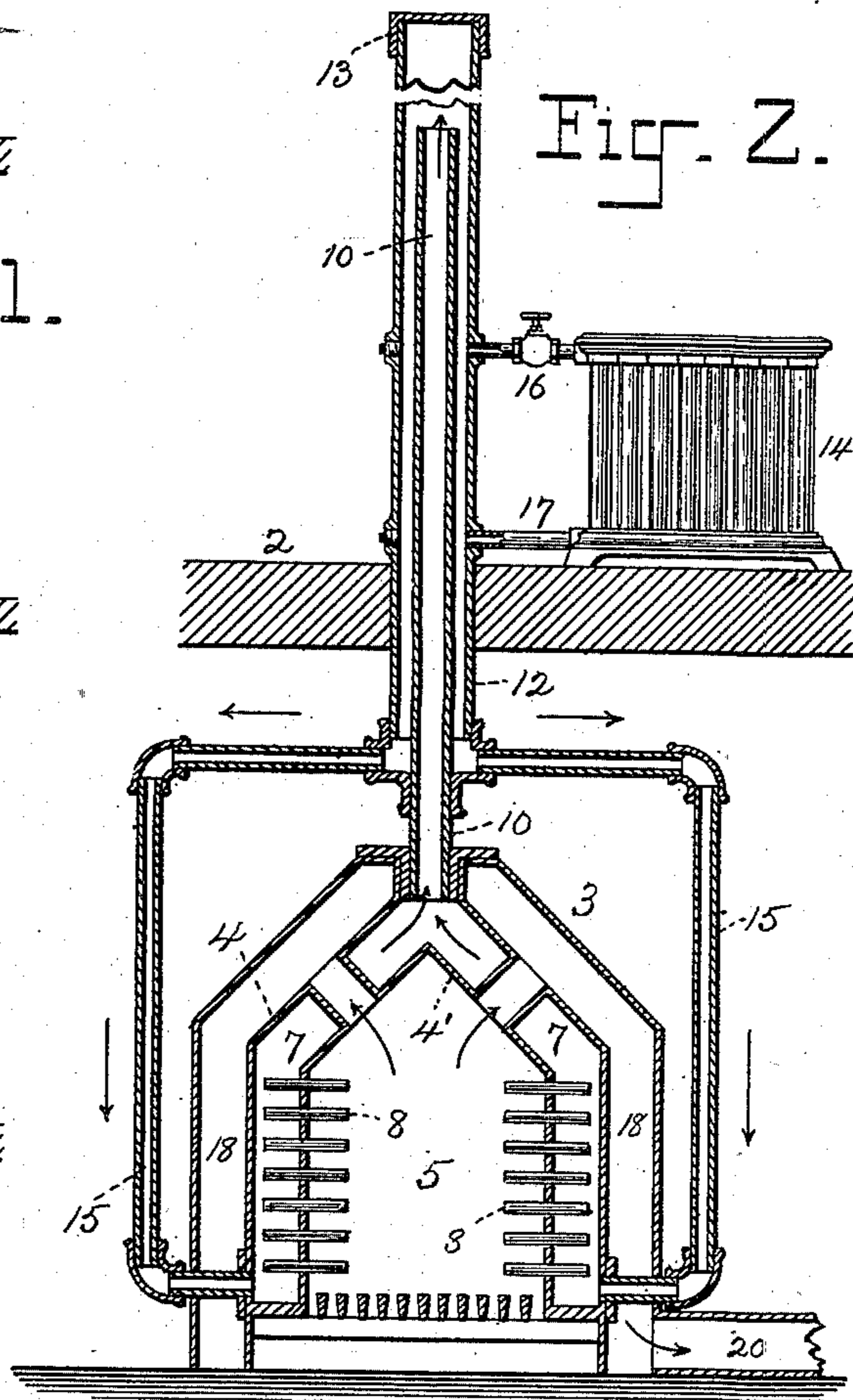
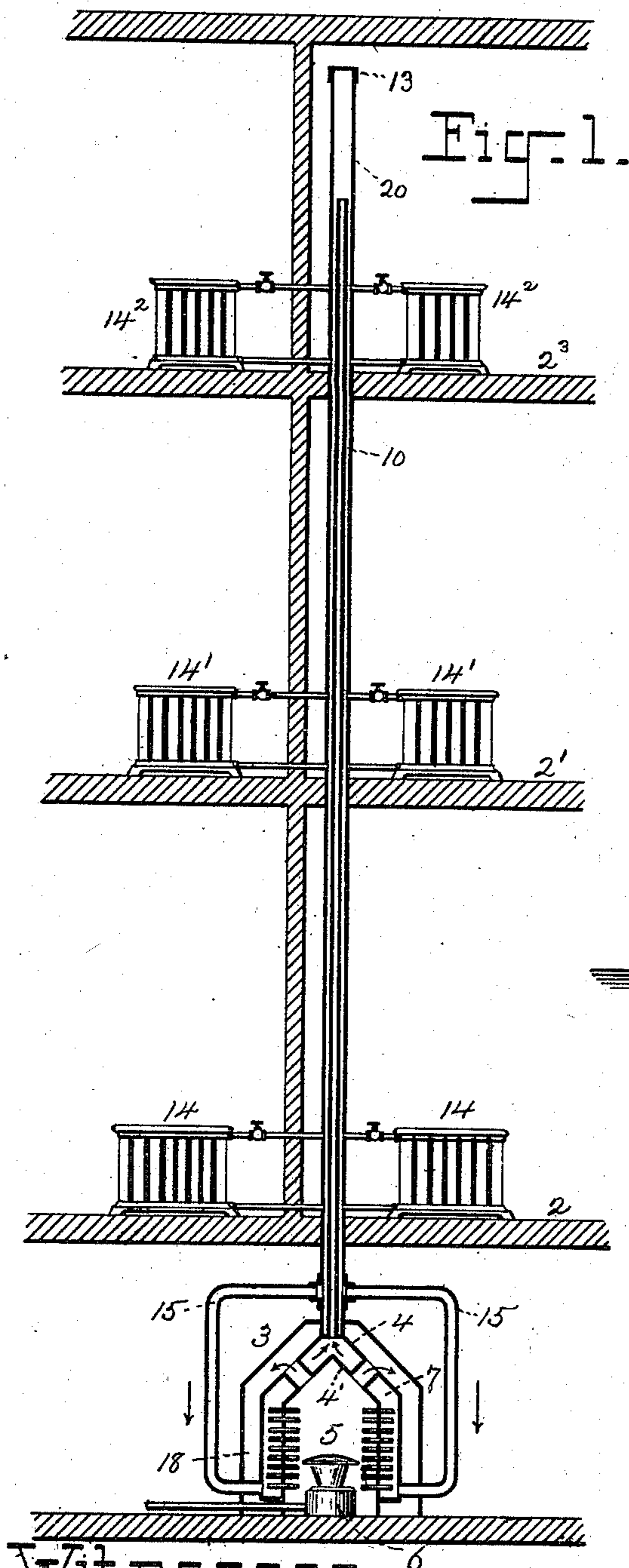


(No Model.)

J. H. MILLS.  
METHOD OF PIPING FOR HEAT DISTRIBUTION IN BUILDINGS.  
No. 579,070. Patented Mar. 16, 1897.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

JOHN H. MILLS, OF BOSTON, MASSACHUSETTS.

## METHOD OF PIPING FOR HEAT DISTRIBUTION IN BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 579,070, dated March 16, 1897.

Application filed February 5, 1894. Serial No. 499,117. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. MILLS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Methods of Piping for Heat Distribution in Buildings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to apparatus for generating and distributing heat to the interior of buildings and is peculiarly adapted to contain a liquid medium, since heat-units are more readily conveyed from place to place by such an agency, and the loss from radiation is reduced to a minimum, while condensation is entirely obviated.

My invention is embodied not only in the apparatus for creating heat, but likewise in the general arrangement of pipes by which the circulation of the heat-conveying liquid is economically produced and obtained in a most simple manner.

Briefly described, my apparatus consists in a generator located in the basement of the building and adapted to contain a liquid medium, while a heating agency of any suitable description is supplied; also in a vertical supply-pipe which leads therefrom and is open at the top, while an exterior or distributing pipe, closed at the top, contains the first pipe and may be united to the exterior of the reservoir by a water-tight joint. The base of this outside pipe may be attached to the reservoir or terminate a short distance above the latter, while it communicates with said reservoir by means of a pipe which enters the base of said reservoir. The radiators are united with and supplied from the exterior pipe, which is fed by the central pipe. Hence a natural flow of liquid as a heating medium is obtained. The hot liquid rises through the central pipe and thence is delivered into the outside pipe and from here is passed to the radiators, whence it gravitates to the base of said exterior pipe and is finally returned to the reservoir or generator.

The drawings represent, in Figure 1, a sectional elevation of a heating system adapted for a liquid agency. Fig. 2 is a similar view in part, but enlarged. Fig. 3 is a sectional plan.

In the above-described drawings, 2 2' 2'' represent the several floors of a building equipped with my system. The generator is shown as composed of a dome-shaped structure 3, formed with outer and inner walls, respectively, 4 4', the latter serving to create a combustion-chamber 5, preferably furnished with a heater 6 for oil or gas. The space 7 which exists between the walls 4 4' serves as a reservoir to contain the liquid medium which acts to convey the heat. In order to obtain the best results from the fuel, I have studded the inner shell 4' of the structure 3 with numbers of metallic pins 8, adapted to extend transversely therethrough. Thus one half the pin projects into the combustion-chamber, while the opposite corresponding portion is located within the reservoir and is surrounded by the liquid which said reservoir contains. By experiment I find it best to employ metals having a great affinity for heat. Hence the liquid is not only affected by the heat imparted through direct contact with the hot walls of the reservoir, but such heat is intensified by convection along and through the pins. As a consequence the liquid receives heat, which is transmitted both by radiation and convection, and highly efficient results are secured from the apparatus, which is simple and compact.

Rising from the top of the reservoir 3 and firmly attached thereto is a pipe 10 open at both ends and of a length adapted to reach the uppermost portion of the building to be heated. Said pipe is termed the "supply-pipe." Exteriorly of and inclosing said pipe is a second distributing-pipe or water-column 12, which is closed at both ends, being affixed to the outer imperforate shell 4 of the reservoir by a liquid-tight joint. A cap 13 surmounts the same and is made removable in case of needed repairs. The shell of the water-column is, moreover, pierced at intervals to suit the location of radiators, (shown at 14 14', 14'',) which are united both for supply and discharge with the said water-column 12. The base of said water-column is equipped with

connections by which liquid communication is maintained from the bottom of said water-column to the base of the reservoir through the pipe or pipes 15.

5 The operation of this apparatus and system is as follows: Activity of the generator by the aid of gas, oil, coal, or otherwise imparts heat to the liquid within the reservoir. As the temperature increases the heated liquid  
10 rises through the supply-pipe and thence passes to the water-column, and from there enters the radiators by the supply-pipes 16. As the water loses its heat it flows out by way of the discharge-pipe 17, and this cooler liq-  
15 uid now gravitates to the base of the water-column and coursing through the pipe 15 again enters the reservoir.

The peculiar and novel features consist in conveying the heated liquid quickly and di-  
20 rectly from the reservoir to the highest point of supply, thence passing it successively through the radiators, and finally returning such liquid as has been cooled by circulation through the radiators back again into the res-  
25 ervoir. In this manner the natural laws such as govern the circulation of a body of water

having different degrees of temperature are complied with.

To provide for escape of hot gases or smoke arising from the heating agency, the gener- 30 ator is incased or partially surrounded by a casing to form flues 18, which are adapted to connect with the main flue, (shown at 20.)

What I claim is—

In a heating system adapted for steam and 35 water circulation, the combination with a boiler or generator, and a suitable heating agency, of an outer distributing-pipe closed at the top and open at the bottom, a feed-pipe to enter the distributing-pipe at the bot- 40 tom and extending within it to a plane above the radiators to be served, a plurality of radiators suitably connected to the outer pipe, and pipes from the base of the outer distrib- 45 uting-pipe to the bottom of the generator, substantially as explained.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. MILLS.

Witnesses:

H. E. LODGE,

RICHARD W. LODGE.