June 12, 1928.

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VALVE FOR REVERSING FURNACES

Filed Aug. 24, 1925

Fig. 1

Fig. 2

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The primary object of my invention is to provide a valve of simple and economical construction for use in reversing type furnaces, especially found in steel plants.

Another object of my invention is to provide a valve that can very easily be operated by automatic means without the installation of costly or cumbersome attachments; one which tends to eliminate the necessity for lifting heavy parts, and at the same time one that will hold up under heavy duty.

Another object of my invention is to provide a three-way valve for use in reversing furnaces so constructed that the main valve water seal remains constant, while a port seal, constructed to permit reversal is normally sealed in as effective a manner as the main valve: that is to say, the port seal is the only seal broken, or in any way modified at the time of reversal so that an effective and constant seal is always had to prevent explosion or outward escape of gas.

With these and other objects in view, my invention consists in the arrangement, combination and construction of the various parts of my improved device, as described in the specification, claimed in my claims and shown in the accompanying drawing.

Fig. 1 is a sectional view of my improved device taken on line 1—1 of Fig. 2. Fig. 2 is a cross sectional view of my improved device taken on line 2—2 of Fig. 1.

I have shown, more or less diagrammatically, a foundation 10 of a conventional stack flue 11, a conventional gas passage 12 and a conventional furnace port 13, as used in a reversing type furnace, using a three-ported valve.

A valve base 14 is provided having an outside circular wall 15 and inner walls 16 around the edges of the ports 11, 12 and 13. The walls 15 and 16 form an outside trough 20 with troughs 21 leading therefrom and terminating at a common point, as in the center 22 of the base 10.

A cross member 23 is suspended over the base 14 by the beams 24 that are secured to the projections 25 of the base. Positioned, on a ball connection, in a member 19 on the base 14, and extending through and above the member 23, is a shaft 26 that is mounted for rotation in a bearing casting 27, as well as a ball connection 96. A valve hood 29 having a top 28 the outside wall 97 and the inner walls 98 and 99 extending from the center 22 to the wall 97 is connected to the shaft 26, so as to rotate therewith. The bottom edges of the hood extend partially into the trough 20 to form a water seal. A smaller hood 34, having a short outer vertical shell 35, and a long inner vertical shell 36 is shown as covering the stack flue 11. A trough 31 is formed by a member 33, which is L shaped in cross section, secured to the inside of a section of the wall 97 and outside of walls 98 and 99. The shell 33 fits into the trough 31 and the shell 36 extends down into the troughs 20 and 21, around the wall 16 of the flue 11.

Stop plates 37 adapted to strike the beams 24, are placed on the hood 29 to prevent complete rotation thereof and to aid in positioning the small hood 34 over either the flue 11 or the passage 12.

Pulleyed on the shaft 26, as at 95, by means of a block 38 fixed to the shaft, is a lever 40 that has an adjustable balance weight 41 on the end 42 thereof. A vertical lever 43 is pivoted at one end to the end 44 of the lever 40 and on the other end to a T plate 45, secured to the center of the small hood 34.

In the practical use of my improved device, water 46 is placed in the troughs 20 and 21 to form an air tight seal for the valve hood 29, and also in the trough 31 to form a seal for the small hood 34. In the admission of gas into the furnace, as shown in Fig. 1, the small hood 34 is placed over the stack flue 11, so that the shell 36 extends into the water in troughs 20 and 21 around the wall 16 of the stack and the shell 35 is placed in the water in the trough 31, thus forming a double seal, which completely closes the stack opening. At the same time, the large hood 29 permits the flow of gas from the passage 12 into the furnace port 13.

When it is desired to stop the flow of gas and open the furnace to the stack 11, enough pressure is placed on the end 42 of the lever 40 to lift the hood 34 far enough so that the shell 36 clears the wall 16 of the stack flue 11, but not enough to break the water seal of the shell 35 in the trough 31. The hoods 29 and 34 and the lever 40 are then rotated with the shaft 26 until stopped by one of the plates 37 bearing against one of the beams 24. Inasmuch as the bottom edges of the walls 98 and 99 extend only to

Patented June 12, 1928. 1,673,018

UNITED STATES PATENT OFFICE.

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VALVE FOR REVERSING FURNACES.

Application filed August 24, 1925. Serial No. 51,963.

In reversing furnaces, the products of combustion are exhausted through a chimney or flue, the flue being generally a long, cylindrical passage extending from the furnace to the outside of the building. The chimney flue is usually in communication with a number of furnaces, the flue of one furnace being joined or connected to the flue of the furnace adjacent to it. In many types of furnaces, the flue is provided with a damper or stop. A flue damper is a device for regulating the flow of gases from the furnace, and is placed in the flue after the gases have passed through the furnace. In reversing furnaces, it is desirable to have the damper movable in the flue in such a manner as to permit of the flow of gases to be reversed in direction.

The present invention relates to improvements in the construction of flue dampers, and particularly to an improved arrangement and construction of a flue damper which is especially adapted for use in reversing furnaces.

In the construction of a flue damper, it is desirable to provide a device for opening and closing the damper, and for keeping the damper in any desired position. The damper should be so constructed that it can be opened and closed with ease, and that it can be held in any desired position without the necessity of using a lock or other device to hold it in place.

In the construction of a flue damper, it is desirable to provide a device for regulating the flow of gases through the damper. The damper should be so constructed that it can be adjusted to regulate the flow of gases as desired.

The present invention relates to improvements in the construction of flue dampers, and particularly to an improved arrangement and construction of a flue damper which is especially adapted for use in reversing furnaces. The invention is characterized by the provision of a flue damper which is provided with a device for opening and closing the damper, and for keeping the damper in any desired position, and which is so constructed that it can be adjusted to regulate the flow of gases through the damper.
the level of the trough 31, it will be readily appreciated that they clear the tops of openings 12 and 13 when the hood 29 is rotated. The pressure on the end 42 of the lever 40 is then released, thus allowing the hood 34 to lower so that the shell 36 thereof will completely surround the wall 16 of the gas flue, and be again sealed by the water in the troughs 20 and 21.

It will be noted from the foregoing, that in this manner, I provide a three-way reversing valve that has an air tight seal at all times formed by the water in the troughs 20, 21 and 31, this seal not being reduced or in any manner lessened while reversing. It will further be apparent that the reversal is obtained without the necessity of lifting heavy parts of the mechanism.

I have not here shown any specific means for raising and lowering the lever 40, nor for rotating it and the parts connected with it, inasmuch as any mechanism well known in the art may be used for this purpose.

It is obvious that various changes may be made in the arrangement, combination and construction of the various parts of my improved device, without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. In combination, three openings, a rotatable hood positioned over two of said openings, a liquid seal for the bottom edge of said hood, a second hood positioned over the third opening, and sealed in said liquid seal, a shell secured to said second hood, a liquid seal for said shell of greater depth than said first seal, means for lifting said second hood to clear said third opening and thereby break its seal with said first liquid seal, means of rotating the hoods to permit the second hood to center over one of said first two openings and said first hood to position over the other two openings, said seal of said shell remaining unbroken throughout said shifting and raising of said second hood.

2. In combination, a base having rimmed openings therein, a shaft extended upwardly from said base, a hood secured to said shaft and covering certain of said openings, a second hood covering other of said openings, liquid seals for the bottoms of said hoods, a depending shell from said second hood having a liquid seal for the bottom thereof, means for lifting said second hood and breaking its liquid seal, means for rotating said hoods, a liquid seal around said opening, a second hood having an opening previously covered by said second hood with said first hood, and means for lowering said second hood over its new opening and engaging the bottom thereof in a liquid seal.

3. In a device of the class described, comprising a hood having an opening therein, a liquid seal around said opening, a second hood having a liquid seal for the bottom of said port, a liquid seal for the bottom of said opening, a port in said second hood surrounding said depending portion, a shell depending from said second hood, said liquid seal remaining unbroken during such lifting.

4. In a device of the class described, comprising a hood having an opening therein, a rimmed port, a second hood covering said opening and having a depending portion extending through said opening surrounding the rim of said port, a liquid seal for the bottom of said opening, a shell depending from said second hood, said liquid seal remaining unbroken during such lifting.

5. In combination, rimmed ports, a rotatable hood having an opening therein positioned around said ports, a liquid seal for the bottom of said port, a second hood having a liquid seal for the bottom of said port, a second hood having a liquid seal for the bottom of said port, a liquid seal remaining unbroken during such lifting.

HENRY C. PERDUE.