

No. 786,033.

PATENTED MAR. 28, 1905.

J. A. HERRICK.
REVERSING VALVE.

APPLICATION FILED JULY 5, 1904.

4 SHEETS—SHEET 1.

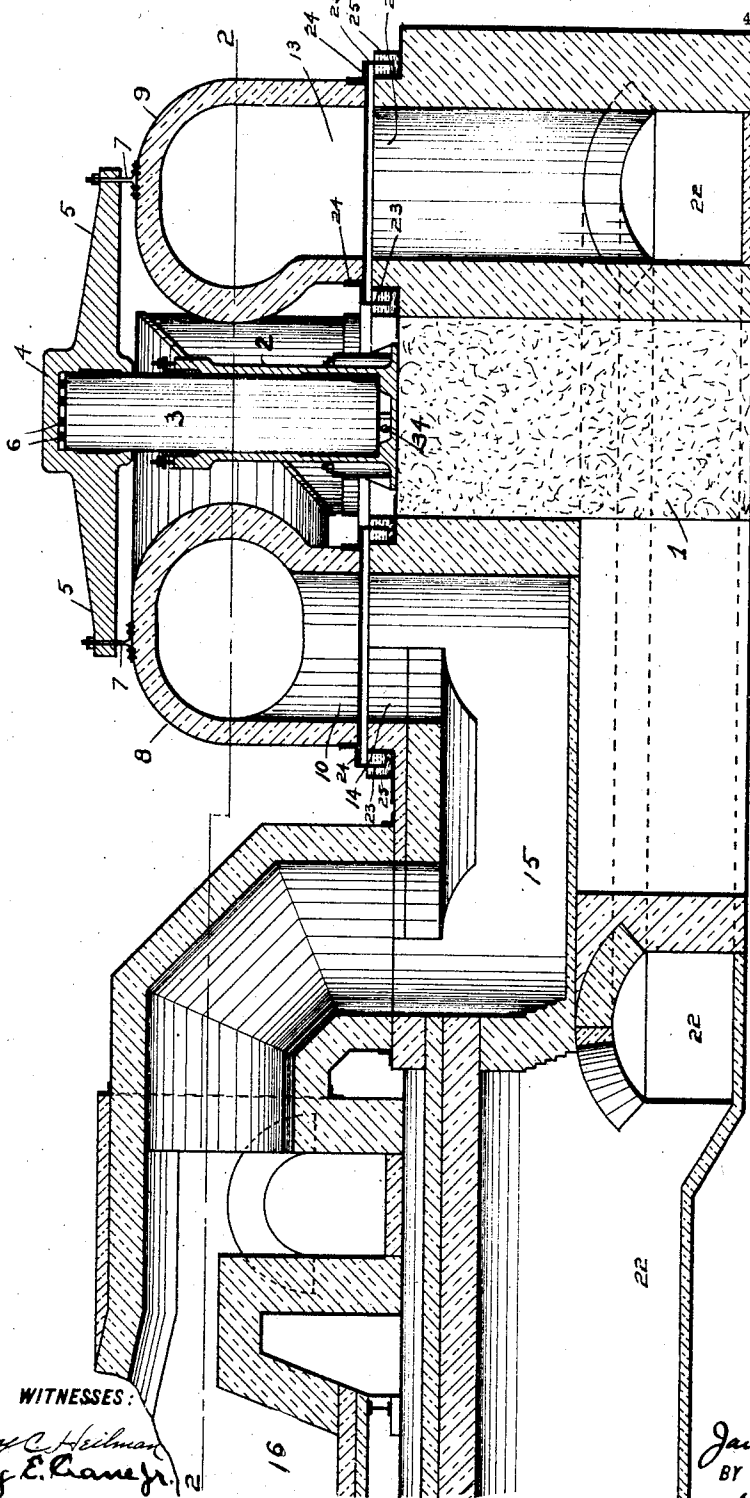


FIG. 1

WITNESSES:

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W. E. Crane Jr.

INVENTOR

James A. Herrick
BY

Chas. W. Butler

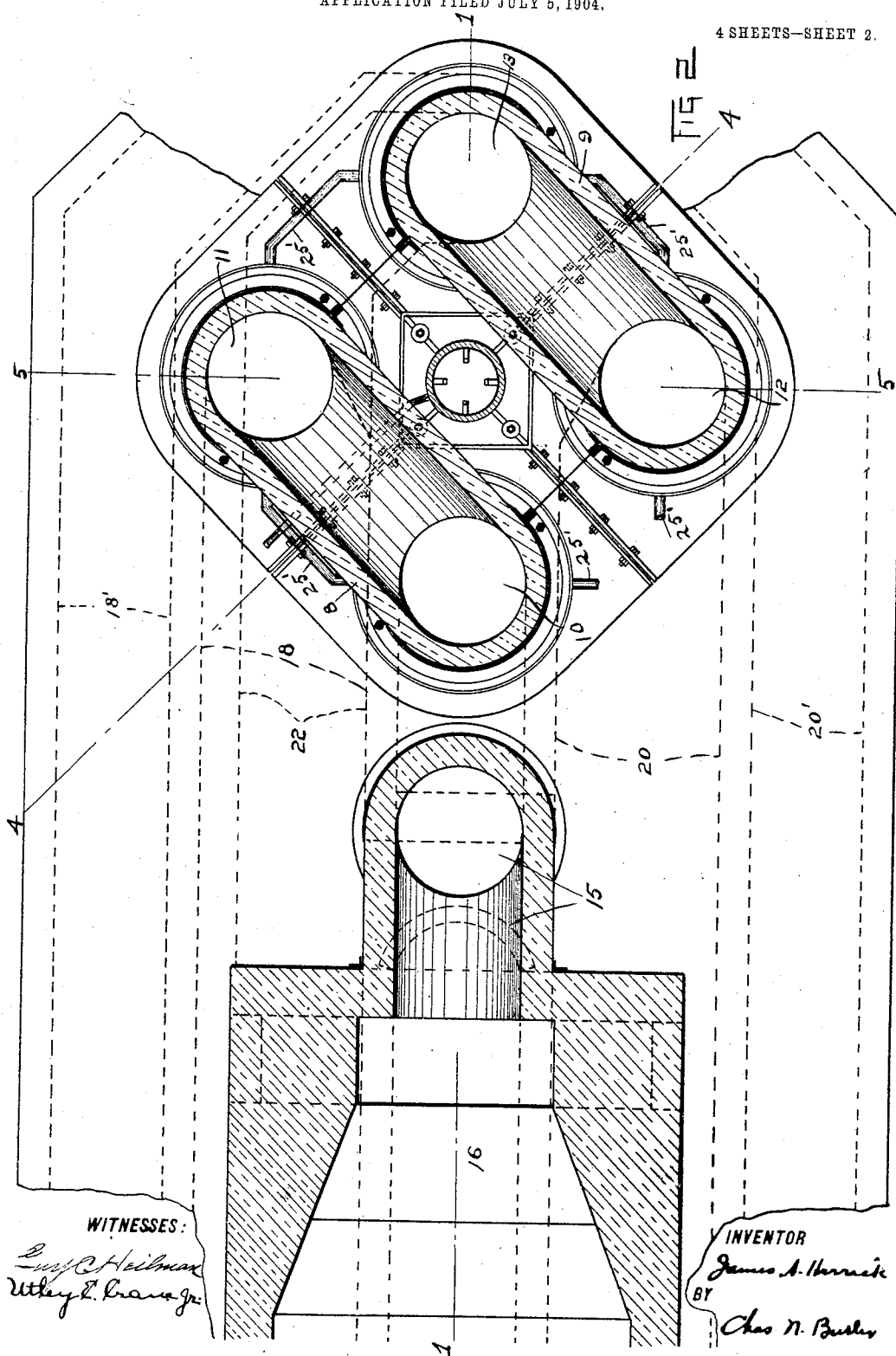
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4 SHEETS—SHEET 2.



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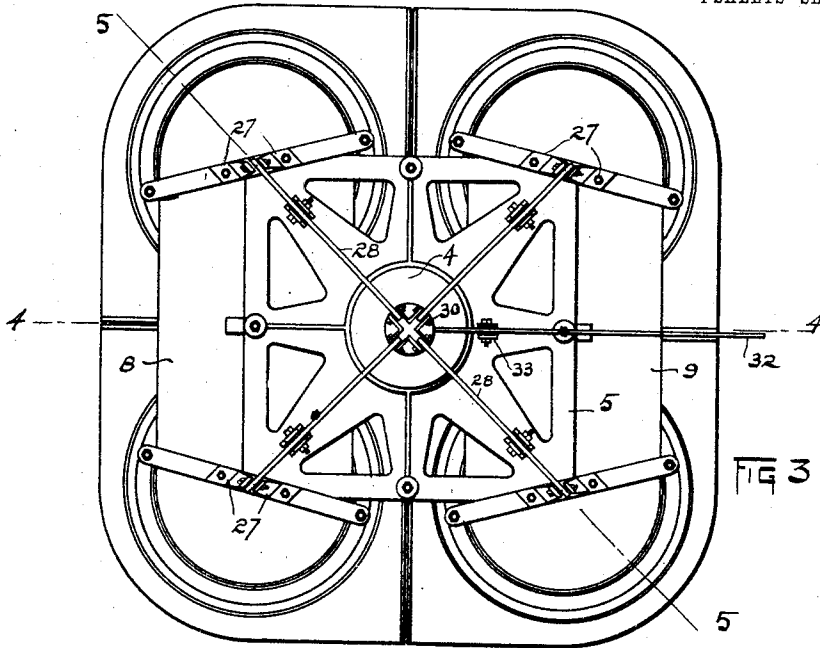


FIG 3

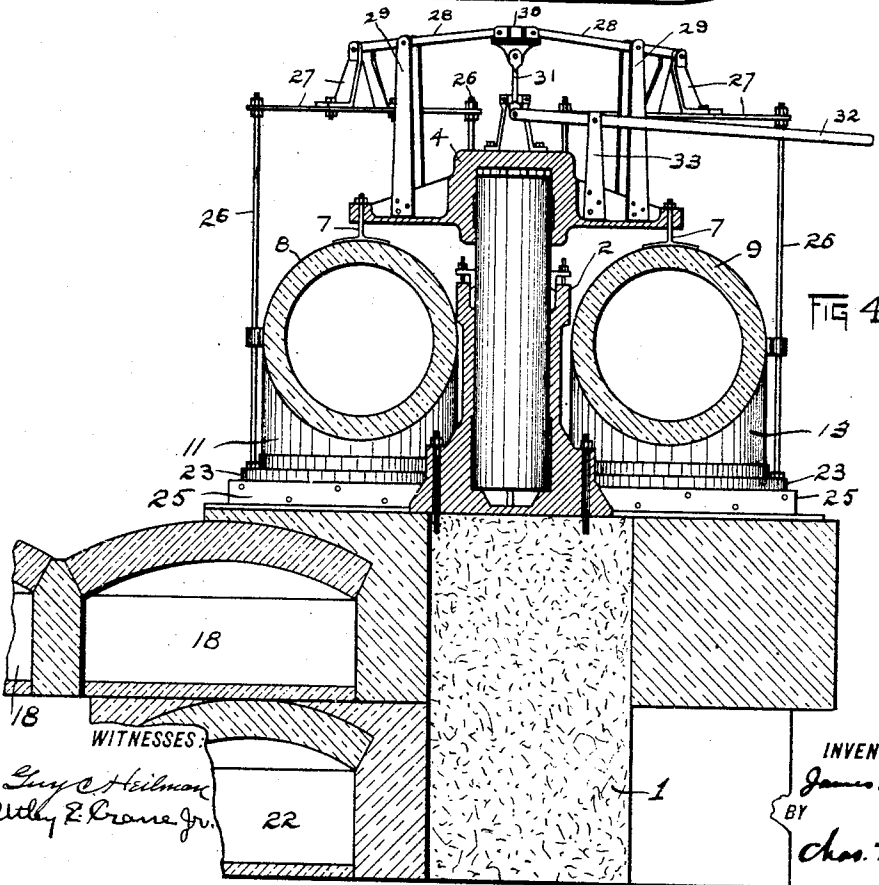


FIG 4

WITNESSES

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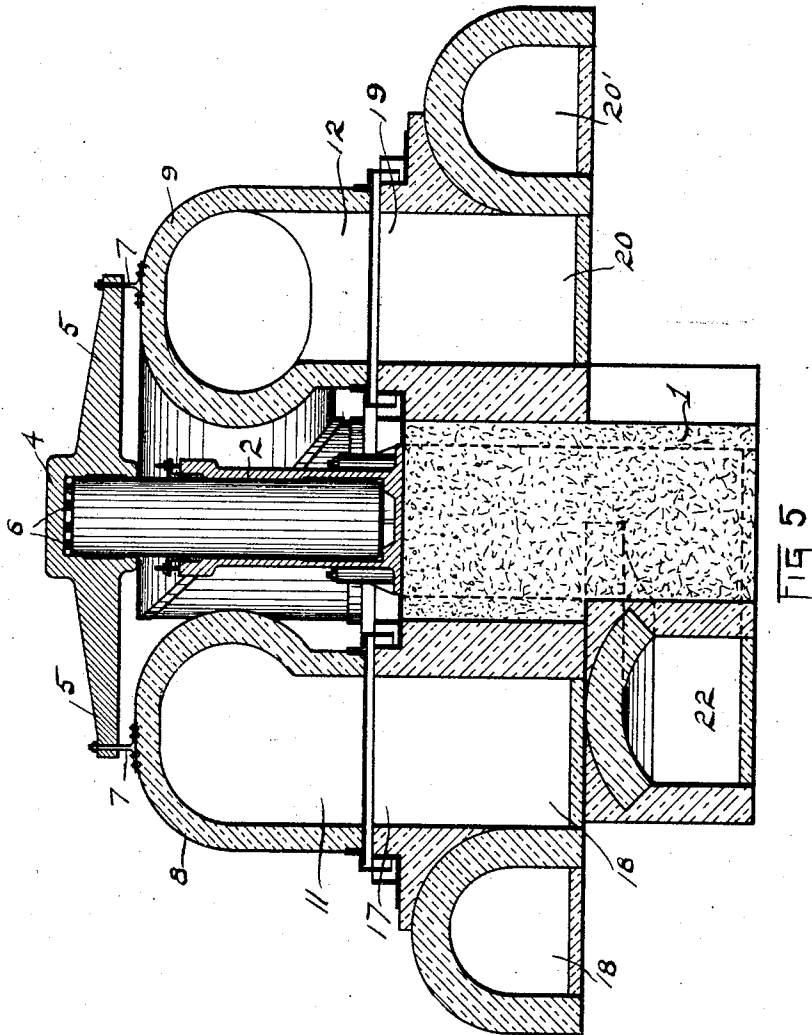
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JAMES A. HERRICK, OF PHILADELPHIA, PENNSYLVANIA.

REVERSING-VALVE.

SPECIFICATION forming part of Letters Patent No. 786,033, dated March 28, 1905.

Application filed July 5, 1904. Serial No. 215,452.

To all whom it may concern:

Be it known that I, JAMES A. HERRICK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Reversing-Valves, of which the following is a specification.

My invention is designed, primarily, for handling the heated products of combustion escaping from a continuous furnace and the air to be heated for use therein, the valve passing the flame and waste products from the furnace to the regenerator to be heated thereby and the heated air from the other regenerator to the hot-air flue leading to the furnace. In such operations, owing to the high temperature to which valves are subjected when constantly exposed to the intense heat of the furnace-gases directly entering them, great difficulty has been experienced from burning out, warping, sticking, and leaking in the valve mechanisms commonly used; and it is the object of the present invention to provide means for overcoming these defects and to facilitate the operation of the valve.

The nature and characteristic features of the improvements will more fully appear by reference to the following description, and the accompanying drawings in illustration thereof, of which—

Figure 1 represents a vertical sectional view taken longitudinally through a valve mechanism and flues connected therewith in embodiment of my invention, the view being taken on the line 1 1 of Fig. 2. Fig. 2 represents a horizontal sectional view of the same, taken on the line 2 2 of Fig. 1. Fig. 3 represents a top plan view of the valve mechanism. Fig. 4 represents a vertical sectional view taken on the line 4 4 of Figs. 2 and 3, and Fig. 5 represents a vertical sectional view taken on the line 5 5 of Figs. 2 and 3.

As shown in the drawings, the foundation 1 has anchored thereto a cylinder 2, which acts as a base for and contains the column 3, movable as a piston in the cylinder. The top of the column has fitted thereon the socket 4 of a frame 5, the frame being revolvably supported on the ball-bearings 6, rolling on the top of the column. The frame carries the

hangers 7, fixed to the valve-drums 8 and 9, having passes with the port ends 10 11 and 12 13. By the revolution of the frame and drums the respective port ends thereof may be brought into registration with the port end 14 of the flue 15, leading from the furnace-chamber 16, the port end 17 of the regenerator-flue 18, parallel to and communicating with the regenerator-flue 18', the port end 19 of the regenerator-flue 20, parallel to and communicating with the regenerator-flue 20', and the port end 21 of the hot-air flue 22, leading to the furnace-chamber. Each of the port ends of the drums has vertically movable thereon a cylindrical apron 23, provided with a collar 24. Each apron is adapted for dipping into the channel 25, surrounding the port end of each of the flues, the channels being connected by the pipes 25' and filled with water to form seals between the drum and flue ports.

The respective aprons are supported by rods 26, suspended from yokes 27, pivotally connected to levers 28, having the fulcrums 29. The levers extend radially from a central coupling 30, to which they are pivoted. The coupling has a link 31, pivoted thereto and to a lever 32, having the fulcrum 33. The lever 32 is elevated and depresses the levers 28 to lift the aprons 23 out of the channels 25 when it is desired to revolve the drums, the aprons being lowered into the channels when the drums have been revolved into the position causing their ports to register with the corresponding flue-ports.

When through any cause it is desired to lift the drums through sticking of the aprons for access to the flues or passes or to make repairs, the cylinder 2 may be charged with water through the port 34, lifting the piston 3, with the frame or spider 5, and drums 8, carried thereby.

It will now be understood that with the mechanism in the position shown the flame and heated products of combustion flowing constantly from the furnace-chamber 16 through the flue 15 pass through the drum 8 to the regenerator-flue 18 and thence through the regenerator-flue 18' to the stack, while the air flowing through the regenerator-flues 20' and 20 is passed by the drum 9 into the hot-

air flue 22, leading to the furnace-chamber. When it is desired to reverse, the aprons 23 are lifted from the channels 25, the valve is swung round, and the aprons lowered into the channels, with the drum 9 connecting the flue 15 with the flue 20 and the drum 8 connecting the flue 18 with the flue 22.

I have found that my passes or drums of circular cross-section have marked advantages over passes of rectangular cross-section. The drums of circular cross-section readily retain the insulating-linings, which cannot be retained in passes of rectangular cross-section, the lining-joints in the latter construction separating. The use of separated drums, as in the present invention, permits a free circulation of air wholly around each pass to keep the walls cool and prevents the communication which takes place between passes that are merely separated by a wall constantly subject to intense heat from one or the other of the passes and destroyed in a short time as a consequence thereof. The constant high temperature to which a division-wall is subjected which separates passes of rectangular cross-section causes it to open at its joints and permits leakage between the passes.

I claim—

1. The combination of a plurality of flues each having a port, with a rotary valve having passes with independent walls exposed to the free circulation of air entirely around said passes, said passes being adapted for registration in alternation with the corresponding ports of said flues, substantially as specified.

2. The combination of a plurality of flues each having a port, a water-channel surrounding each of said ports, a pair of rotary passes circular in cross-section provided with independent walls each having a pair of ports adapted to register with a pair of said flue-ports, and aprons surrounding said rotary passes and dipping into said water-channels, substantially as specified.

3. The combination of a plurality of flues each having a port, a water-channel surround-

ing each of said ports, a plurality of rotary passes each having a pair of ports adapted to register with said flue-ports, aprons surrounding said rotary passes and dipping into said water-channels, and means for elevating and lowering said aprons independently of said passes, substantially as specified.

4. The combination of a plurality of flues having ports, with a pair of separated drums having ports adapted for registration with alternate ports of said flues, a column, and means for permitting said drums to rotate independently of the movement of said column, substantially as specified.

5. The combination of a plurality of flues having ports, with a pair of separated drums exposed to the free circulation of air entirely around them, said drums having ports adapted for registration with alternate ports of said flues, a column, and a frame rotatably supported on said column and supporting said drums, substantially as specified.

6. The combination of a plurality of flues having ports, with a pair of revoluble drums having ports adapted for registration with alternate ports of said flues, means for rotatably supporting said drums, and sealing mechanism movable independently of the movement of said drums, substantially as specified.

7. The combination of a plurality of flues having ports, channels surrounding said ports, a pair of rotary drums having ports adapted for registration with said flue-ports, aprons sleeved on said drums and registering with said channels, and lever mechanism connected with said aprons for operating them, substantially as specified.

In testimony whereof I have hereunto set my hand, this 30th day of June, 1904, in the presence of the subscribing witnesses.

JAMES A. HERRICK.

In presence of—

THOMAS S. GATES,
UTLEY E. CRANE, Jr.