W. F. HAGEN.

GATE VALVE.

APPLICATION FILED SEPT. 23, 1916.

1,219,392.

Patented Mar. 13, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

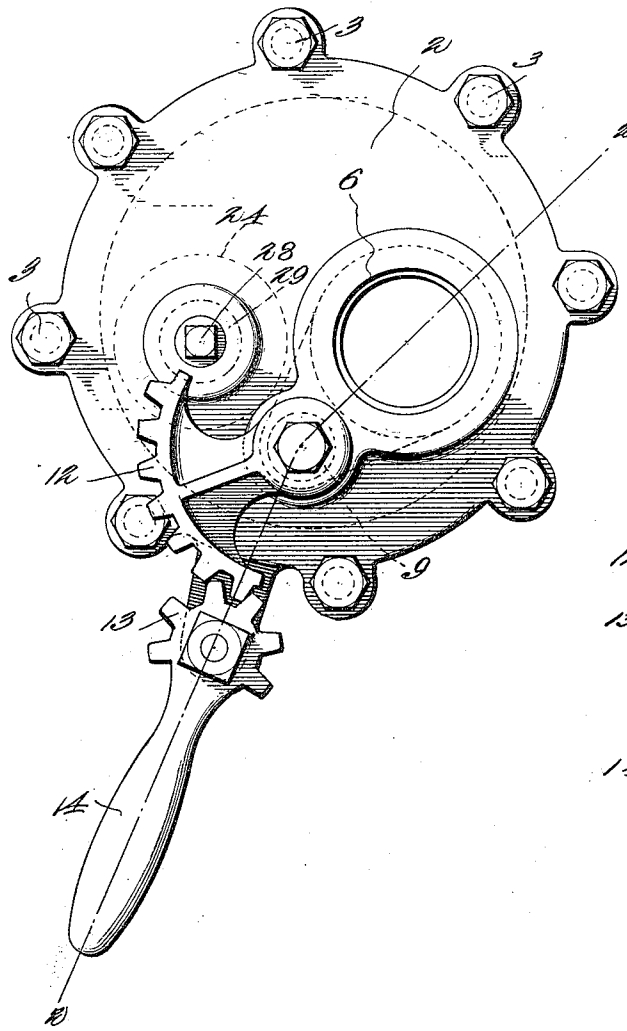
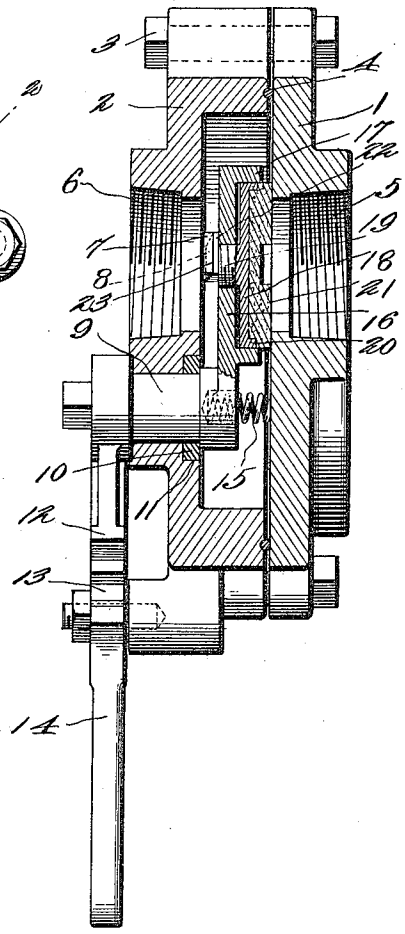


Fig. 2.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 3.

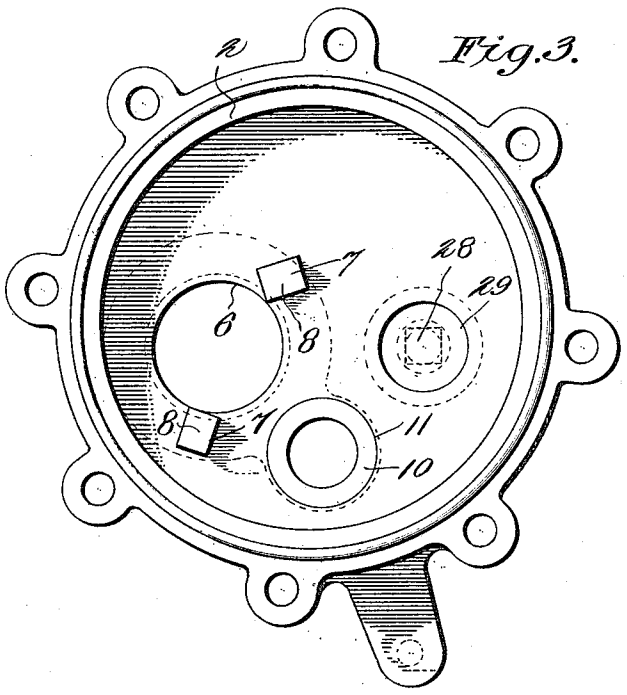


Fig. 4.

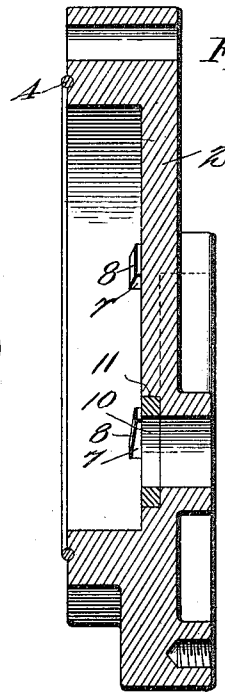
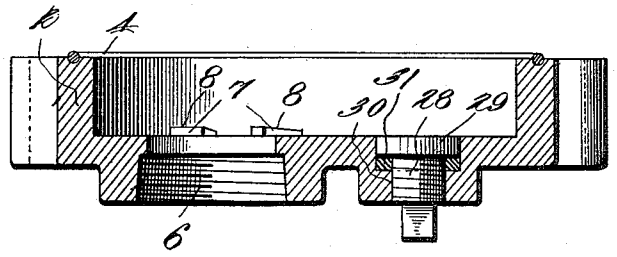


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

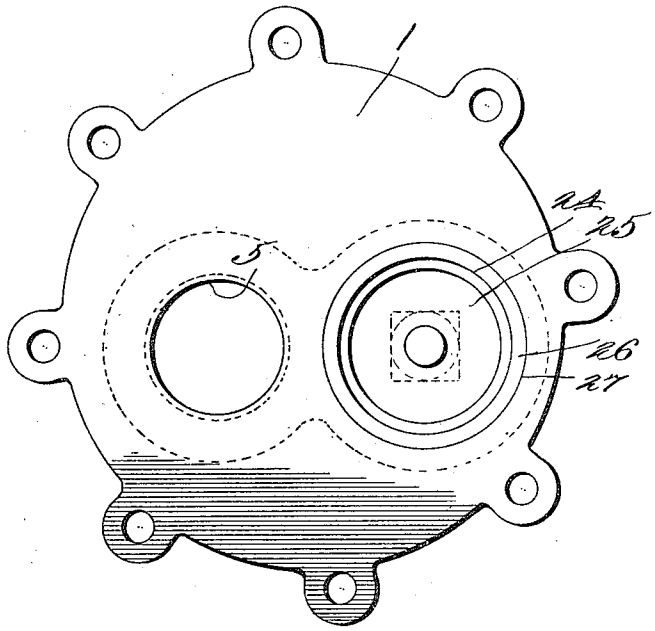


Fig. 7.

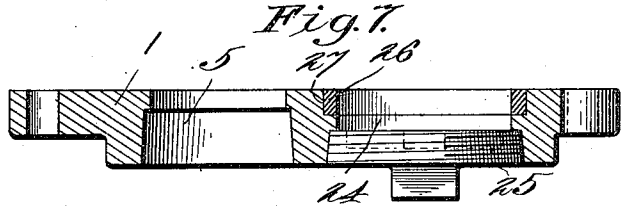


Fig. 8.

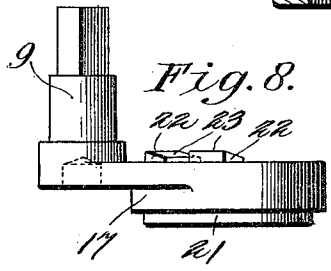
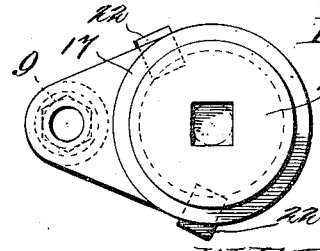


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM F. HAGEN, OF SCRANTON, PENNSYLVANIA.

GATE-VALVE.

1,219,392. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed September 23, 1916. Serial No. 121,768.

To all whom it may concern:

Be it known that I, WILLIAM F. HAGEN, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented new and useful Improvements in Gate-Valves, of which the following is a specification.

This invention relates to gate valves and it consists in the novel features hereinafter described and claimed.

An object of the invention is to provide a gate valve of simple and durable structure adapted to be connected with the ends of pipe sections for controlling the passage of air or steam pressure through the same. The parts being susceptible of manipulation whereby the disk of the valve may be removed while the casing is subjected to pressure, thus making it possible to renew the valve disk in the event that the same becomes worn without interfering with the passage of the pressure through the valve casing and connected pipes.

A further object of the invention is to provide a lever-mechanism of simple and durable structure adapted to operate and move the valve stem while the parts are subjected to pressure.

In the accompanying drawing:—

Figure 1 is a plan view of the gate valve.

Fig. 2 is a transverse sectional view of the same cut on the line 2—2 of Fig. 1.

The other figures are detailed views of the features thereof.

The gate valve comprises a casing which is composed of heads 1 and 2 secured at their edge portions together by means of bolts 3. A packing gland 4 is interposed between the edge portions of the heads 1 and 2 and serves as means for preventing leakage from between the said heads. The intermediate portions of the heads 1 and 2 are spaced from each other. The head 1 is provided with an opening 5 in which may be secured the end of a pipe section. The head 2 is provided with a similar opening 6 with which the end of a pipe section may be connected. The openings 5 and 6 are opposite each other. Lugs 7 are formed on the head 2 at the opposite sides of the openings 6 therein and the said lugs are provided with inner spaces 8 which lie in planes inclined at angles to the plane in which the inner surface of the head 2 lies.

A shaft or stem 9 is journaled in the head 2 and passes transversely through the same. A packing 10 surrounds the inner portion of the said shaft 9 and is located in a recess 11 provided at the inner side of the head 2. A dentate segment 12 is fixed to the outer portion of the shaft 9 and its teeth mesh with a gear wheel 13 which is journaled upon the head 2. The said gear wheel 13 is provided with a laterally disposed handle 14 which may be used for turning the said gear wheel. A spring 15 is located between the heads 1 and 2 and bears at one end against the head 1 and at its other end against the inner end of the shaft 9. The said spring is under tension with a tendency to hold the inner end of the shaft toward the packing 10. A plate 16 is carried at the inner end of the shaft 9 and the said plate is provided with an annular flange 17 which is adapted to receive a valve disk 18. The said disk 18 is provided with a threaded stud 19 which is screwed into the plate 16 at a point at the center of the flange 17. The disk 18 is provided at its edge with an annular flange 20 which receives and retains a valve disk 21. The valve disk 21 is of a diameter sufficient to close over the inner end of the opening 5 when the gate valve is at a closed position. Lugs 22 are provided at the upper side of the plate 16 and at the opposite edges thereof. The lugs 22 are provided with upper inclined surfaces 23 which are adapted to move along the faces 8 of the lugs 7 whereby the valve disk 21 is forced down into tight engagement with the inner surface of the head 4 when the said disk is moved to a closed position over the opening 5 and thus effectually sealing the said opening.

It is apparent that when the handle 14 is swung the gear wheel 13 will turn the segment 12 whereby the shaft 9 is partially rotated in the head 2 and the valve disk 21 may be moved to a position over the opening 5 or removed therefrom. When the said valve disk 21 is moved away from the opening 5 the spring 15 moves the shaft 9 longitudinally whereby the said valve disk 21 is carried away from the inner surface of the head 4. When the said valve disk 21 is moved over the opening 5 the inclined surfaces of the lugs 22 move the inclined faces 8 of the lugs 7 whereby the said disk 21 is moved down into close contact with the inner surface of the head 1, thus completely closing the opening 5 in the said head.

The head 1 is further provided with an

opening 24 the center of which is located at the same distance from the axis of the shaft 9 as the center of the opening 5 hereinbefore described. The outer portion of the opening 24 is normally closed by a screw plug 25 and the diameter of the said opening 24 is sufficient to permit the valve disk 21 to pass through the same but is less than the diameter of that portion of the face 16 which carries the flange 17. An annular packing 26 surrounds the inner portion of the opening 24 and is located in a recess 27 provided at the inner side of the head 1.

A stud 28 is screwthreaded in the head 2 and passes transversely through the same at a point opposite the center of the opening 24. The stud 28 is provided at its inner end with an enlargement 29 which is normally received in a bore 30 provided at the inner side of the head 2. A packing 31 is located in the inner portion of the bore 30 and surrounds the intermediate portion of the stud 28. The adjacent surface of the enlargement 29 normally bears against the packing 31 whereby a tight joint is effected between the stud and the head 2 which carries the same.

When it is desired to remove the valve disk 21 while the casing and the connected pipes are subjected to pressure, for the purpose of renewing the valve disk after the same has become worn; the handle 14 is swung whereby the plate 16 is moved from over the opening 5 and is moved over the opening 24. The stud 28 is turned whereby it is moved inwardly with relation to the head 2 and when the enlargement 29 comes in contact with the adjacent surface of the plate 16, the said plate is moved toward the head 1 against the tension of the spring 15. When the edge of the flange 17 comes in contact with the packing 26 the plug 25 is removed and thus the valve disk 21 may be removed from the plate 16 by unscrewing the stud 19 from the said plate. A new valve disk 21 may be then inserted in position upon the plate 16 within the flange 17 thereof. The plug 25 is then reinserted in the opening 24 and the stud 28 is turned back to its normal position with its enlargement 29 in engagement with the packing 31. Then the handle 14 may be swung so that the plate 16 is carried over the opening 5 and the passage of the pressure through the casing is interrupted. Or if desired the said plate 16 may be permitted to remain at an open position thus permitting the pressure to pass through the valve casing from one pipe section to the other.

From the foregoing description taken in conjunction with the accompanying drawings, it will be seen that a gate valve of simple and durable structure is provided and that the parts may be easily and quickly manipulated while the structure is subjected to pressure to permit the removal of a worn valve disk and the substitution of a new one in its stead.

Having described the invention what is claimed is:—

1. A gate valve comprising a casing provided at its opposite sides with openings adapted to be connected with pipe sections, a shaft journaled in one side of the casing, means for turning the shaft, a plate carried by the shaft, a valve disk removably mounted upon the shaft, a spring bearing against the shaft and adapted to hold the same away from one side of the casing, means for forcing the said plate toward the side of the casing against the tension of the said spring when the plate is moved between the said openings, a stud movably mounted in one of the sides of the casing and adapted to engage the plate when the same is moved opposite the stud, the opposite side of the said casing having an opening adapted to be closed by the plate and through which the valve disk may pass and a plug normally closing the last mentioned opening.

2. A gate valve comprising a casing provided at its opposite sides with openings adapted to be connected with pipe sections, a shaft journaled in one side of the casing, a spring bearing against the opposite side of the casing and bearing against the said shaft, a dentate segment fixed to the outer end of the shaft, a gear wheel journaled upon the casing and meshing with said segment, a plate carried by the said shaft and adapted to be interposed between the said openings, said plate having an annular flange, a disk detachably connected with the said plate and located between the flange, a valve disk carried by the first mentioned disk and adapted to be closed over one of the said openings, lugs having inclined faces mounted upon the said plate, lugs mounted at the side of the casing and adapted to be encountered by the inclined faces of the lugs upon the plate whereby the disk is forced in contact with the opposite side of the casing, a stud movably mounted in one side of the casing and adapted to engage the said plate and move the same against the tension of the said spring, the casing having at its opposite side an opening of sufficient diameter to permit the valve disk to pass through the same, the flange carried by the said plate adapted to engage around the last mentioned opening and a detachable plug normally closing the last mentioned opening.

In testimony whereof I affix my signature.

WILLIAM F. HAGEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."