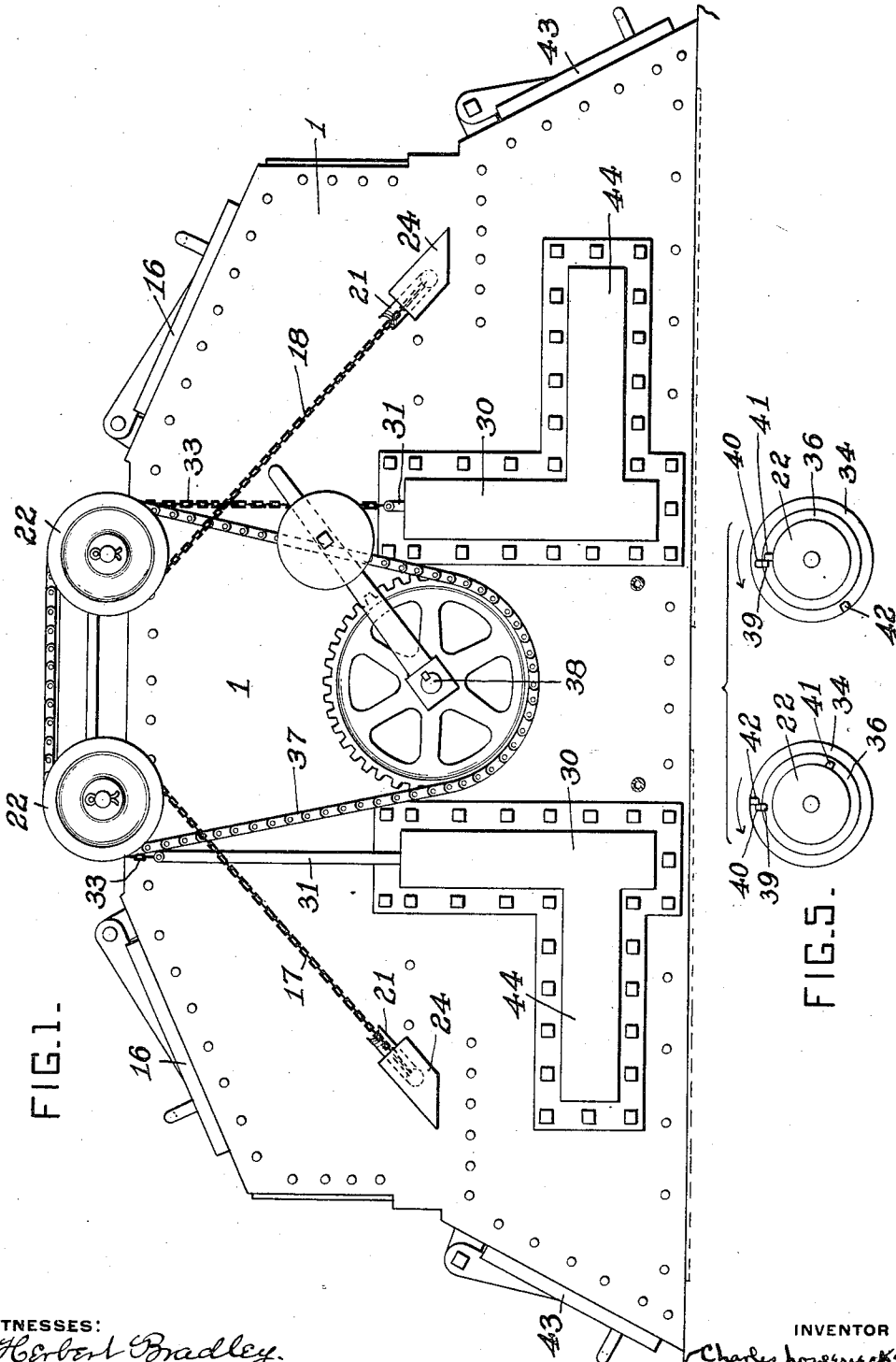


C. LONGENECKER.
VALVE MECHANISM FOR FURNACES.
APPLICATION FILED JAN. 22, 1910.

1,017,159.

Patented Feb. 13, 1912.

3 SHEETS—SHEET 1.



WITNESSES:
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Theodore Duff.

INVENTOR
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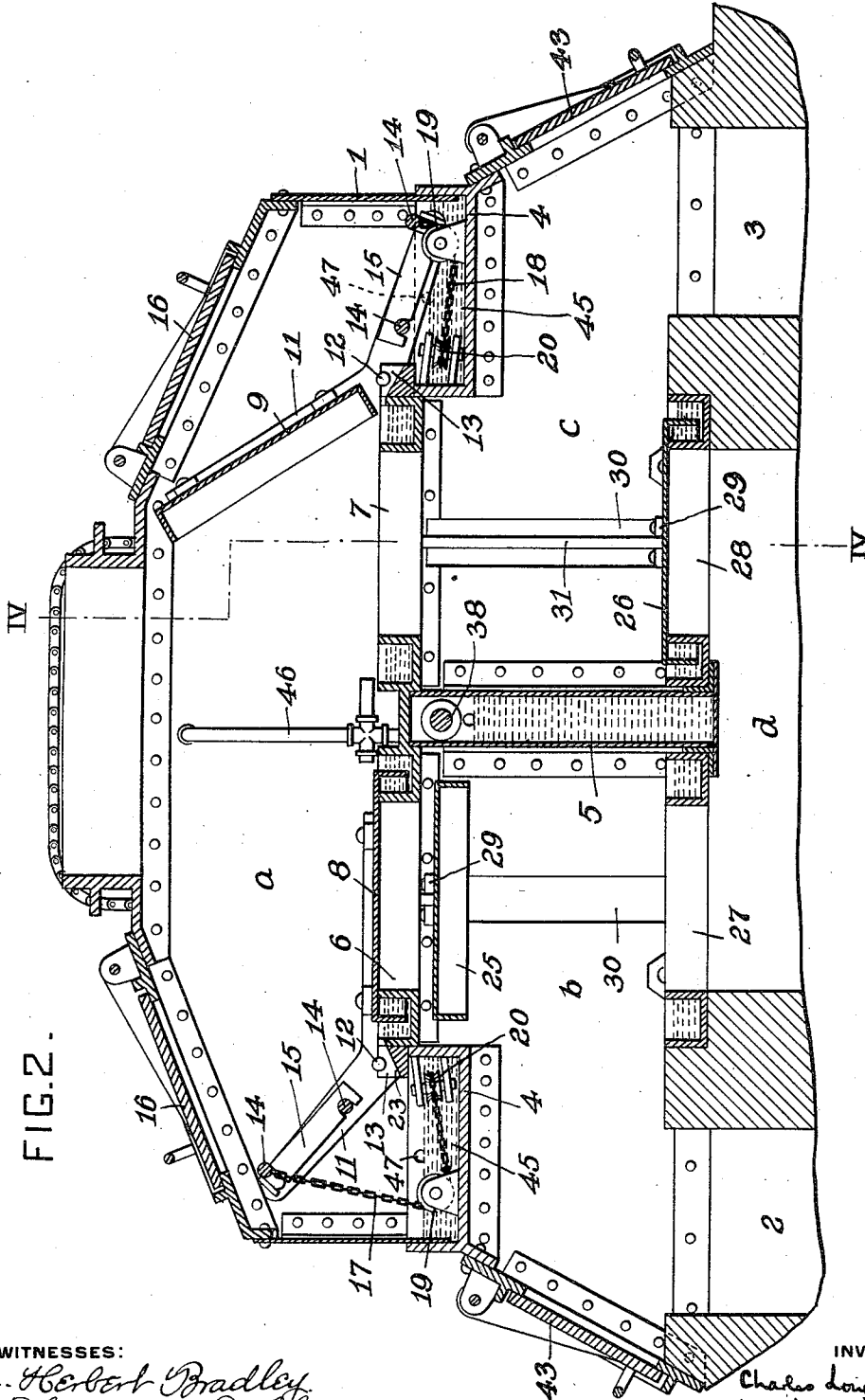


FIG. 2.

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UNITED STATES PATENT OFFICE.

CHARLES LONGENECKER, OF PITTSBURGH, PENNSYLVANIA.

VALVE MECHANISM FOR FURNACES.

1,017,159.

Specification of Letters Patent.

Patented Feb. 13, 1912.

Application filed January 22, 1910. Serial No. 539,461.

To all whom it may concern:

Be it known that I, CHARLES LONGENECKER, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Valve Mechanism for Furnaces, of which improvements the following is a specification.

It is the object of the invention to provide a reversing valve mechanism which shall be of simple construction, easy of access for purposes of repair and renewal of parts, and by the employment of which all the gaseous fuel shall be effectively utilized.

In the accompanying drawings forming part of this specification there is illustrated a reversing valve structure embodying the said improvements in preferred form.

Figure 1 is a side elevation thereof; Fig. 2 is a sectional elevation; Fig. 3 is a view partly in plan and partly in section of one of the gas controlling valves; Fig. 4 is a partial section on the line IV—IV, Fig. 2; Fig. 5 is a diagrammatic view illustrating the operation of the valve-reversing mechanism.

In the practice of my invention a shell or casing 1, preferably formed of metal, and inclosing the several valves, is supported on a suitable base or foundation in which are formed a flue or passage *d* leading to the stack, and flues or passages 2 and 3 leading to the regenerating chambers, which as is well known are connected to opposite sides or ends of the heating or melting chamber of the furnace. The shell or casing is divided by a horizontal partition 4 in which are formed openings for the passage of gas from the upper chamber *a* into the chambers *b* and *c*, into which the lower portion of the shell or casing is divided by the vertical wall 5, preferably made hollow as shown in Fig. 2.

The ports connecting the chamber *a* with the chambers *b* and *c* are formed by annular valve-seats 6 and 7 which are preferably made U-shaped in cross-section so that water-seals may be formed around the edges of the cup-shaped valves 8 and 9. The valves are provided at their ends with pins 10 (Fig. 3), adapted to rest in notches in the upper edges of levers 11, so that the valves can be readily removed from and others placed in position on the levers. These levers are provided with pivot-pins

or trunnions 12, which rest in notches in the fulcrum blocks 13, thus permitting of the easy removal of the levers when necessary. The outer ends of the levers are connected by rods 14, which serve as supports for the removable counter-weights 15, which are notched in their under side for the reception of said rods. This construction permits of the easy removal of the valves and other parts for repairs, etc., access being had through doors 16 in the casing. The levers are connected to ends of chains 17 and 18, passing around guide-pulleys 19, 20 and 21, and outside of the casing to drums 22, to which the opposite ends of the chains are attached. By reference to Fig. 2 it will be seen that the guide pulleys 19 and 20 are located in depressed portions of the horizontal partition 4, and that provision is made as by aprons 23 for the discharge of water from the valve-seats into these depressed portions, thereby preventing excessive heating of the pulleys. The guide-pulleys 21 are arranged outside of the shell, adjacent to openings therethrough for the passage of the chains. These pulleys 21 and the holes in the casings are covered by hoods 24, which extend above the level of the water in the depressed portions of the horizontal partitions.

The flow of the products of combustion from the chambers *b* and *c* to the stack flue *d* is controlled by cup-shaped valves 25 and 26, having annular seats 27 and 28 on opposite sides of the vertical partitions 5. These valves are provided at their ends with slotted lugs 29, projecting through slots in the wall (Fig. 4) into channels 30 secured to the walls of the shell or casing. Lifting-rods 31 extend down into the channels and are provided with hooks 32 which engage the lugs 29. This construction permits of the easy detachment of the valves from their operating mechanism. As the valves have to be turned horizontally in order to pass through the doors 43 in the casing, the channels on one side of the casing are provided at or near their lower ends with branches 44 extending laterally toward the doors 43, (Fig. 1).

The rods 31 are connected to chains 33 having their opposite ends attached to drums 34 loosely mounted on studs 35, on which the drums 22 are also mounted. Intermediate of the drums 22 and 34, sprocket-wheels 36 are loosely mounted on the studs

35, said wheels being rotated by sprocket chains 37 passing around them and around sprocket-wheels on the shaft 38 passing through the hollow partition 5. The sprocket wheels 36 are provided with lugs or projections 39 and 40 adapted to engage corresponding lugs or projections 41 and 42 on the drums 22 and 34 respectively. These several lugs are so arranged on the drums and wheel that each gas valve will be closed before the stack valve on the same side is opened, and will not be opened until the said stack valve is closed.

The operation will be apparent by reference to Figs. 2 and 5, the valves 9 and 25 being open and the valves 8 and 26 closed, so that the gas will flow through chamber *c* and passage 3 to the furnace, and the products of combustion pass through passage 2 and chamber *b* to the stack-flue *d*. In reversing the valves the initial movement of sprocket-wheels 36 withdraws the support of lugs 39 from lugs 41 on drums 22 on the right-hand side, thus permitting the valve 9 to close by gravity, the said valve being entirely closed when the wheels 36 have turned through an arc of 120 degrees. At the same time by the movement of wheels 36 on the left-hand side, the valve 25 has been permitted to fall half-way. As the wheels 36 continue to rotate, the lugs 40 on the wheels at the right engage the lugs 42 on the corresponding drums 34, thus commencing to open valve 26. During this second stage of movement of 120 degrees the valve 26 is raised half-way, while the valve 25 has been permitted to entirely close. Just as the valve 25 closes the draft of the furnace will overcome the draft of the stack, so that there will be a reverse draft from the stack through the chamber *c*, which will cause the gas remaining in the chamber to pass through the checkerwork and be effectively utilized in the furnace. The lugs 39 on the wheels at the left have now reached the lugs 41 on the corresponding drums 22, so that in the final movement of 120 degrees the valve 8 is opened and the valve 26 elevated to its limit of upward movement. The parts then stand in the reverse position to that shown on Fig. 5, and upon the next reversal of the valves the movements take place in

reverse order, the valve 8 being the first to close (before valve 25 is opened), and the valve 9 being the last to be opened. 55

It will be observed by reference to Fig. 2, that the horizontal partition 4 is made up of the depressed portions or water-containing pockets 45 and the valve seats 6 and 7, and that the hollow vertical partition 60 is water cooled. Water is supplied to the vertical partition by a pipe 46, and to the valve seats 6 and 7 by branches from said pipe. As before stated, the water from these valve seats flows into the pockets 45 and escapes through outlets 47. The valve seats 27 and 28 may be supplied in any suitable manner, as by pipes extending from the vertical partition. 65

I claim herein as my invention: 70

1. In a valve mechanism for furnaces, the combination of levers and a valve provided with lugs supported on the upper edges of the levers.

2. In a valve mechanism for furnaces, the combination of fulcrum blocks, levers provided with trunnions loosely supported by said blocks, a valve loosely supported by the lever arms on one side of the fulcrum, and counterbalancing weights loosely supported by the levers on the opposite side of the fulcrum. 75

3. In a valve mechanism for furnaces, the combination of a pair of gas controlling valves, a pair of stack valves controlling the flow of products of combustion, and a common means for closing one gas valve, then reversing the stack valves, and then opening the other gas valve. 80

4. In a valve mechanism, the combination of valves controlling the flow of gas and products of combustion, and means for reversing said valves with sequential movement, said reversing means consisting of a series of disks mounted on a shaft, said disks being operatively connected to each other and to said valves, substantially as described. 85

In testimony whereof, I have hereunto set my hand.

CHARLES LONGENECKER.

Witnesses:

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FRANCIS J. TOMASSON.