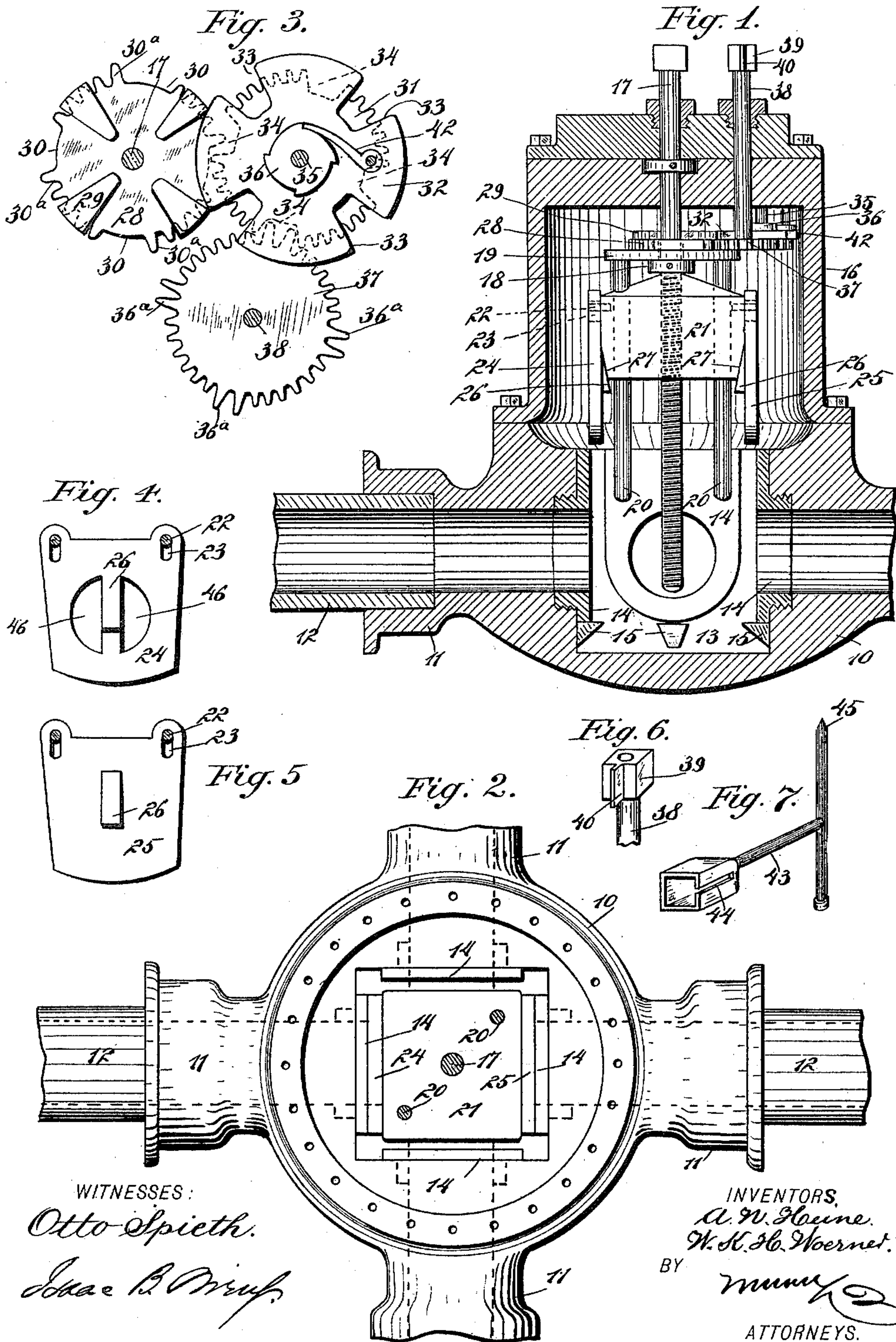


(No Model.)

A. N. HEINE & W. K. H. WOERNER.
GATE VALVE.

No. 600,363.

Patented Mar. 8, 1898.



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ALFRED N. HEINE AND WILLIAM K. H. WOERNER, OF EVANSVILLE,
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GATE-VALVE.

SPECIFICATION forming part of Letters Patent No. 600,363, dated March 8, 1898.

Application filed September 9, 1897. Serial No. 651,099. (No model.)

To all whom it may concern:

Be it known that we, ALFRED N. HEINE and WILLIAM K. H. WOERNER, of Evansville, in the county of Vanderburg and State of Indiana, have invented a new and useful Gate-Valve, of which the following is a full, clear, and exact description.

This invention is a gate-valve capable of controlling the inlets and outlets of a valve having a plurality of ways—such, for example, as a four-way valve—the apparatus having one or more gates and having means by which the gates may be adjusted about the several ways.

This specification is a disclosure of one form of our invention, while the claims define the actual scope of the conception.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section taken through the valve. Fig. 2 is a plan view with the dome removed and showing the gates in operative position. Fig. 3 is a fragmentary view illustrating the gearing for adjusting the gates. Fig. 4 is a face view of one of the gates. Fig. 5 is a face view of another of the gates. Fig. 6 is a detail perspective view showing the head of the adjusting-shaft, and Fig. 7 is a perspective view illustrating the wrench by which said adjusting-shaft is operated.

The valve-casing 10 has four necks 11, effecting connection with a like number of conduits 12. The necks 11 lead to the interior cavity 13 of the casing, and the four walls of said cavity are respectively provided with wear-plates 14, forming valve-seats against which the gates, hereinafter described, bear to close the necks. Below the lower edge of each wear-plate 14 a stop-lug 15 is fixed, such stop-lugs serving to limit the downward movement of the gates, whereby said gates may be held in operative position. The interior cavity of the casing 10 has an open top covered by a dome 16, said dome forming a cavity larger than the interior of the casing 10. The dome 16 carries the means for carrying and adjusting the gates.

Mounted in the top of the dome 16 and held

to turn, but not to slide therein, is a vertically-extending shaft 17, having a square head to permit the shaft to be operated by a wrench. The shaft 17 extends centrally through the dome and down into the cavity of the casing 10 and is screw-threaded below the collar 18, formed on the shaft 17 at a point within the dome 16. Carried loosely on the shaft 17 and resting on the collar 18 is a disk 19, to which two downwardly-extending guide-rods 20 are fixed. Screwing on the shaft 17 and guided by the rods 20 is a nut-block 21, having at each of two opposite sides two pins 22, respectively receiving vertically-elongated slots 23, formed in the gates 24 and 25. The gates 24 and 25 are thus mounted to have slight vertical movement on the nut-block 21 and are carried up and down in and out of the casing 10 by means of said nut-block, which in turn is moved by the action of the threaded shaft 17, turning in the top of the dome 16. As the nut-block 21 moves into the casing 10 the gates 24 and 25 are seated upon two of the four wear-plates 14. The lugs 15 stop the downward movement of the gates 24 and 25. The gates are wedged outward against their seats by means of inclined lugs 26, formed one on the inner face of each gate and bearing against inclined surfaces 27, formed on the nut-block 21. Consequently after the gates are once engaged with the lugs 15 a slight downward movement of the block 21, independent of the gates, will force the gates outward and cause them to be hermetically seated on the wear-plates 14.

For the purpose of turning the disk 19 to adjust the position of the nut-block 21 and the gates 24 and 25 and also for the purpose of holding the disk 19 stationary, so that the guide-rods 20 may perform their requisite functions, we provide a gear-wheel 28, fixed to the disk 19 and mounted to turn loosely on the shaft 17. The gear-wheel 28 has on its upper face four equidistant radial segmental blocks 29 and has four mutilations 30, respectively, between the blocks 29, and each mutilation is bounded at one side by a giant tooth 30^a. Coacting with the gear 28 is a gear 31, having a disk 32 fixed on its upper face. The disk 32 overhangs the gear 31 and has

four peripheral recesses 33, capable, respectively, of receiving the blocks 29. The gear 31 is mounted to turn on a stub-shaft 35, depending from the top of the dome 16. The gear 31 has four equidistant mutilations 34, designed, respectively, to receive the giant teeth 30^a and also to receive the pairs of giant teeth 36^a of the gear 37, fixed on a shaft 38, revolubly mounted in the top of the dome 16.

A ratchet-wheel 36, fixed on the disk 32 and engaged by a pawl 42, prevents back movement of the disk. The disk 32, bearing at its periphery against the blocks 29, prevents the rotation of the gear 28 and consequently holds the blocks 21 firmly from turning. When the gear 31 and disk 32 are turned, the disk 32 slides around the blocks 29 until one of the giant teeth 30^a engages the wall of one of the mutilations 34, whereupon the adjacent block 29 will be in position to pass into a recess 33. This allows the wheels 28 and 31 to mesh, and the wheel 28 may then be driven. The wheel 31 is driven from the wheel 37, and the latter wheel is provided with the giant teeth 36^a to prevent missing mesh at the mutilations 34. The shaft 38 has a square head 39, provided with a vertically-extending spline 40. The heads of the shafts 17 and 38 are adapted to be engaged by a socket-wrench 43, the socket of which has a groove 44 to receive the spline 40, and the handle of which has one end pointed, as shown at 45. The single wrench shown in Fig. 7 can be used successively for both shafts 17 and 38, thereby avoiding the necessity of two separate wrenches. The shafts 17 and 38 are provided with stuffing-boxes above the top of the dome 16.

In operating the valve the shaft 17 is turned to raise the nut-block 21 and the attached parts upward into the dome 16. The shaft 38 is now turned to adjust the nut-block 21 and the gates 24 and 25, so that the gates will be located in the proper position for closing the desired necks 11. In order that the position of the nut-block 21 and gates 24 and 25 within the dome may be determined from without, we have provided the spline 40 on the shaft 38 and the slot 44 and the pointed handle end 45 on the wrench 43. These parts, when given a proper and known relative relation, will indicate exactly the position of the gates within the dome. After the gates have been adjusted the shaft 17 is turned again to move the nut-block and the gates downward and seat the latter.

If desired, both gates may be solid, so that two necks 11 will be closed; but this is not generally necessary, and the preferred construction is that which provides the gate 24 with orifices 46, (see Fig. 4,) in which case the gate 24 serves merely as a means for receiving the side pressure of the nut-block 21 as the same moves downward to force the gate 25 into place against the coacting wear-plate 14.

Having thus described our invention, we

claim as new and desire to secure by Letters Patent—

1. The combination of a threaded and revoluble shaft, a nut-block threaded on the shaft, a valve-gate carried by the nut-block, the nut-block and valve-gate being moved vertically to seat and unseat the valve-gate, and means for turning the nut-block and valve-gate to adjust the valve-gate.

2. The combination of a threaded and revoluble shaft, a nut-block threaded on the shaft, a gate carried by the nut-block, a disk loose on the shaft, a guide-rod fixed to the disk and engaged by the nut-block, and means for turning and holding the disk.

3. The combination of a threaded and revoluble shaft, a gate mounted on the shaft, to be moved vertically thereby, a disk loose on the shaft, a guide-rod having connection with the valve-gate, and gearing capable of turning and fixing the disk.

4. The combination of a mounted valve-gate, means for raising and lowering the valve-gate to seat and unseat the same, a revolubly-mounted disk, a guide-rod having sliding connection with the valve-gate, and gearing capable of holding and revolving the disk.

5. The combination of a threaded shaft, a nut-block thereon and movable vertically by the action thereof, a valve-gate carried by the nut-block, and means for turning the nut-block on the shaft to adjust the valve-gate and for holding the nut-block from turning as the shaft revolves.

6. The combination of a threaded revoluble shaft, a valve-gate mounted to be moved vertically by the revoluble action of the shaft, and gearing having connection with the valve-gate and capable of turning the same around the shaft to adjust the valve-gate and also of holding the valve-gate from turning during the action of the shaft.

7. The combination with a valve-casing, of a threaded revoluble shaft carried therein, a nut-block carried on the shaft and movable by the revoluble action thereof, a valve-gate carried by the nut-block, a disk loose on the shaft, a rod attached to the disk and having sliding connection with the nut-block, and gearing in connection with the disk by which the disk may be turned and by which the disk may be held immovable.

8. The combination of two gears meshing with each other, a series of blocks attached to the face of one of the gears and arranged equidistant thereon, and a disk attached to the other gear and having radial and equidistant recesses therein, the recesses respectively receiving the said blocks, and the disk overhanging the gear having the blocks.

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Witnesses:

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