F. H. MOYER AND G. E. THACKRAY.

REVERSING VALVE.

APPLICATION FILED OCT. 21, 1918.

1,362,539.

Patented Dec. 14, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

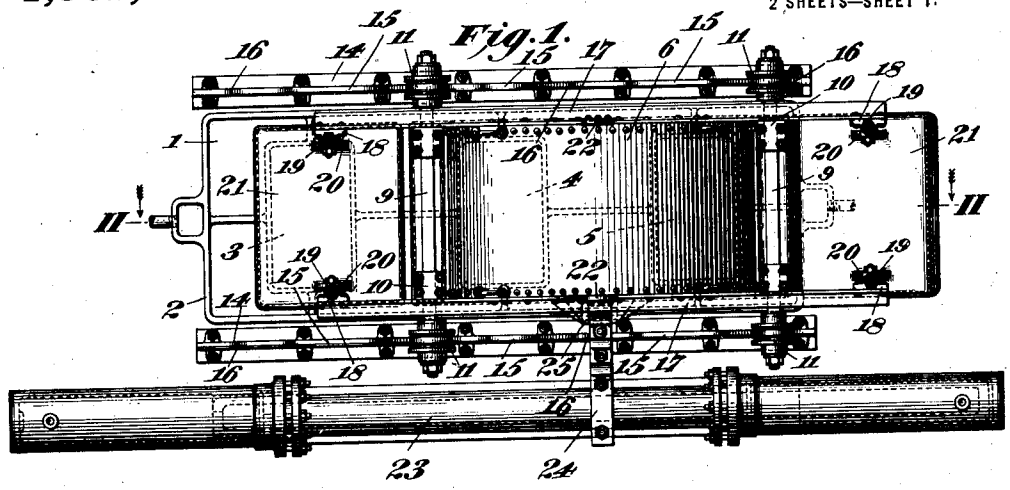


Fig. 2.

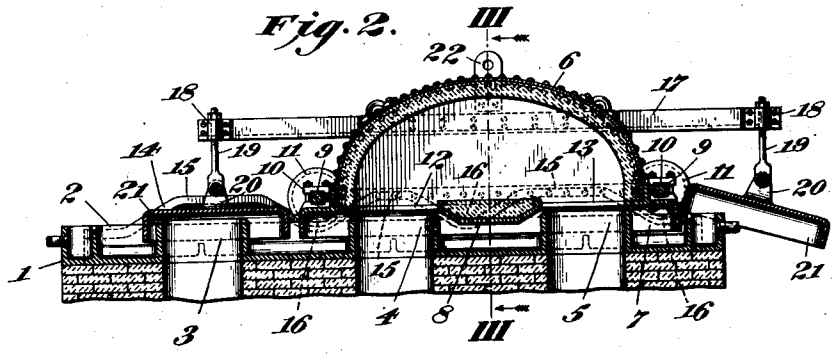
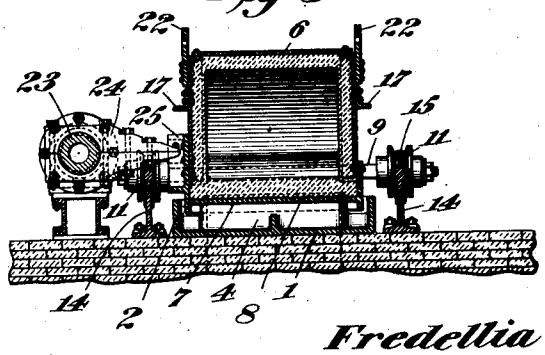


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

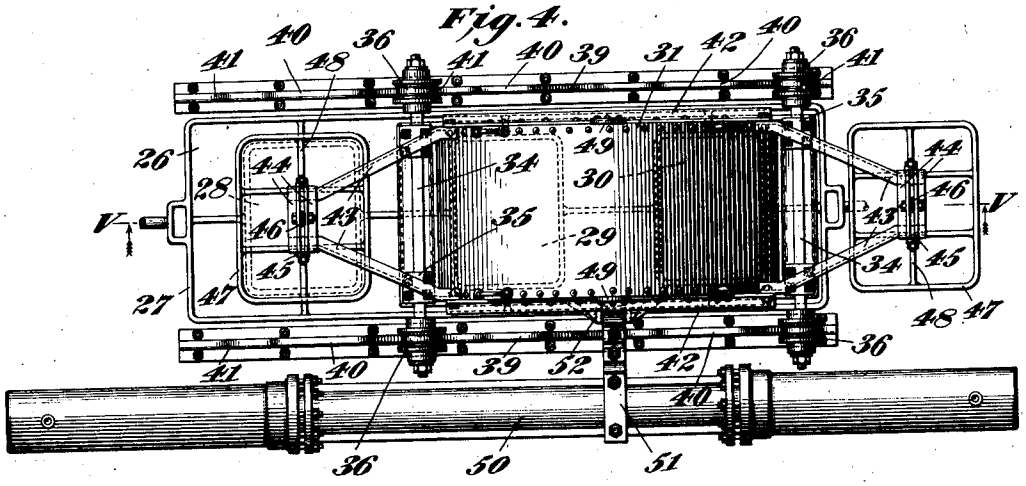


Fig. 5.

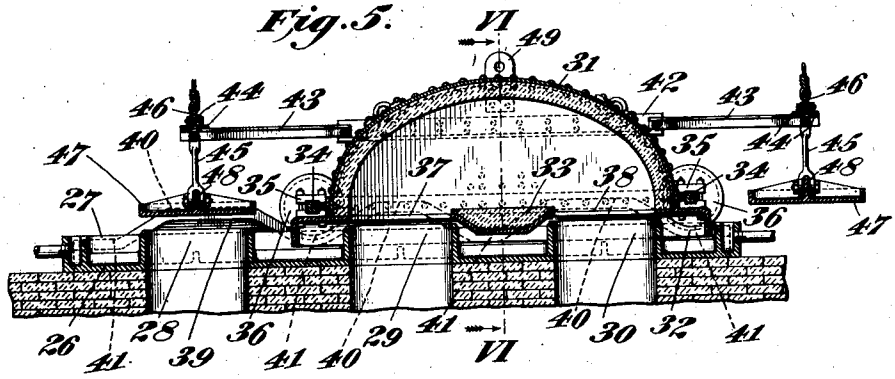
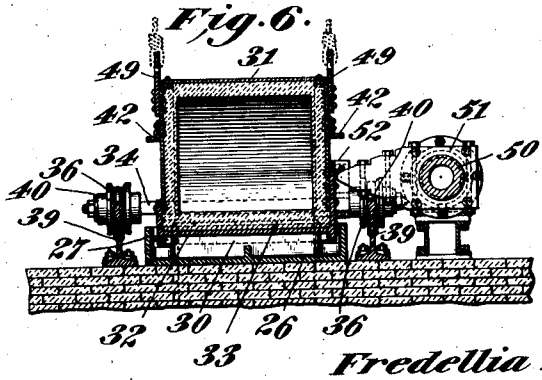


Fig. 6.



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FREDELLIA H. MOYER AND GEORGE E. THACKRAY, OF WESTMONT BOROUGH, PENNSYLVANIA.

REVERSING-VALVE.

1,362,539. Specification of Letters Patent. Patented Dec. 14, 1920.

Application filed October 21, 1918. Serial No. 258,933.

To all whom it may concern:

Be it known that we, FREDELLIA H. MOYER and GEORGE E. THACKRAY, both citizens of the United States, and both residing in the borough of Westmont, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Reversing-Valves; and we 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.

Our invention relates to improvements in reversing valves, particularly of the type used in connection with regenerative furnaces for the purpose of simply and promptly reversing the flow of currents of gases through the regenerators and furnaces as required during their operation.

Heretofore, most reversing valves have been inclosed in an outer casing so that the valve hood or valve proper, which may be of oscillating or D type, is within the casing and subjected at all times to the heat of the passing gases on both sides of said valve in such a way as to lead to their warping and cracking, causing inoperativeness and quick destruction.

It is one of the objects of our invention to provide a reversing valve, the outer portion of which is exposed to the atmosphere so that it is always cooled thereby, thus prolong its life and maintaining its operableness.

Another particular feature of our construction resides in the use of separate disk valves for the flue which is not controlled by the D-valve proper and in this construction one of these disks is operative, dependent upon the position of the main valve, and when the main valve controls the two right-hand ports or passages or the two left-hand ones, the disk valve controls the other passage or port.

In our construction we equip the main valve with two separate disk valves which are attached to and moved with the main valve, being hung from a light frame-work secured to the main valve. Our reversing valve is adapted both for controlling the gas passages or the air passages of a regenerative furnace, and also the passages to the stack.

Our air reversing valve has separate valve disks hung from a frame secured to the main or D-valve and these disks may be connected to a raising or lowering mechanism so that when either of these separate valve disks is over the air port which supplies air to the regenerator, it may be raised or lowered to increase or decrease the supply of air, thus acting both as a part of the reversing valve and as an air controlling valve. The separate valve disks for the gas valve, however, are not provided with lifting mechanism but are preferably arranged so that they move with and are lowered or lifted as they seal or open the port during the operation of the valve. For the ordinary regenerative furnace having one gas regenerator and one air regenerator at each end, two gas reversing valves of our construction are required, but only one air reversing valve, as will be more fully described hereinafter.

Having thus given a general description of our invention, we will now refer to the annexed two sheets of drawings in which like characters refer to like parts:—

Figure 1 is a top plan view of our improved reversing valve adapted to be used as either a gas valve or an air valve. Fig. 2 is a vertical longitudinal sectional elevation taken on the line II—II of Fig. 1. Fig. 3 is a vertical transverse sectional elevation taken on the line III—III of Fig. 2. Fig. 4 is a top plan view of our valve showing a slightly modified form of separate valve disks more particularly adapted to regulate or control the air, although it could also be used for controlling gas, if desired, in which case the valve disks would be arranged to seat about the port instead of being maintained above it. Fig. 5 is a vertical longitudinal sectional elevation taken on the line V—V of Fig. 4 and Fig. 6 is a vertical transverse sectional elevation taken on the line VI—VI of Fig. 5.

Referring now to the various characters of reference on Figs. 1 to 3 inclusive: 1 is the base casting formed with upwardly extending flanges 2 around the edges thereof, which, in connection with the other flanges serve to retain water, sand, or other sealing medium in the space between said flanges, 3 is a flue opening or port adapted to connect with the chimney stack through which the products of combustion ultimately pass, 4 is a port or passage connecting with the gas regenerator, and 5 is a flue or port adapted to connect with a source of producer gas or

similar gas supply. 6 is the valve hood which is shown as of D-form with a refractory lining, 7 is the base ring of the valve hood provided with downwardly extending flanges adapted to be submerged in the sealing medium to make the valve tight when in operative position. 8 is a central cover within the hood, preferably lined with refractory material, as illustrated, which is adapted to cover the sealing groove and prevent unnecessary evaporation of water, or other sealing fluid, when the valve is in position as illustrated in Fig. 2. 9 are axles mounted at the ends of the valve hood, provided with bearings 10 and wheels 11 mounted thereon, and the openings in the base of the valve hood are 12 and 13 respectively, as illustrated. Tracks 14 are provided on each side of the valve, which have raised portions 15 and depressed portions 16 united by inclines, the construction being such that as the valve is traversed longitudinally the wheels roll up the inclines, thereby lifting the sealing portions of the base ring 7 above the base flanges and out of the sealing fluid, and as the movement continues the valve passes over the inclines on the track to its next position and the flanged base rings again are submerged and sealed in their new position. The track is arranged with depressions, elevations and inclinations so that the downwardly projecting flanges of the hood base ring are carried over the flanges of the base casting without interference and set in the new position. The hood is further provided with brackets shown as angles 17 secured thereto, with sockets 18 provided in the ends thereof, in which sockets the hangers 19 are adjustably mounted and secured to the ears 20 of the separate valve disks 21. An eye-plate 22 is provided on the top of the hood for the purpose of securing a counterbalancing construction to the same or for the purpose of lifting the hood when desired, and other similar eyes are also secured to the upper ends of the hood, as illustrated. In order to move the valve, I provide an operating plunger 23, mounted in cylinders as shown and provided with an adjustable arm 24, which projects within the space formed by the brackets 25 on the hood, so that a forward or backward movement of said plunger will reciprocate the valve and move it on its tracks from one position to the other. The plunger may be operated by any suitable fluid under pressure.

Referring now to Figs. 4, 5 and 6: The pan or base casting is 26, the upwardly extending flanges of the same are 27, 28 is a flue opening or passage to the regenerator, 29 is a flue opening or passage to the stack and 30 is a flue opening or passage to the other regenerator which is controlled by the valve. The valve hood proper is 31, the flanged base ring thereof is 32, the central cover within the hood is 33, the axles are 34, bearings for the axles are 35, wheels mounted on the axles are 36, the openings within the base valve are 37 and 38 respectively, 39 are the track rails made separately, mounted on the foundations, provided with raised portions 40 and depressed portions 41 and the inclines as shown. 42 are angle brackets at the ends of the hood to which the frame-work 43 is secured and hinged, as shown. The outer ends of frame-work 43 are 44, from which hangers 45 are swung, their upper ends being provided with links or eyes 46, provided with a flexible or other connection to a screw wheel or other apparatus for raising and lowering the frame-work 43 and consequently raising or lowering the valve disks 47, which valve disks are each provided with a central rib or flange 48 to which the hanger 45 is pivoted, as illustrated. The hood is provided with eye-plates 49 secured to the top thereof for the purpose of lifting or counterbalancing the same. The valve is moved by means of the operating plunger 50 and the cylinders therefor which may be actuated by any suitable fluid under pressure. 51 is a bracket arm, mounted on the plunger 50, and 52 are brackets secured to the side of the hood adapted to contact with the bracket arm 51 for the purpose of moving the valve backward or forward.

The valve hood may be made of metal such as plate iron or plate steel for the purpose of lightness and may either be unlined or provided with a refractory lining, preferably of light material in order to minimize the weight of the moving parts.

The operation of our valve is as follows: Referring now to Figs. 1, 2 and 3: The valve being in the position shown, is adapted to connect the gas flue 5 with the regenerator flue 4 so that the gas supply can pass to the regenerator, there be heated and thence into the furnace.

Referring to Fig. 2: When the valve is in the left-hand position, namely, over ports 3 and 4, the regenerator flue is then connected to the stack flue 3 and the flow of off-gases passes into the stack flue 3 and then to the stack. While the valve is in its right-hand position as shown in Fig. 3, the right-hand valve disk 21 hangs in the air, as illustrated, whereas the left-hand valve disk 21 closes the opening 3, as shown, thus preventing the flow of atmospheric air to the stack.

Referring to Figs. 4, 5 and 6: This valve is particularly adapted to act as an air control valve and when in the position shown in Fig. 5, is adapted to connect the regenerator flue 30 with the stack flue 29, while at the same time the space between the left-hand disk 47 and the upper flange base ring 27 allows air to pass into the other regenerator flue 28. The separate valve disks 47 can be raised or lowered by any suitable

means to allow more or less air, or to entirely cut off the supply. On reversal, the main valve connects the regenerator port 28 with the stack flue 29 and the right-hand disk 47 controls the air supply to the regenerator port 30.

Although we have shown and described our improvements in considerable detail, we do not wish to be limited to the exact and specific details shown and described, but may use such substitutions, modifications or equivalents thereof, as are embraced within the scope of our invention, or as pointed out in the claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. A reversing valve of D-type, a separate valve disk at each end thereof suspended from a frame-work secured to the valve body.

2. A reversing valve hood of D-type, a separate valve disk at each end thereof suspended from a frame-work secured to the hood, said valve and disk being exposed on one side at least to the atmosphere.

3. A water sealed reversing valve hood of box type with one side open and provided with a centrally located closure adapted to form two passages in said valve, said closure being also adapted to cover the water seal of the valve.

4. A water sealed reversing valve hood of box type with one side open and provided with a centrally located closure lined with refractory material, adapted to form two passages in said valve, said closure being adapted to cover the water seal to prevent heating and evaporation thereof.

5. A reversing valve of reciprocating type, adapted to connect two flues and provided with a separate valve disk at each end, adjustably mounted on a frame-work secured to the valve body.

6. The combination with three flue terminals, of a water sealed reversing valve adapted to connect two adjacent terminals, means for longitudinally reciprocating said valve, and separate valve disks at each end of said valve mounted on a frame-work secured thereto.

7. The combination with three flue terminals, of a water sealed reversing valve adapted to connect two adjacent terminals, means for longitudinally reciprocating said valve, and a separate valve disk at each end of said valve adjustably mounted on a frame-work secured thereto.

8. A reversing valve comprising a flanged base casting provided with openings therethrough, tracks adjacent the sides of said base provided with depressed and elevated portions connected by inclined portions, a D-shaped reversing valve mounted on wheels adapted to traverse said tracks, and a separate valve disk at each end of said valve mounted on a frame-work secured thereto.

9. A reversing valve comprising a flanged base casting provided with openings therethrough, tracks adjacent the sides of said base provided with depressed and elevated portions connected with inclined portions, a D-shaped reversing valve mounted on wheels adapted to traverse said tracks, and a separate valve disk at each end of said valve adjustably mounted on a frame-work secured thereto.

10. A reversing valve comprising a flanged base casting provided with openings therethrough, tracks adjacent the sides of said base provided with depressed and elevated portions connected with inclined portions, a D-shaped reversing valve mounted on wheels adapted to traverse said tracks, a separate valve disk at each end of said valve adjustably mounted on a frame-work secured thereto, provided with lower flanges adapted to submerge in the sealing fluid.

11. A reversing valve comprising a base casting provided with openings therethrough, flanges extending upwardly on the outside and inside thereof adapted to retain sealing fluid, a D-shaped reversing valve mounted thereon and adapted to connect two of said openings, the valve being provided with downwardly extending flanges arranged to project within the sealing fluid when in operative position, and separate valve disks at each end of said valve mounted on a frame-work secured thereto.

12. A reversing valve comprising a base casting provided with openings therethrough, flanges extending upwardly on the outside and inside thereof adapted to retain sealing fluid, a D-shaped reversing valve mounted thereon and adapted to connect two of said openings, the valve being provided with downwardly extending flanges arranged to project within the sealing fluid when in operative position, and separate valve disks at each end of said valve adjustably mounted on a frame-work secured thereto.

13. The combination with a plurality of flue openings of a D-shaped reciprocable reversing valve, adapted to connect two of said flues, means for raising, traversing and lowering said valve, and a separate valve disk mounted on a frame-work secured to said valve.

14. The combination with a plurality of flue openings of a D-shaped reversing valve, adapted to connect two of said flues, means for raising, traversing and lowering said valve, and a separate valve disk adjustably mounted on a frame-work secured thereto.

In witness whereof we hereunto affix our signatures.

FREDELLIA H. MOYER.
GEORGE E. THACKRAY.