

(No Model.)

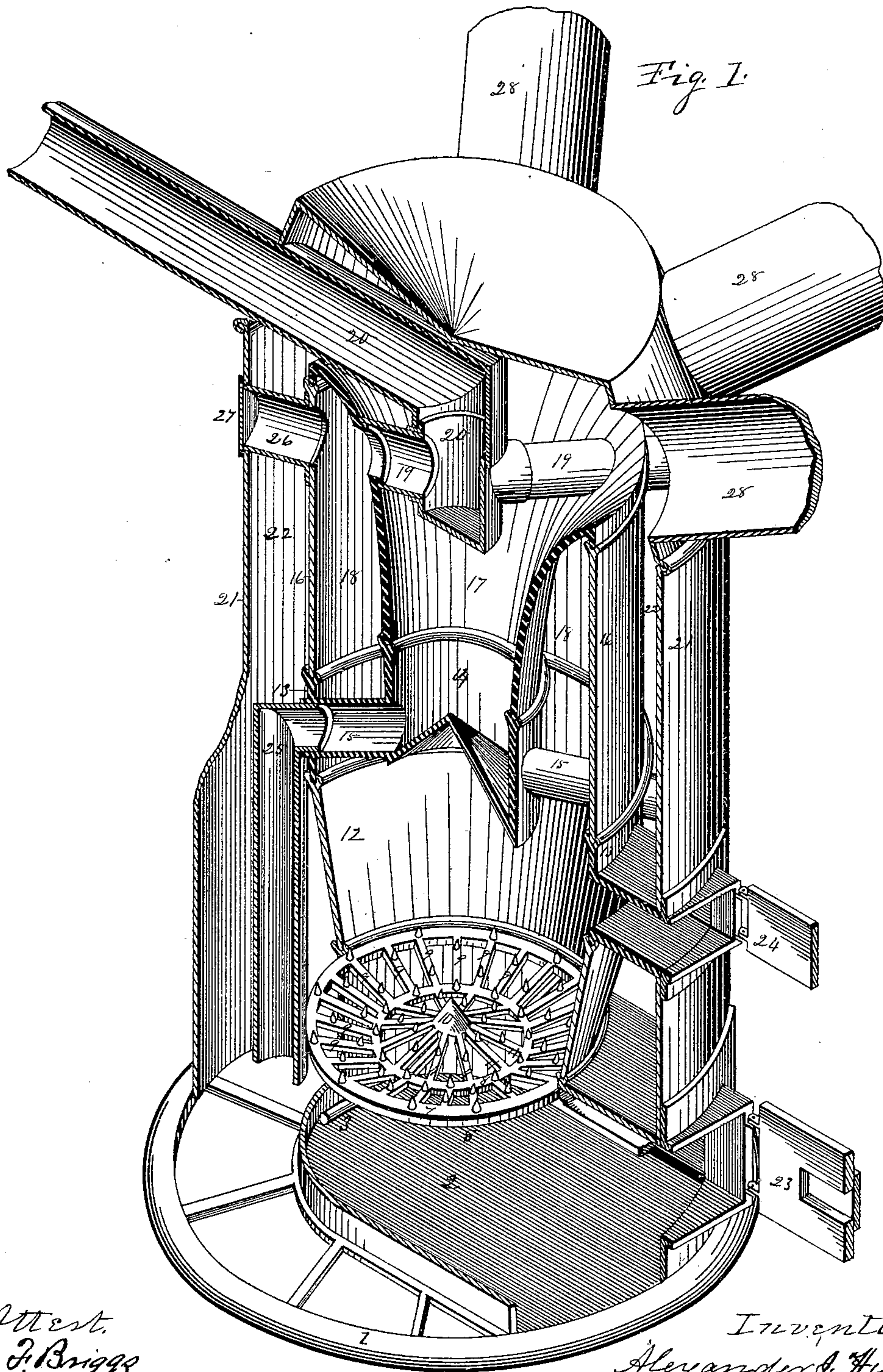
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A. J. HILL.

FURNACE.

No. 388,360.

Patented Aug. 21, 1888.



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Inventor.  
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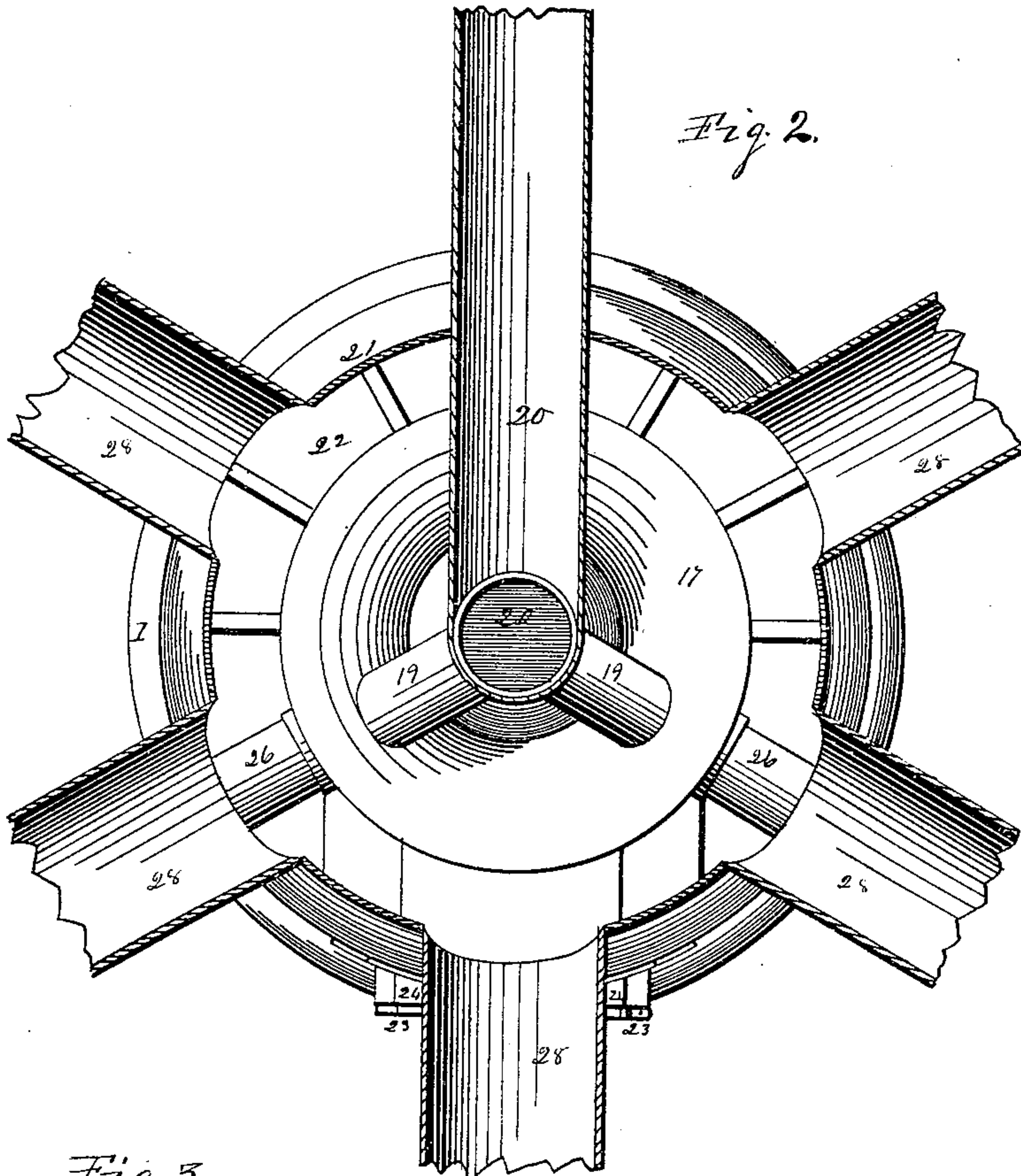
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A. J. HILL.

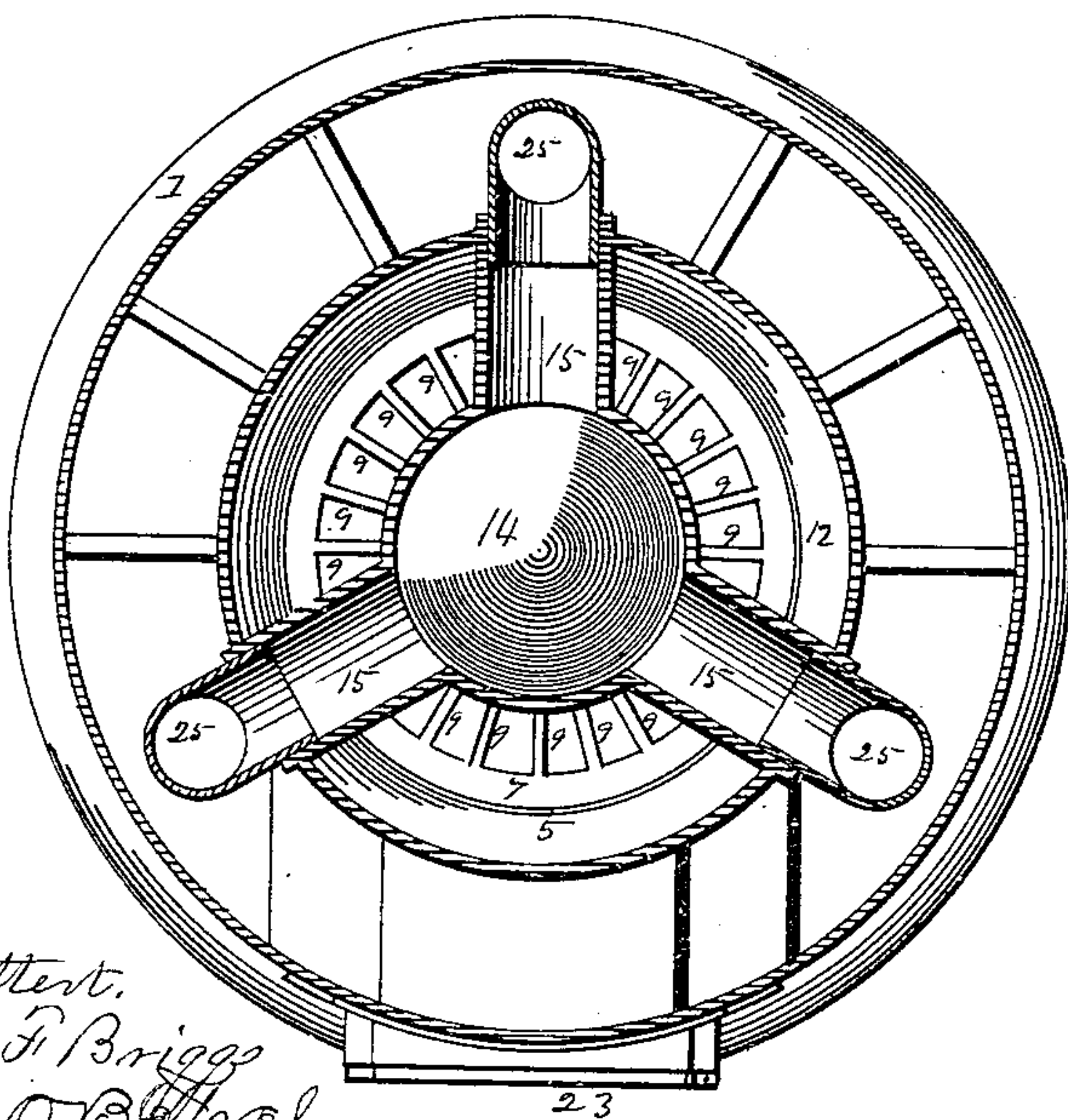
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE

ALEXANDER J. HILL, OF ROCKFORD, ILLINOIS.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 388,360, dated August 21, 1888.

Application filed August 22, 1887. Serial No. 247,539. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER J. HILL, a citizen of the United States, residing in the city of Rockford, county of Winnebago, and State of Illinois, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

This invention relates to a class of furnaces known as the "hot-air furnace," employed for heating purposes.

The object of this invention is to improve this class of furnaces to render them more efficient.

It is a well-settled axiom in my mind that a furnace limited in its capacity to the delivery of a small volume of air highly heated is not as efficient as a heater as a furnace capable of delivering a larger volume of air containing the same amount of heat. With this axiom in view I have designed and constructed the furnace represented in the accompanying drawings, in which—

Figure 1 is a vertical central section in isometrical of a furnace embodying my invention. Fig. 2 is a transverse section through the hot-air flues and through the outlet-smoke flue. Fig. 3 is a transverse section through the cold-air induction-pipes.

In the figures the base 1 of the furnace is cylindrical in plan, with ash-pit 2 rising from its central portion and extending on one side to its periphery, and outside of the ash-pit it is made in the open form shown to admit air to the heating-chamber.

A fire-pot, 12, is supported at its lower edge on the upper edge of the walls of the ash-pit.

The heating portion of the furnace above the fire-pot consists, first, of a section composed of an outer cylinder, 13, an inner cylinder, 14, with closed lower end, and air-tubes 15, opening through the wall of the outer cylinder and opening into the chamber of the inner cylinder, (this first section is supported on the upper edge of the fire-pot;) second, of an upper cylindrical section, 16, supported on the upper edge of section 13; and, third, of an inverted-bell-shaped inner section, 17, having its lower end supported on the upper edge of the inner cylinder, 14, and its upper end resting on the upper edge of the second section

16, and forms a fire-chamber, 18, between the outer and inner cylinders.

Radial smoke-flues 19 connect the fire-chamber 18, and a smoke-flue, 20, suspended in the dome centrally in the upper end of the inner bell-shaped cylinder is supported in position of the radial smoke-flues 19, fixed in the walls on the respective parts.

A jacket, 21, of plate material, serves to inclose the furnace, and its foot end is supported on its base 1, and forms an air-chamber, 22, between the jacket and furnace.

Doors 23 and 24 open through the jacket into the ash-pit and into the fire-pot, in the usual manner.

Air-tubes 25 open through the base of the furnace and rise within the air-chamber 22 and connect with the radial tubes 15 to conduct external air into the lower end of central bell-formed cylinder. By admitting the air to the chamber 14 at a point at the base of the furnace and leading it thence upwardly along the side of the fire-pot, as shown by the tubes 25, a strong current of air is induced because of the increased temperature of the same as it gradually approaches the hotter portion of the fire-pot.

Tubes 26 connect the jacket with the second cylindrical section, 16, in line with the smoke-flues 19, for the purpose of cleaning the smoke-flues, and these tubes 26 are provided with a removable cap or door, 27, to close their external openings. Hot-air tubes 28 connect with the upper end or dome portion of the jacket to conduct the heated air of the furnace to deliver it at the points required.

In the use of my improved furnace fire is made upon the grate, and air to support combustion is admitted to the ash-pit under the fire-grate through the door 23, or through a register therein, and the gases generated by the combustion of the fuel will rise through the fire-chamber 18 and through the gas-flues 19, as indicated by the arrows.

External air to be heated will be admitted through the openings formed in the base of the furnace, and will rise through the air-chamber 22 in contact with the external surface of the furnace into the dome, as indicated by the arrows, and external air will rise through



the air-tubes 25 and enter the lower end of the inner chamber within the walls of the inverted-bell-formed cylinder, composed of sections 14 and 17, as indicated by the arrows, and in contact with the heated surface of its inner walls will rise into the dome to mingle with the heated air of the chamber 22, to be distributed through the hot-air tubes 28. In this construction of furnace the air is subjected to a large area of heating-surface by which a large volume of air is rapidly heated for distribution.

The specific construction of the grate herein set forth forms no part of my present invention, but is reserved as subject-matter of another application to be hereafter filed.

I claim as my invention—

1. In a hot-air furnace, the combination of an outer air-chamber, an inner air-chamber centrally over the fire-pot, air-flues connecting the outer and inner chambers, a fire-chamber between the air-chambers, a smoke-flue centrally in the dome, and radial gas flues connecting the fire-chamber and central smoke-flue, substantially as and for the purpose set forth.

2. In a hot-air furnace, the combination of an outer air-chamber, an inner air-chamber, furnace-chamber between the inner and outer air-chambers, a smoke-flue centrally in the dome, radial smoke-flues connecting the furnace-chamber and central smoke flue, and radial

tubes connecting the jacket and outer wall of the furnace in line with the smoke-flues connecting the furnace-chamber and central smoke-flue, substantially as and for the purpose set forth.

3. In a hot-air furnace, the combination of an outer air-chamber and inner air-chamber centrally over the fire-pot, air-flues connecting the outer and inner chambers, the said connecting-flues extending through the fire-chamber and downwardly along the side of the fire-pot toward the base of the furnace, substantially as set forth.

4. In a hot-air furnace, the combination of an outer air-chamber, an inner air-chamber centrally over the fire-pot, air-flues connecting the outer and inner chambers, said outer and inner chambers meeting in the dome, and a fire-chamber between the said air-chambers, the said fire-chamber being formed by an outer wall-section resting on the top of the fire-pot, an inner wall-section supported centrally over the fire-pot, an upper outer wall-section resting on the top of the first-named outer wall-section, and an inner upper wall-section resting on the top of the said inner wall-section and on the top of the said upper outer wall-section, substantially as set forth.

ALEXANDER J. HILL.

Witnesses:

JACOB BEHEL,  
A. O. BEHEL.