

G. M. S. TAIT.

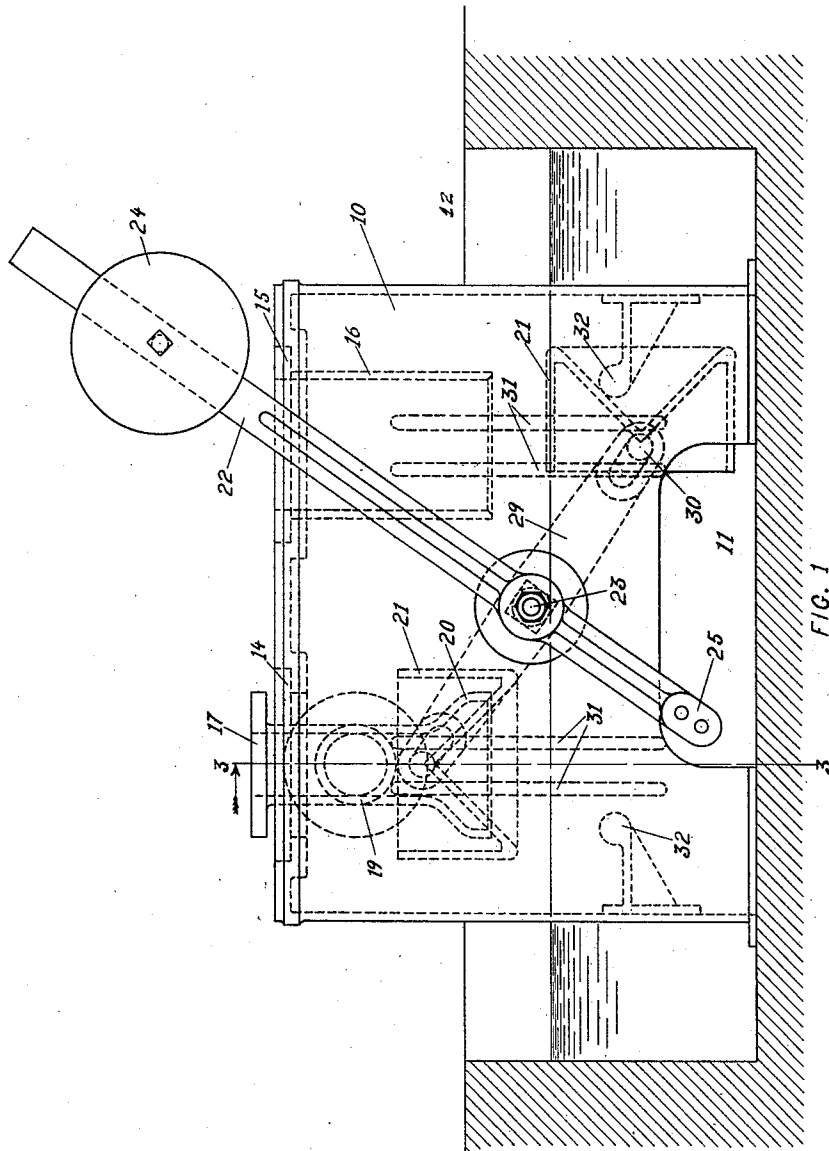
GAS VALVE.

APPLICATION FILED APR. 16, 1910.

998,931.

Patented July 25, 1911.

2 SHEETS—SHEET 1.



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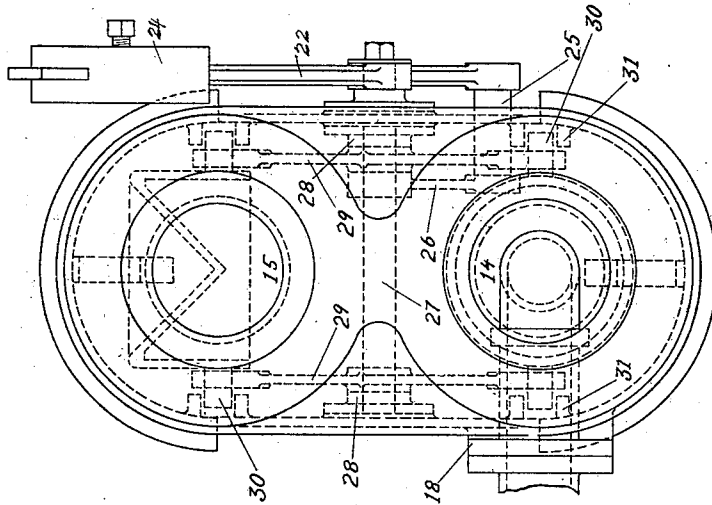


FIG. 2

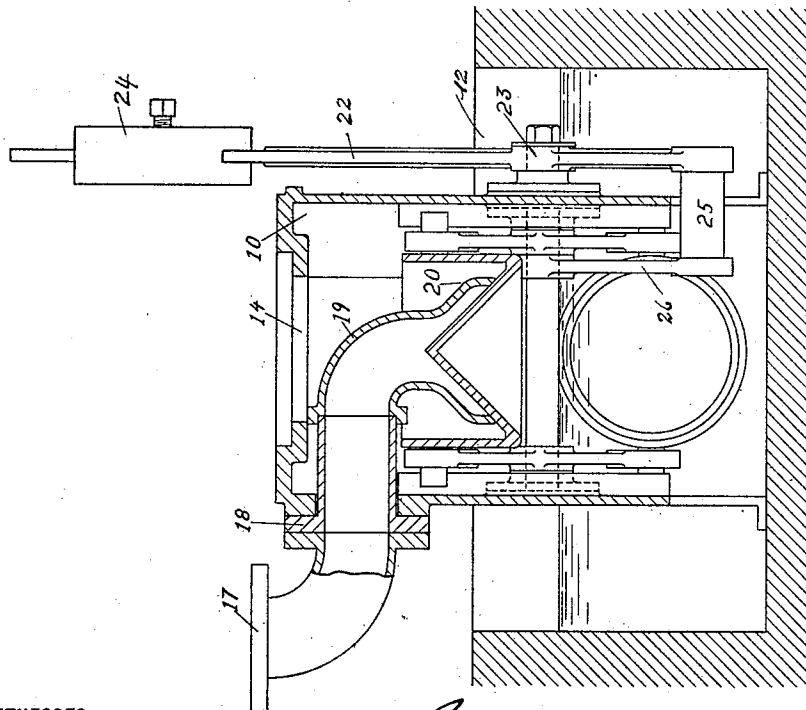


FIG. 3

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# UNITED STATES PATENT OFFICE.

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## GAS-VALVE.

998,931.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed April 16, 1910. Serial No. 555,909.

*To all whom it may concern:*

Be it known that I, GODFREY M. S. TAIT, of Montclair, Essex county, State of New Jersey, have invented certain new and useful Improvements in Gas-Valves, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a valve for controlling the movement of gas from a gas producer to the engine or from the producer to the purge pipe to the atmosphere. In gas producer plants it is common to employ a mechanism of this sort by which the connection between the producer and the point of gas consumption may be closed when the plant is shut down and the interior of the producer opened into the atmosphere to permit free escape of such gases as might remain therein.

The object of my present invention is effectually to seal the various connections with the water which is primarily relied upon.

A further object of the invention is to provide means for automatically washing out any dirt or other solid matter which may accumulate in the valves, such washing or cleansing of the valves to take place each time that they are operated.

Still a further object of the invention is effectually to seal the whole apparatus and avoid the use of any joint or moving connections passing through the walls of the device which are not protected by the water seal.

My invention involves various other features of importance, all of which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is now had to the accompanying drawings which represent, as an example, the preferred embodiment of my invention.

In these drawings—Figure 1 is a side elevation of the apparatus showing the interior parts by broken lines; Fig. 2 is a plan view of the same also showing the interior parts by broken lines; and Fig. 3 is a cross-sectional elevation on the line 3—3 of Fig. 1 looking in the direction of the arrow applied to said line.

The apparatus comprises a casing or housing 10, which is open transversely at its

bottom as indicated at 11, and is situated in a pit or pan 12 wherein a body of water is maintained approximately at level indicated in Fig. 1.

14 indicates a connection in the top of the housing 10, to which the gas supply pipe leads from the producer.

15 indicates a connection also in the top of the housing with which communicates the pipe leading to the engine or other point of gas consumption. Usually, though certainly not necessarily, the parts communicating with the connections 14 and 15 include scrubber towers through which water flows into said connections. The connection 15 has depending from it a skirt 16 reaching down in the housing 10 to a point somewhat above the water line therein.

17 indicates a fragment of the purge pipe which extends into the atmosphere and is fastened onto a connection 18 at the side of the housing in transverse line with the connection 14, but below the same. As shown best in Fig. 3, an elbow 19 communicates with said connection 18 and forms a continuation of the pipe 17. This elbow is within the housing and extends horizontally and thence bends downward at a point under a vertical position of the connection 14. The lower end of this vertical limb of the elbow 19 is flared or enlarged to form a bell 20.

The essential function of the mechanism is alternately to open and close the connection 15 and the connection 18, so that the producer is either in communication with the engine through the connections 14 and 15 or is closed to the engine and in communication with the connection 18 leading to the purge pipe 17. This latter adjustment, resorted to when the plant is shut down, allows the gaseous contents of the producer to be blown off into the atmosphere. In attaining this result I employ valves 21 which are in the form of cups with conical bottoms projecting upward into the cups. Said cups are adapted, when active, to inclose the lower ends of the skirt 16 and elbow 19 with their conical bottoms snugly engaged with the beveled lower edges of said parts 16 and 19. When active, the cups are upright and are filled with water either gathered from the supply in the pit 12 or from the water which is flowing down the connections 14 and 15

from the scrubber towers. The importance of this structure and arrangement should here be pointed out, namely, if by any mischance the water supply to the cup valves 21 should fail and the water therein evaporate, a seal would still be maintained, owing to the arrangement of the conical bottoms of the cup valves with the beveled edges of the parts 16 and 19. This forms a closure equal to that effected by a ground-in valve of the puppet or other type. Of course, it is primarily intended to water seal the valves and the structure referred to is a precautionary measure.

22 indicates a rocker arm which is disposed vertically and is mounted loosely on a stud 23, projecting from the outer side wall of the housing 10, preferably at the side opposite the connection 18. The side wall of the housing is unbroken at this, as well as at other points, and the stud 23 merely projects from this wall without penetrating it. The stud may be bolted on or cast integral with the housing, as preferred. The upper end of the rocker arm 22 carries a weight 24 and the lower end extends to the transverse opening 11 in the side of the housing and there carries transversely a pin 25 which extends inward through said opening into the lower portion of the housing. At its inner end said pin 25 is engaged with a link 26 and this extends back to the pivot position of the arm 22 where it is fastened to a rock shaft 27, said shaft has its ends dropped into bearings 28 on the inner surfaces of the walls of the housing 10, the shaft extending horizontally across the interior of the housing from side to side. Fastened to the shaft 27 are two walking beams 29, the ends of which extend respectively to the vertical positions of the connections 14 and 15 and loosely mount trunnions 30 formed on the sides of the cup valves 21. As shown in Fig. 1, the ends of said walking beams 29 are slotted longitudinally to accommodate the trunnions, and the trunnions are guided in straight line vertical motion by ribs 31 or equivalent means on the side walls of the housing with which ribs the trunnions 30 slidably engage. It will therefore be seen that upon throwing over the arm 22 from one side to the other of its center motion the shaft 27 will be rocked through the parts 25 and 26 and the walking beams 29 will reverse their position. This elevates one of the cup valves and depresses the other, the walls of the slots in the walking beams sliding on the trunnions 30 and said trunnions being constrained to vertical rectilinear motion by the guides 31. This insures proper engagement between the valves and the skirt 16 or elbow 19 as the case may be. For the purpose of dumping the cup valves as they drop, I provide within the housing 2 detents 32. These are attached to the inner

end walls at the power portions and are so positioned that as the valves descend their conical bottoms engage the detents 32 at points at one side of the trunnions 30 and the continued downward motion of the cup valves thus engaged with the detents causes the valves to turn over as they enter the water. This dumps from the cup valves any solid matter which may have accumulated therein and subjects them to the washing action of the water so that as the valves are again raised they rise from the water cleansed. The valves also gather water from the water supply in rising to the extent that they engage their respective coacting parts 16 and 19. They form a perfect seal therewith not only by reason of the mechanical contact heretofore referred to but by reason of the presence of the water in the valves.

In the use of the apparatus therefore it is connected in the plant in the manner described and during normal operation the parts stand as indicated in Fig. 1. In this position the connection 15 is opened and the elbow 19 to the purge pipe is closed. Gas then flows freely from the producer to the engine or other point of gas consumption and the purge pipe is hermetically sealed. The water flowing down from the scrubber towers will keep the cup valve flooded, but should this water supply for any reason fail and the water evaporate from the cup a seal will still be effected. In this connection it should be observed that the weight 24 on the arm 22 exerts a pressure on the arm which is communicated to the cup valve and holds it firmly against the elbow. When the plant is shut down, it is only necessary to throw over the arm 22 which reverses the situation within the housing closing the connection 15 and opening the elbow 19 so that the gaseous contents of the producer may pass off freely without danger of escaping in the building.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A valve device for gas producer plants comprising a housing open at the bottom and constructed to have its lower portion submerged, said housing having connections with the gas producer, gas purge and gas consumer, pipe sections communicating with the gas purge and gas consumer and opening into the housing, cup valves with conical bottoms adapted to inclose the ends of said pipe sections and engage their conical bottoms therewith, a rocking arm mounted outside of the housing, a rock shaft mounted inside of the housing, a connection between the arm and said shaft extending through the opening at the bottom of the housing, a walking beam on the rock shaft within the housing on the ends of which beam the cup valves are

swung and detents for tilting the cup valves located in the lower part of the housing and engaged by the valves as they descend.

2. A valve device for gas producer plants comprising a housing open at the bottom and constructed to have its lower portion submerged, said housing having connections with the gas producer, gas purge and gas consumer, pipe sections communicating with the gas purge and gas consumer and opening into the housing, cup valves with conical bottoms adapted to inclose the ends of said pipe sections and engage their conical bottoms therewith, a rocking arm mounted outside of the housing, a rock shaft mounted inside of the housing, a connection between the arm and said shaft extending through the opening at the bottom of the housing, a walking beam on the rock shaft within the housing on the ends of which beam the cup valves are swung and detents for tilting the cup valves located in the lower part of the housing and engaged by the valves as they descend, the gas producer and gas consumer connections located at the top of the housing and the gas purge connection located at the side and the pipe section of the purge connection being elbow shaped and extending inward and downward from said connection.

3. A gas valve device comprising a cup-valve with a tapering bottom and a coacting member having a seat surface inclosed by the cup and engaged by said tapering bottom.

4. A gas valve device comprising a cup-valve with a conical bottom and a coacting member having an annular seat surface inclosed by the cup and engaged by said conical bottom.

5. A gas valve device comprising a cup-valve with a conical bottom and a coacting pipe, the lower end of which is adapted to be inclosed by the cup and to receive and engage the conical bottom.

6. A valve device for gas producer plants comprising an inlet, an outlet, a liquid container, a housing constructed to be submerged at its lower portion in said container and having an opening in said submerged portion, a valve in the housing and operating means extending from the outside of the housing to the valve, said operating means passing through the submerged opening.

7. A valve device for gas producer plants comprising an inlet, an outlet, a housing constructed to be submerged at its lower portion and having an opening in said submerged portion, a valve in the housing, an arm mounted to swing outside of the housing, a rock shaft within the housing, and means connecting the arm with the rock shaft including a part extending through the opening in the submerged part of the housing.

8. A valve device for gas producer plants comprising an inlet pipe, an outlet pipe, a housing constructed to be submerged at its portion and having an opening in its submerged portion, a swinging arm mounted outside of the housing and having its lower end adjacent to the said opening, a pin projecting from such end through the opening in the housing, a rock shaft mounted in the housing, an arm within the housing connecting the pin with the rock shaft and valve devices in the housing and connected with the rock shaft to be actuated thereby.

9. The combination of a valve, means for guiding the valve during a variation of the position of the valve, a pivot movable with the valve, means for turning the valve on its pivot, and a seat member coacting with the valve and toward and from which it moves.

10. The combination of a pivoted valve, means for moving said valve bodily to vary the position of the pivotal center, and means for turning the valve on its pivot at one point in its movement.

11. The combination of a pivoted valve means for guiding said valve during a bodily movement thereof and means for turning the valve on its pivot at one point in its movement, said last mentioned means, comprising a detent located in the path of the valve at one side of the pivot.

12. The combination of a valve having trunnions, guides in which the trunnions move, an actuating means having pivotal connection with the trunnions and means for turning the valve on its trunnions at a point in the movement of the valve.

13. The combination of a valve having trunnions, guides in which the trunnions move, an actuating means having pivotal connection with the trunnions and means for turning the valve on its trunnions at a point in the movement of the valve comprising a detent located in the path of the valve at one side of its pivot.

14. The combination of a valve having trunnions, swinging arms having slots loosely receiving the trunnions, guides also loosely receiving the trunnions and means for turning the valve on its trunnions at a point in the line of movement of the valve.

15. The combination of a valve having trunnions, swinging arms having slots loosely receiving the trunnions, guides also loosely receiving the trunnions and means for turning the valve on its trunnions at a point in the line of movement of the valve, comprising a stationary detent in the path of the valve at one side of its pivot.

16. A valve device for gas producer plants having a housing with gas producer and gas consumer connections at the top and a gas purge connection at the side, a skirt in the housing depending from the gas consumer

connection, an elbow in the housing extending from the purge connection inward and thence downward, valves respectively coacting with the skirt and elbow and means for alternately opening and closing the valves.

17. A valve device for gas producer plants comprising a housing, a conduct having a downwardly facing open end, a cup valve within said housing and adapted to receive said open end, and means for lowering said

cup valve away from said lower open end and tilting said cup valve to permit the drainage of sediment therefrom.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GODFREY M. S. TAIT.

Witnesses: .

GEO. H. LANDFEAR,

H. E. PORTER.

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

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