No. 816,813. PATENTED APR. 3, 1906.

J. B. NAU.

REVERSING VALVE FOR REGENERATIVE FURNACES.

APPLICATION FILED NOV. 23, 1905.

Fig. 1.

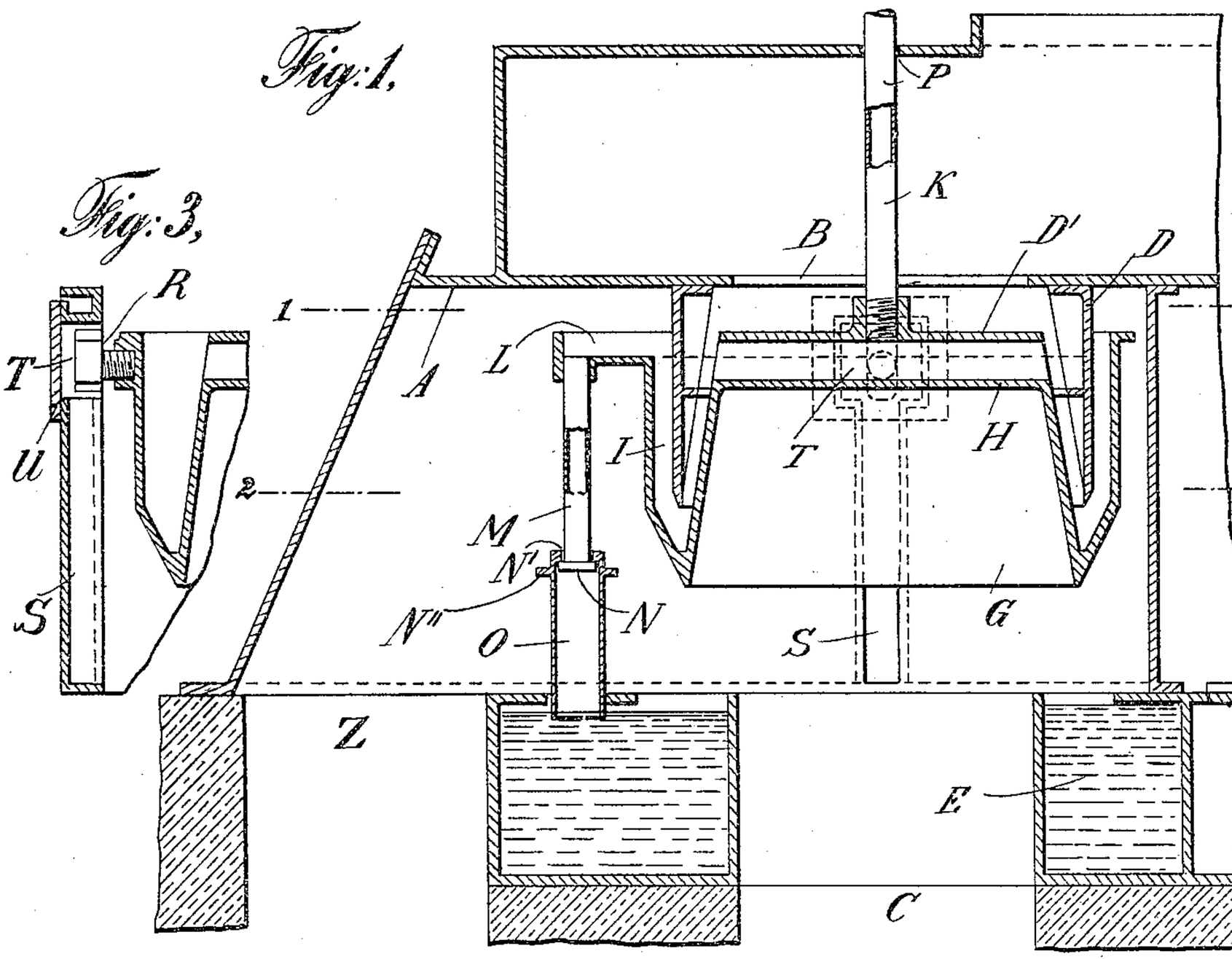
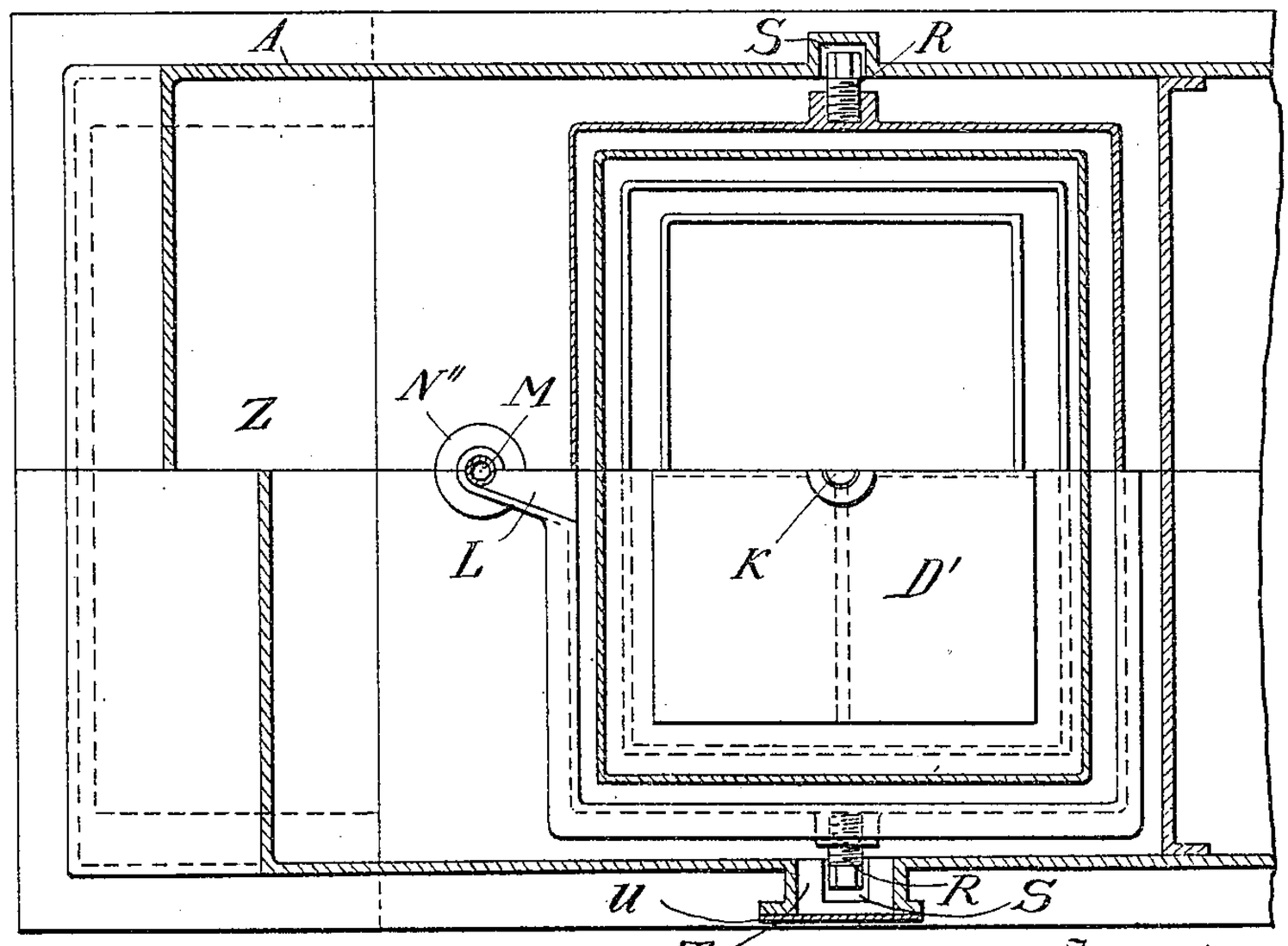


Fig. 3.

Fig. 2.



Witnesses
Max B. A. Döring
L. F. Browning

Inventor
John B. Nau
By his Attorney
Edward C. Davidson

UNITED STATES PATENT OFFICE.

JOHN BAPTISTE NAU, OF NEW YORK, N. Y.

REVERSING-VALVE FOR REGENERATIVE FURNACES.

No. 816,813. Specification of Letters Patent. Patented April 3, 1906.

Application filed November 23, 1905. Serial No. 288,691.

To all whom it may concern:

Be it known that I, JOHN BAPTISTE NAU, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Reversing-Valves for Regenerative Furnaces, of which the following is a specification.

This invention relates to improvements in reversing-valves of the kind described in my United States Patent No. 805,024, of November 21, 1905. I attain these improvements with the arrangement illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical cross-section of the valve-chamber. Fig. 2 in the front half shows a horizontal section on line 1 1 and in the rear part a horizontal section on line 2 2 of Fig. 1. Fig. 3 shows a detail of the guide-bolt arrangement.

Similar letters refer to similar parts.

The valve is inclosed in a valve-chamber A, provided with a regenerator-flue opening Z, a gas-inlet opening B, and a smoke-flue opening C. Around opening B is placed a shell D open at both ends. Around and surmounting smoke-flue opening C is a water-trough E. Shell D and water-trough E form, respectively, upper and lower valve-seats for the valve G. This valve is substantially made of a partition of any suitable shape, but preferably a horizontal disk H, terminated at its rim by a water-trough I of such a shape and depth that when filled with water to the right level the valve will form at one period a water seal with its upper valve-seat D only, while at another period the lowest point of trough I will plunge in the water of trough E, there to form a water seal before the water seal between the valve and the upper valve-seat D is broken, and at still another period the valve will form a water seal with its lower valve-seat only. It will be noticed in Fig. 1 that the vertical cross-section of the valve-trough is not rectangular, but becomes narrower toward its bottom, where it forms, preferably, as thin an edge as can be obtained practically. This shape is of importance, inasmuch as it allows the valve to enter the water without much splashing and to displace less water and cause less variation of the level of the water in the lower valve-seat than a rectangular-shaped valve-trough would do. Partition H is placed lower than the proposed level of the water in the trough. This is done so as to have a larger body of water in the upper part of the trough in order to have the level of the water vary less in height when the upper valve-seat enters or leaves the trough. A cover D′, provided above the water-level, prevents the hot gases from coming into close contact with too much surface of water. The sealing and cooling water runs down through hollow stem K into trough I, which it leaves through an overflow L to enter pipe M, fastened under the overflow, and that leads it downward into the lower valve-seat. The reason for leading the water coming from the overflow through a pipe instead of letting it fall down without protection is to remove it from the influence of the strong draft and powerful evaporating action of the hot gases, both of which actions would cause much water and steam to be carried into the regenerator, which should be avoided. As pipe M is moved up and down with the valve its lower end should be kept above the lower end of the valve. It follows that when the valve is in its upper position, as shown on Fig. 1, the lower end of valve-pipe M is so high up that the stream of water flowing from it would still be exposed freely before it reaches the lower water seal, and the purpose of pipe M would partly be defeated. To remedy this, the lower end of pipe M, provided on its outside with a larger rim N, telescopes a larger pipe O, open at both ends and provided with an inside rim N′ and outside rim N″ at its upper end, while its lower end reaches down into the lower water-seal trough. With this arrangement when the valve is in its upper position the water flows from the overflow through pipes M and O without ever coming in direct contact with the draft or hot gases. When the valve is lowered, pipe O also descends until it is kept up and rests with its rim N″ on top of the roof of the water seal, while pipe M can go lower down with the valve. I have described this arrangement as a suitable means by which the stream of water coming from the overflow toward the lower water seal can be practically isolated and removed from the influence of the draft and hot gases. Other means can be employed, and I employ different ones in the construction of the style of valve described in my Patent No. 805,024 of November 21, 1905. The arrangement of the means is immaterial, provided they make it possible to protect the

stream of water as desired, which I want to realize. It may also be necessary to prevent the valve from turning around its axis or from tilting or from getting into such a position that would prevent it from entering the lower or upper valve-seat. This can be done with adequate guides, of which I show different styles. The stem of the valve is guided in P, while its sides are guided by means of at least one bolt R, whose head slides in slot S in the side of the chamber. Guides R prevent the valve from turning. In its upper end, slot S widens out into a space T, open at its back, closed normally by a plate U and wide enough for the bolt-head to be turned here. When this upper plate is removed and the valve is brought into its upper position, bolt R can be removed from the outside. Naturally other guiding devices can be used. The ones here described are simple and effective. They afford good means for guiding the valve.

It is often desirable to have the valve system occupy less room in length without in any way decreasing the area of the flue. This can be obtained by replacing the round valve by a rectangle one. (Shown in the drawings.) This valve being much narrower in one direction makes it possible to gain room in that direction, and thereby constitutes an improvement over the round valve. Other shapes may be used. Of course the shape of the seats must suit the shape of the valve. The upper valve-seat may be water-cooled, if found necessary.

I do not limit myself to the application of the different devices herein described nor to the special valve above mentioned. They may be applied to any other valve working on the same principle.

I claim as my invention—

1. In a reversing-valve system, the combination of an upper valve-seat, a lower valve-seat, and a valve working between said seats in such a manner that at one period it makes a water seal with one seat only and at another period a simultaneous water seal with both seats, said valve being made of a partition, a vertically-movable water-trough around the rim of the partition and an overflow from the water-trough, and provided with means to prevent the water discharged through the overflow from coming into direct contact with the draft air and the hot gases during the descent of the trough from upper position to the lower water seal.

2. In a reversing-valve system, the combination of an upper valve-seat, a lower valve-seat, and a valve working between said seats in such a manner that at one period it makes a water seal with one seat only and at another period a simultaneous water seal with both seats, said valve being made of a partition, a water-trough around the rim of the partition and movable therewith, an overflow from the water-trough, a discharge-pipe hanging from the overflow and another pipe that leads the water to the lower water-seal trough and into which said hanging pipe extends.

3. In a reversing-valve system, the combination of an upper valve-seat, a lower valve-seat, and a valve working between said seats in such manner that at one period it makes a water seal with one seat only and at another period a simultaneous water seal with both seats, said valve being made of a partition, a water-trough around the rim of the partition and movable therewith, an overflow from the water-trough, a pipe extending from the overflow and a second pipe telescoping therewith in such a manner that in the upward movement of the valve, there happens a moment when said second pipe is caught and lifted up by said first pipe and in the downward movement of the valve there happens a time when said second pipe will be prevented from moving farther down with said first pipe.

4. In a reversing-valve system, the combination of an upper valve-seat, a lower valve-seat, a valve that works between said seats in such a manner that at one period it makes a water seal with one seat only and at another period a simultaneous water seal with both seats, said valve being made of a partition, a water-trough around the outer rim of the partition with a cross-section narrowing down toward its bottom and an overflow from the water-trough, and provided with means to remove the water discharged through the overflow from the direct influence of the draft and hot gases.

5. In a reversing-valve system, the combination of an upper valve-seat, a lower valve-seat, a valve that works between said two seats in such a manner that at one period it makes a water seal with one seat only and at another period a water seal with both seats, said valve being made of a partition, a water-trough around the outer rim of the partition and an overflow from the water-trough with its bottom higher up than the top of the partition, and provided with means to remove the water discharged through the overflow from the direct influence of the draft air and the hot gases.

6. In a reversing-valve system, the combination within the limits of one valve-chamber, of an upper valve-seat, a lower valve-seat, a valve working between said seats in such a manner that at one period it makes a water seal with only one of said seats and at another period a water seal with both said seats, and at least one valve-guide sliding in a vertical slot in the side plate of the casing.

7. In a reversing-valve system, the combination of an upper valve-seat, a lower valve-seat, a valve working between said seats in such a manner that at one period it makes a water seal with one seat only and at another

period a simultaneous water seal with both seats, a valve-guide consisting of at least one bolt screwed to the side of the valve and a slot in the side plate in which it slides, the slot widening at its upper end into a space open at the back, and a removable cover to close said space in the back.

In testimony whereof I have hereunto subscribed my name.

JOHN BAPTISTE NAU.

Witnesses:
L. F. BROWNING,
E. F. WICKS.