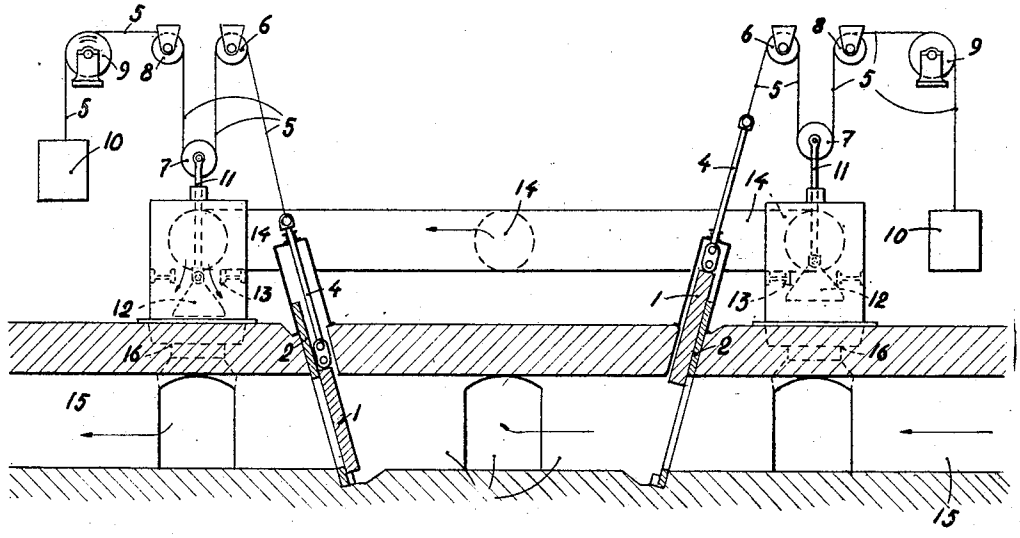
Aug. 18, 1931. E. S. S. WOHLFAHRT 1,819,052

VALVE AGGREGATE FOR REGENERATIVE FURNACES, HEAT APPARATUS, ETC

Filed Oct. 30, 1929



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Patented Aug. 18, 1931

1,819,052

UNITED STATES PATENT OFFICE

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VALVE AGGREGATE FOR REGENERATIVE FURNACES, HEAT APPARATUS, ETC.

Application filed October 30, 1929, Serial No. 403,507, and in Sweden September 19, 1929.

The present invention relates to a valve aggregate, especially adapted to be used where cross-over valves are necessary, for instance in regenerative furnaces and similar devices.

The demands of the regenerative cross-over valves are as follows. The reversal of the direction of the gas must take place without direct loss of gas to the chimney (or to the free air). The valves must be tight so that no losses of gas occur during the driving periods between the crosses-over.

The reduction of the draft caused by leakage in the valves must be as small as possible. The cross-over valves must be regulatable, so that supply for gas and air and the chimney draft do not necessitate any other valves for their regulation. The valve system must be in safe working order and cheap to establish.

Of the present systems for cross-over valves there is none meeting all the stated demands at the same time. The present invention, however, purports a practical and cheap solution of the problem meeting all demands for a cross-over valve in safe working order.

The valve system and its mode of operation are exemplified in the annexed drawing which shows the device constructed as a cross-over valve for the producer gas for an open-hearth furnace.

1 indicates two valves constructed according to the damper system, which valves close against the slanting frames 2, which are applied in the chimney canal 3. They can be raised and lowered by means of the rods 4 connected to the ropes (or cable-chains) 5, which run over the pulleys 6, 7 and 8 to the block-pulley devices 9. In order to facilitate the work of the block-pulley devices the free ends of the ropes 5 may be provided with the counterweights 10. The pulleys 6 and 8 are rigidly journalled, whereas 7 are movable and fixed to the valve rods 11, the bottom ends of which carry the cornish double beat valves 12, which from below close against the valve seats 13. The valves 12 are located in the gas pipe 14. The canals 15 are open towards the gas producer chambers of the furnace.

In the position of the valves shown on the drawing, the producer gas runs through the pipe 14, past the left valve 12, and then through the canal 15 to the left gas producer. Thus the left valve 1 is fully closed and prevents the producer gas from entering into the chimney. The flue gases from the furnace pass through the right producer chamber to the canal 15 through the right frame 2 below its open damper 1 to the chimney canal 3.

The valve 12 is then fully closed and prevents the producer gas from passing to the chimney on that way. There must be observed in the exemplified embodiment of the valves, that the valves 1 must be at least only half as heavy as the valves 12. Yet, in order to get over the friction losses, the valves 1 should be made considerably heavier. Moreover, the tightening pressure against the frame 2 is increased thereby, and, as the valves 12 are held up towards the seats 13 by means of counterweight influence from the valves 1, it will be appreciated, that even the tightening pressure between the valves 12 and the seats 13 is increased in correspondence to the weight of the valves 1.

A reversal of the direction of the gas in the system takes place in the following manner. The block-pulley devices 9 are started, the left one for the purpose of raising the valves, and the right one for the purpose of lowering the valves. If one looks at the left side of the system, the valve 12 is raised towards the seat 13 and closes completely against the seat before the valve 1 can begin to be raised. At the right side, the valve 1 is lowered, the valve 12, however, on account of the counterweight influence of the valve 1 remaining closed until the valve 1 has come to its bottom position and is completely closed. Now first the valve 12 can open.

Through the device described may, at the first moment of the reversal, the producer gas be completely shut off, so that no direct loss of gas to the chimney can take place. Further, there is the possibility of setting the one of the valves 1, which is not in its bottom

position, for any opening, thus causing a regulation of the draft. A regulation of the gas may also be obtained by means of the one of the valves 12 which is open. Its regulation can be effected by means of the block-pulley devices 9 as soon as the corresponding valve 1 is in its bottom position. In the example mentioned, the valve is imagined used for the producer gas for an open-hearth furnace. It may, of course, even be used for any gas, or for air, and for any furnaces, as for instance for regenerative heat-apparatus. The valves 12 may, of course, with maintenance of the same fundamental principles, be constructed as sliding dampers, swivel dampers, or of any imaginable valve type. The dampers 1 may also be constructed as cornish double beat valves, swivel dampers, or of any suitable construction. The ropes may be substituted by cable-chains or lever gearings. Likewise the canal indicated as chimney canal may even be used for the supply of the producer gas and the air respectively, and the canals 14 may instead be drawn to the chimney. Between the valve 1 and the block-pulley device 9 may also, if desired, as may be the case in regenerative heat-ap paratus, several valves of the type 12 be coupled in. The block-pulley devices 9 may, if desired, be constructed as a single one, and yet the control of the single valves may take place in such a manner that the active length of the rope (cable-chain) 5 is made controllable.

As a safety measure, in order to reduce the risk of loss of gas, or explosion danger if the rod or the rope should break, a lower seat 16 may be arranged, against which the valve 12 tightens when falling down.

The system also brings with it the advantage, that the gas and air valves 12 respectively may be located beside the flue gas shafts, so that their parts are not directly subjected to the warm flue gases. The construction also makes it possible for the connection between the producer chamber of the furnace and the chimney to be made straight and without contractions, which cause deterioration of the draft.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a regenerator oven, the combination of a plurality of valves arranged in groups, each thereof comprising two valves movable to closed positions in opposite substantially upright directions, and a cable for operating the valves arranged with respect to the latter to compel either valve to reach its full closed position before the other valve begins to move to its open position.

2. In a regenerator oven, the combination of a pair of valves, each thereof being movable in substantially upright direction to open and closed positions, the valves further moving in opposite directions to their closed and open positions, a cable attached at one end to the valve which is closed in its lowered position, a sheave block supported on the cable and carrying the valve which is closed in its uppermost position, fixed blocks on opposite sides of the sheave block to support the cable, and a weight for the other end of the cable to counter balance said valves, whereby either valve is compelled to complete its closed position before the other may begin to move to its open position.

In witness whereof I have hereunto signed my name

EDVARD SIXTEN SIXTENSSON WOHLFAHRT.