

W. AHLEN.  
 REGENERATIVE FURNACE VALVE.  
 APPLICATION FILED JULY 29, 1909.

991,592.

Patented May 9, 1911.

3 SHEETS—SHEET 1.

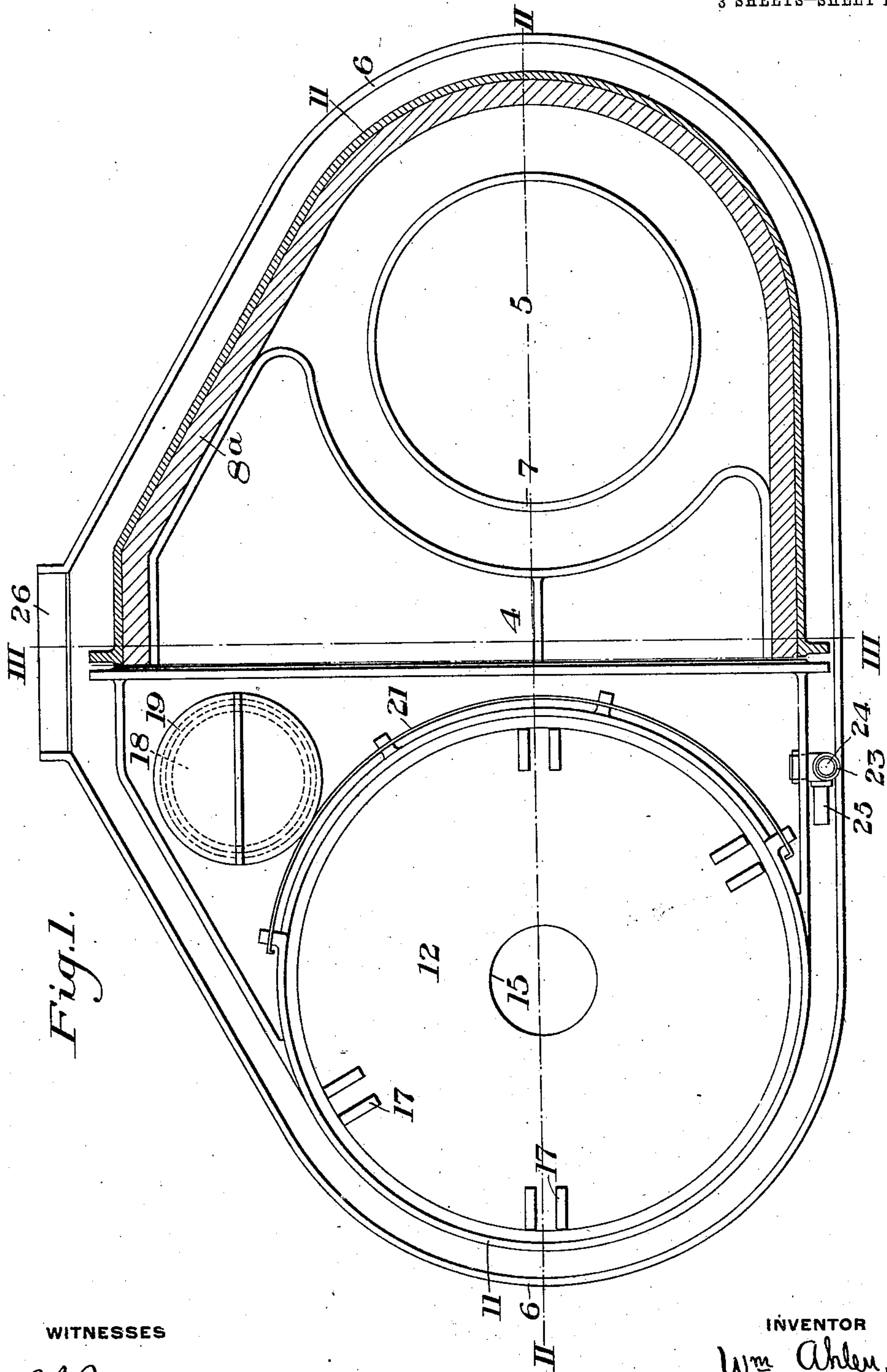


Fig. 1.

WITNESSES

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*Walter Farnsworth*

INVENTOR

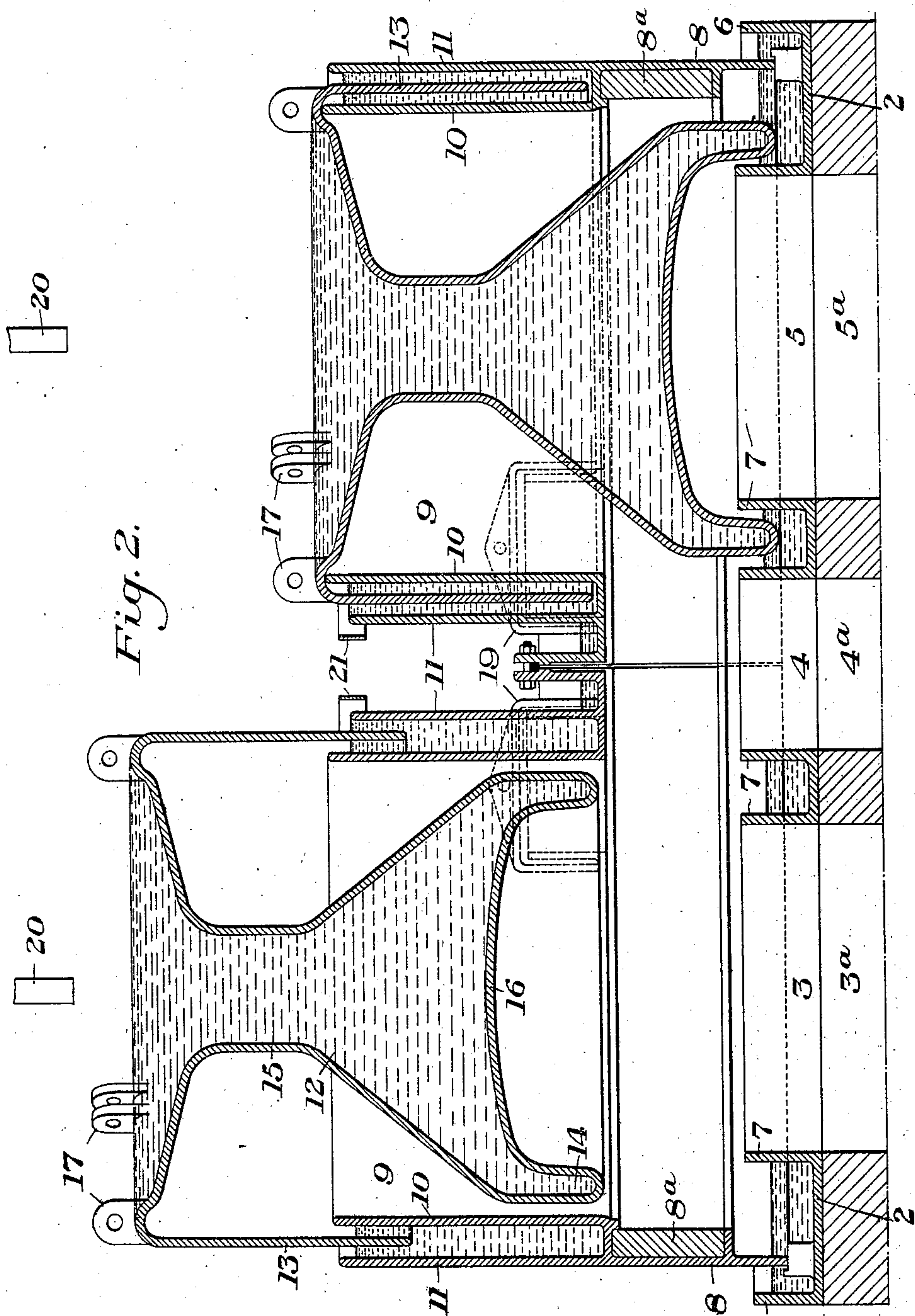
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 his Attys.

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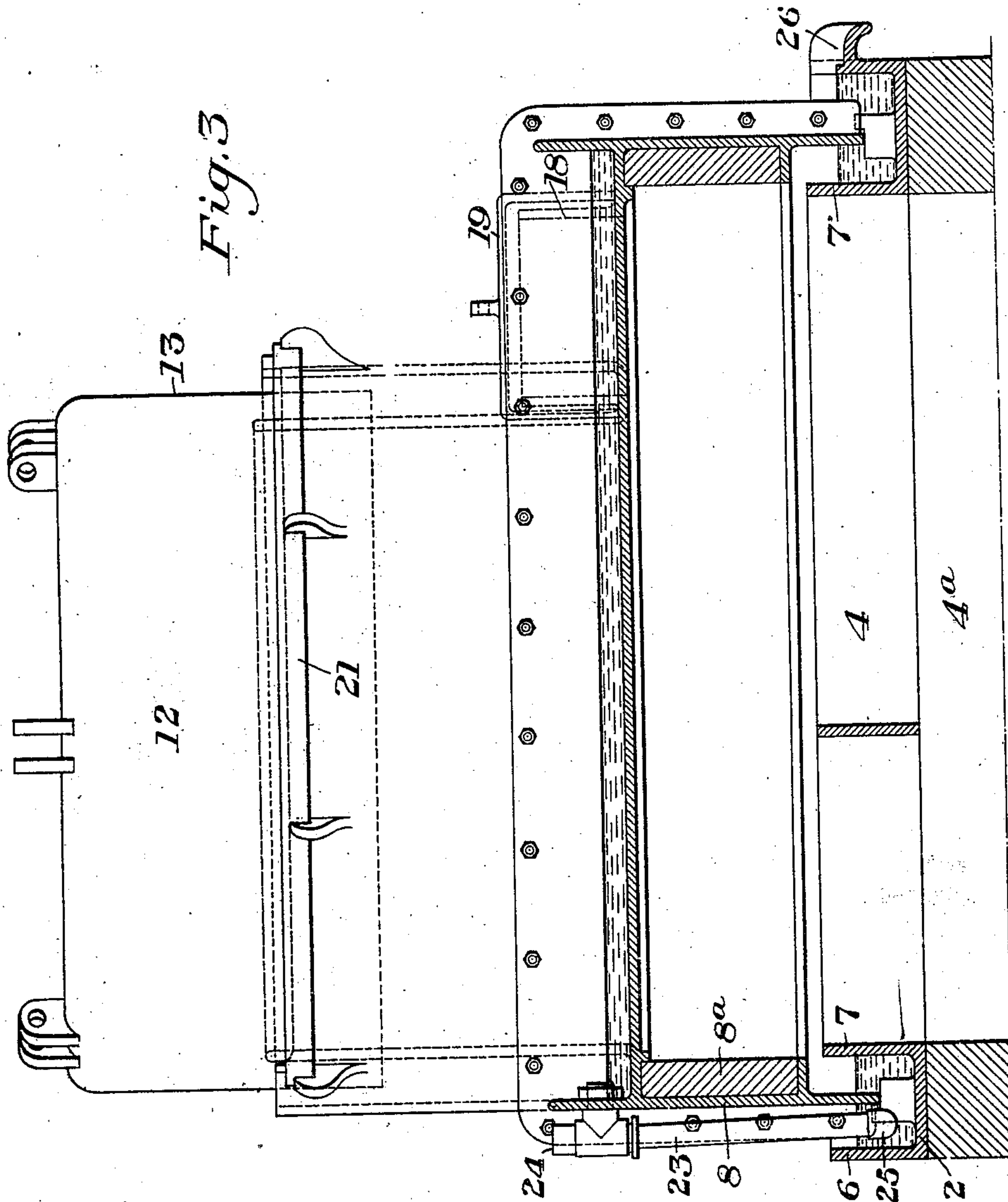
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3 SHEETS-SHEET 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM AHLEN, OF DUQUESNE, PENNSYLVANIA.

## REGENERATIVE-FURNACE VALVE.

991,592.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed July 29, 1909. Serial No. 510,181.

*To all whom it may concern:*

Be it known that I, WILLIAM AHLEN, of Duquesne, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Regenerative-Furnace Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan, partly in section, of a valve constructed and arranged in accordance with my invention; Fig. 2 is a longitudinal sectional elevation of the same on the line II—II of Fig. 1; Fig. 3 is a transverse sectional elevation on the line III—III of Fig. 1.

My invention relates to the construction and arrangement of reversing valves employed to control the flow of gases through the regenerators of regenerative heating and melting furnaces, and more particularly relates to the water-cooled and water-sealed type of valves used on such furnaces.

The object of the invention is to provide a valve having improved means for cooling and sealing the valves, and having means by which the weight of the moving parts of the apparatus is reduced, and the amount of water used to cool and water-seal the valve is greatly lessened.

In the drawings, 2 designates the bottom casting or base plate of the valve casing, having openings 3, 4 and 5, which register with the top ends of the vertical flues 3<sup>a</sup>, 4<sup>a</sup> and 5<sup>a</sup>. The flues 3<sup>a</sup>, 4<sup>a</sup> and 5<sup>a</sup> serve to connect, through the valve, the furnace regenerators with the gas or air supply flues or the stack flue or to connect a regenerator alternately with the stack and a gas or air flue. The bottom casting or base 2 is provided with marginal flanges 6, and the openings 3, 4 and 5 also have upwardly extending flanges 7, the flanges 6 and 7, with the bottom of the casting 2, forming a water trough in which the lower edges of the casing 8 are seated when the parts of the valve are assembled in place. On account of the large size of the casing 8, it is preferably made in two transversely divided halves which are symmetrical. The top of the casing 8 is provided with openings 9 having vertically extending cylindrical walls 10, which are surrounded by similar walls 11, so as to form annular spaces. Placed in each of the openings 9 is a vertically mov-

able hollow water cooled valve 12 of peculiar construction forming part of this invention.

The vertically movable valves 12 are provided with an outer, downwardly depending water sealing flange 13. The valve 12 is made hollow, and is provided with a contracted opening 15 at a point intermediate of its ends, which contracted portion largely reduces the weight of the movable valve 12. The water space formed by the walls of the restricted portion, and between the walls of the flange 14 require a smaller volume of water to fill, and the space between the flanges 13 and the walls 15 forming the restricted opening becomes filled with dead gas which remains in this portion of the valve during the movements of the valves, and prevents the highly heated gases from coming into direct contact with the surfaces of the valve, other than those of the head portion 16 which is always covered with water.

The upper ends of the valves 12 are provided with suitable ears or lugs 17, by which the valves are secured to the operating mechanism, which may be of any desired type. The upper surface of the valve casing 8 is provided with man-holes 18, having covers 19, the lower marginal edges of which dip downwardly into the cooling water in the troughs formed on the upper surface of the casing so as to maintain a water seal between the parts.

Preferably the lower portion of the casing 8 is provided with a refractory lining 8<sup>a</sup>. The manholes 18 are made of such size that this lining can be put into position, and be repaired while the valve is assembled in place over the top of the flues 3<sup>a</sup>, 4<sup>a</sup> and 5<sup>a</sup>. The manholes are also used when necessary to remove an accumulation of tar or dirt from the water space on the inside of the valve in the bottom casting 2.

A suitable water supply pipe 20 is provided so as to discharge into the annular water space in the valves 13. The water fills this annular space, and overflows over the edges downwardly into the water seal formed by the flanges 10 and 11 on the casing 8. The water overflows from this space at the inner sides of the casing downwardly into the pool of water on the top of the base or casting 2. As the valves are moved upwardly and downwardly in the casing, considerable water is displaced, and in order to prevent splashing of this water, a splash



board or plate 21 is provided opposite the overflow on each of these water seals, so as to direct the water downwardly.

The water from the top of the casing 8 overflows through the overflow pipe 23 into the water channel formed in the bottom casting 2. The pipe 23 is provided with an open upper end 24, so as to prevent siphoning of the water from the pool maintained on top of the casing 8. The lower end of the pipe 23 is preferably provided with an elbow 25, which directs the flow of water in such manner as will create a current in the pool maintained in the bottom casting 2, and the water from the bottom casting 2 overflows through the overflow opening 26 provided in the casting 2 for that purpose.

The advantages of my invention will be apparent to those skilled in the art. By the improved construction of my valve the weight is greatly reduced, and the amount of water required for use is lessened. This is of importance, especially with the larger sizes of these valves. The apparatus is simple, and is easily kept in repair. The provision of the manholes in the top of the casing permits of repairs being made without removing the casing from the bottom casting. The coverings for the manholes are water sealed when in place. Tar and other accumulations on the interior of the apparatus can be removed without difficulty through the manholes without disturbing the valve casing or valves.

Modifications in the construction and arrangement of the parts may be made without departing from my invention.

I claim:—

1. A regenerative furnace valve, comprising a valve casing having opposite water

sealed openings in its top and bottom end, a hollow water cooled valve extending through the upper opening in the casing and adapted to be removed therethrough, the valve having a surrounding flange depending from its upper edge extending into the water seal for the top opening, the wall of said valve having a contracted portion adapted to form with the surrounding flange a dead space in which cooled gases are maintained during the operation of the valve the area of the mouth of the dead space at the lower edge of the surrounding flange being less than the transverse area of the dead space above the mouth of said space; substantially as described.

2. A regenerative furnace valve, comprising a valve casing having opposite water sealed openings in its top and bottom end, a hollow water cooled valve extending through the upper opening in the casing and adapted to be removed therethrough, the valve having a surrounding flange depending from its upper edge extending into the water seal for the top opening, the wall of said valve having an upwardly and outwardly tapering portion adapted to form with the surrounding flange a dead space in which cooled gases are maintained in the operation of the valve the area of the mouth of the dead space at the lower edge of the surrounding flange being less than the transverse area of the dead space above the mouth of said space; substantially as described.

In testimony whereof, I have hereunto set my hand.

WILLIAM AHLEN.

Witnesses:

GEORGE L. NEFF,  
T. E. McDOWELL.