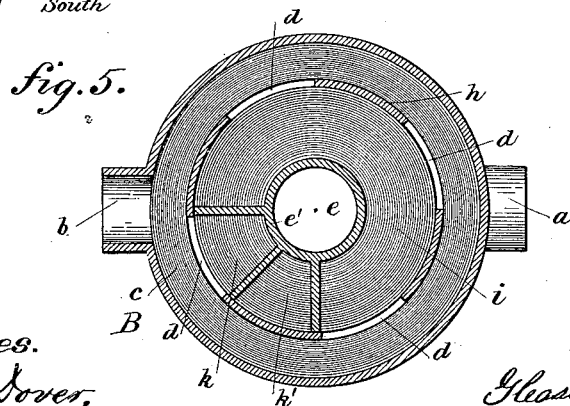
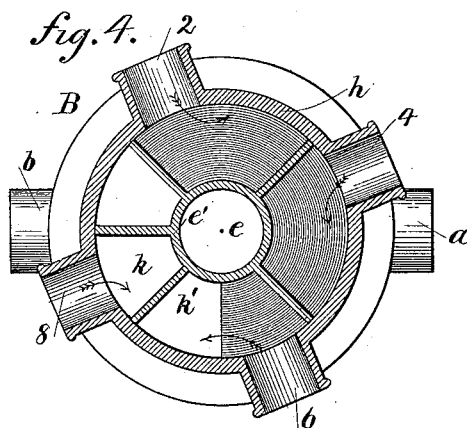
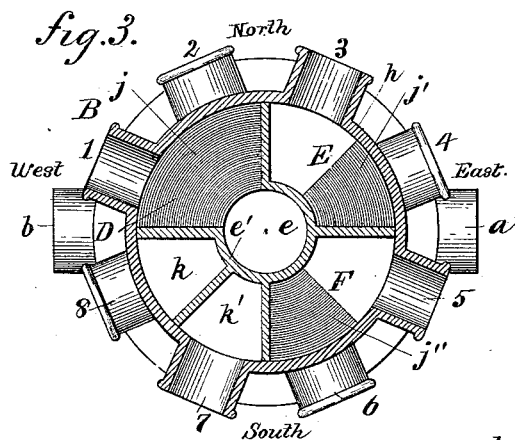
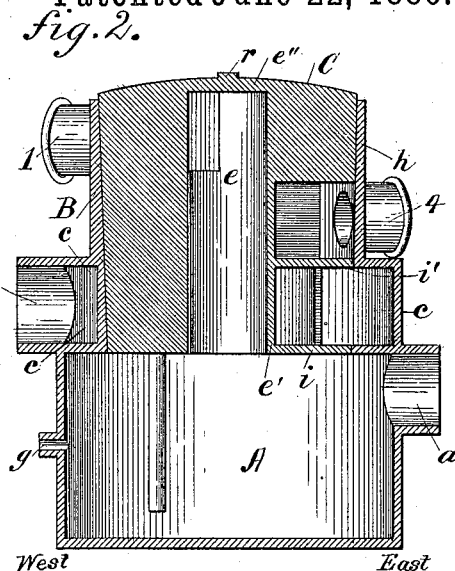
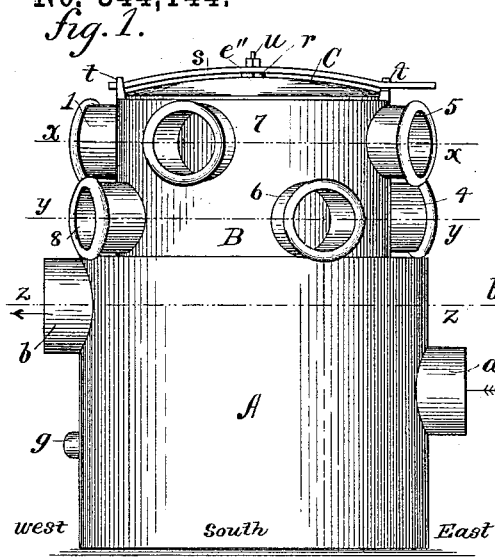


G. F. STARKWEATHER.

CENTER SEAL FOR GAS WORKS.

No. 344,144.

Patented June 22, 1886.



Witnesses.  
Saml. B. Dover.  
Arthur Holladay

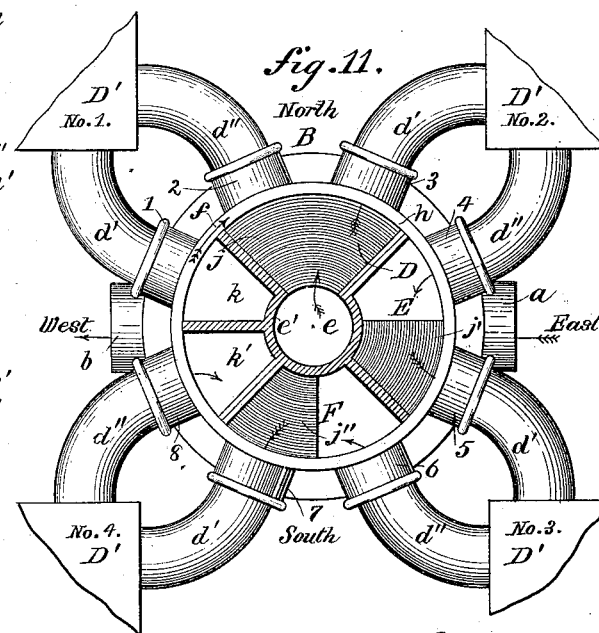
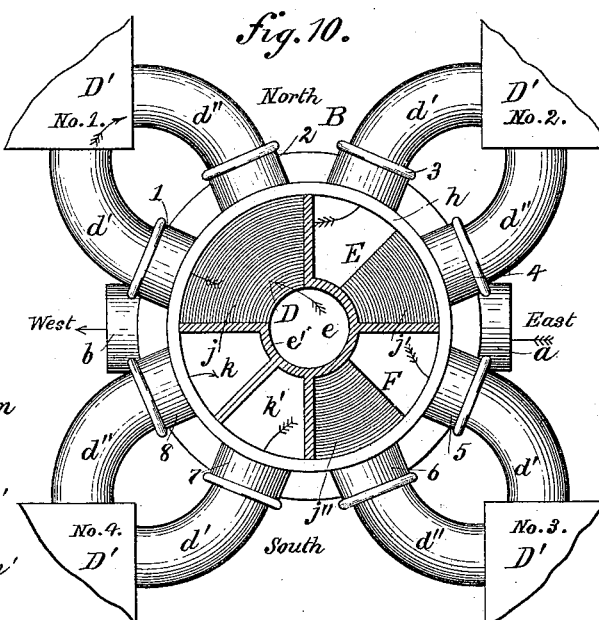
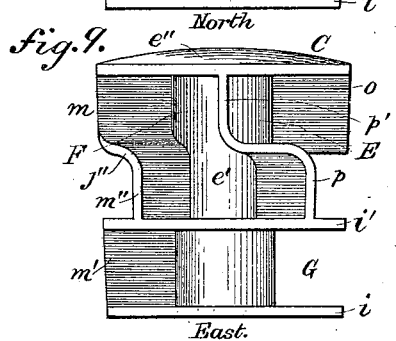
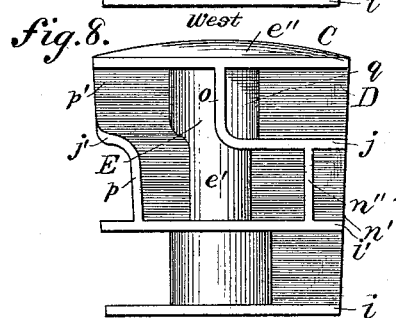
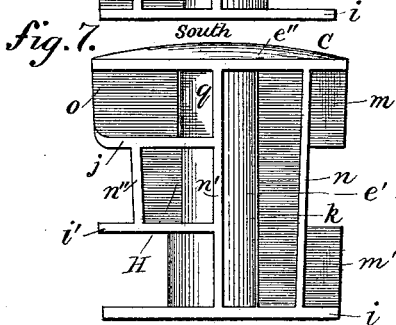
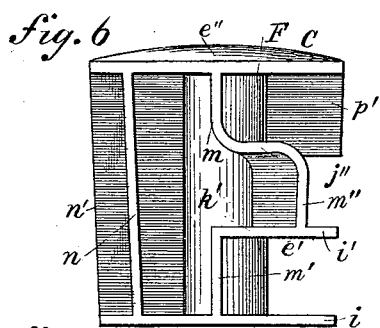
Inventor.  
Gleason F. Starkweather  
By John Lane  
his Atty.

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# UNITED STATES PATENT OFFICE.

GLEASON F. STARKWEATHER, OF EVANSTON, ASSIGNOR TO NATHANIEL S. BOUTON, OF CHICAGO, ILLINOIS.

## CENTER SEAL FOR GAS-WORKS.

SPECIFICATION forming part of Letters Patent No. 344,141, dated June 22, 1886.

Application filed October 2, 1885. Serial No. 178,820. (No model.)

*To all whom it may concern:*

Be it known that I, GLEASON F. STARKWEATHER, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Center Seals for Gas-Works, of which the following is a specification.

This invention relates to the center seal used in connecting the several boxes of an apparatus for purifying gas, and has the object of such a construction as to be of a compact form, and be able to shut off a box at pleasure for the purpose of being cleaned, and then, after being cleaned, again connected without disturbing the flow of gas through the other boxes.

In another application for a patent, filed same day with this, I have shown the center seal with a seat having a series of outer chambers and a valve rotary thereon for directing the flow of gas about the seat. In this invention the construction is changed, in that the seat is of a more simple construction and the valve of such a construction as to receive and send off the gas to the purifying-boxes more direct, and without the use of the series of outside chambers in the seat shown in my other application.

The invention consists, first, in constructing the center seal with an improved seat having a central opening for seating the valve therein, an annular chamber for receiving and conducting the gas from the valve to the outlet-pipe, and having two series of pipe-thimbles, one series above the other, and the thimbles of one series arranged zigzag with the other, for connecting with the purifying-boxes; second, an improved valve constructed with a central chamber outleting into a distributing-chamber, three directing-chambers, one returning-chamber, and one connecting-chamber, as shown, for sending off, directing, returning, and connecting the flow of gas from the inlet-pipe through the several boxes to the outlet-pipe; and, third, in certain other construction and arrangement of parts, which will first beset forth in the specification and shown, and afterward pointed out in the claims.

Referring to the drawings, like letters refer to like parts in all the figures, in which—

Figure 1 is a side elevation view of my improved center seal, showing the seat B, with the two series of thimbles arranged zigzag around the shell of the seat. Fig. 2 is a cross-section view of same, showing the central vertical cross-section view of both seat B and the valve C. Fig. 3 is a top or plan view taken on the dotted line *xx* in Fig. 1, with the part above removed shown in cross-section, and showing the position of the thimbles relative to each other; also showing the construction of the upper section of the valve through which the gas is passed to the several boxes *via* the thimbles 1, 3, 5, and 7. Fig. 4 is a like top or plan view taken on the dotted line *yy* in Fig. 1, showing the construction of the middle section of the valve, through which the gas is received back from the several boxes *via* the lower series of thimbles, 2, 4, 6, and 8. Fig. 5 is a like top or plan view, taken on the dotted line *zz* in Fig. 1, showing the construction of the lower section of the valve, through which the gas is passed to the annular chamber *c* in the seat B; also showing the openings *d* in the shell of said seat. Figs. 6, 7, 8, and 9 are side views in elevation of the valve C, showing the several sides—south, west, north, and east sides, respectively—taken as in the first position, as shown in Figs. 3, 4, 5, and 10, showing the construction of said valve, showing how it is divided into three several divisions—the upper, the middle, and the lower sectional parts—and also how the several divisions are further divided by partitions. Fig. 10 is a plan view of my improved center seal with the top plate of the valve removed, showing the partitions in the upper section of the valve in cross-section, showing the seal connected to four purifying-boxes, D', by the pipes *d'* and *d''*, and showing by the arrows how the gas travels, how the flow of gas is direct from the upper section part of the valve into the four pipes *d'*, leading to the boxes D', and showing how the gas comes to the valve through the central chamber, *e*, and departs through the chamber *k*, after having made the circuit of the purifying-boxes. Fig. 11 is a like view as Fig. 10, with the valve rotated one-eighth part of a revolution in the direction of the arrow *f*, showing how the positions of the partitions in

the valve have changed, and showing by the arrows how the flow of gas has been stopped from entering box D', No. 1, by being made first to enter box D', No. 2, and departing from the valve after having passed box D', No. 4.

My improved center seal is constructed in two parts, the seat B, with a central opening, and the valve C, seated in the said opening.

In the drawings, A represents a drip-tub, a foundation for the support of the seat B, and having the inflow-pipe *a* and a drip overflow pipe, *g*. On the top of the said tub A is seated the seat B, and the said seat may or may not be made in one piece with the said tub. I prefer, however, to make them together in one piece, as shown.

B represents the seat, consisting of a cylindrical shell or cylinder, *h*, provided with a vertical opening of suitable size and shape for the admission and seating therein of the valve C. The said opening is preferably made somewhat tapering from the top to the bottom end, the bottom end being the smallest for the better fitting and keeping of the valve tight or close-fitting.

For the purpose of describing the said seat B, I will divide it into section parts, as a lower part, a middle part, and an upper part. The lower part is provided with an exterior annular chamber, *c*, extending all around the shell *h*, with the four openings *d* in the said shell, as shown in Fig. 5, and also provided with the outflow or distributing pipe thimble *b*. The middle section part is provided with the four thimbles 2 4 6 8, with openings through the said shell, as shown, for connecting with the purifying-boxes, and the upper section part is provided with the four thimbles 1 3 5 7, also with openings through the said shell and for connecting with the said boxes.

It will be observed that the thimbles of the upper section part are set zigzag and above the thimbles of the middle section part, by which the gas will flow outward from the upper section of the valve C through the upper section of thimbles 1 3 5 7, and in returning flow inward through the middle section of thimbles 2 4 6 8 and enter the middle section of the valve, as will be more fully hereinafter shown.

C represents the valve, constructed with the central chamber, *e*, preferably cylindrical-shaped, and extending from the bottom to the top of the valve formed by the tubular pipe *e'*. The bottom end of the said chamber is open to admit the flow of gas from the pipe *a*, and an opening, *g*, near the top end of said pipe *e'*, permits the gas to flow outward into the chamber D. The top end of the said pipe *e'* is covered with the cover *e''*, which said cover projects outward and fills the top end of the opening in the seat B, and the bottom end of said pipe *e'* is provided with an outwardly-projecting rim, *i*, to fill the bottom end of the said opening in the said seat B. The said valve C I divide into sections—

as a lower section, a middle section, and an upper section—and the three sections are each about one-third of the height of the valve, and are more or less divided by rims, floors, 70 and partitions, as follows: Between the lower section and the middle section is the rim *i'*, as a floor to the middle section, and extends about three-fourths of the way around the said pipe *e'*, as shown in Fig. 4, in which Fig. 4 is shown 75 the rim *i'* by the dark circular lines, and the clear spaces *k* and *k'* as openings to the section part below. Between the middle section and the upper section parts there is a rim or parts of a rim or flanges, *j j' j''*, forming floors to the 80 chambers, as shown in Fig. 3, in which the floors are represented by the dark circular lines and the clear spaces as openings into the middle section part below, and in which the floor *j* represents the complete flooring of the 85 chamber D, the floor *j'* as flooring about one-half of the chamber E, and the floor *j''* as flooring about one-half of the chamber F. The said valve C is also provided with several vertical partitions, as follows: Commencing in the 90 center of the south side of the valve (see Fig. 6) is the partition *m* in the upper section as joining the cover *e''* with the floor *j''*, and the partition *m'* in the lower section as joining the rim *i* with the floor *i'*; then in the southwest, 95 at one-eighth around the valve, is the partition *n*, extending from the bottom to the top of the valve and joining the rim *i* with the cover *e''*; then in the west, at one-eighth more around the valve, (see the center of Fig. 7,) is the par- 100 tition *n'*, also extending from the bottom to the top of the valve, and joining the rim *i* with the cover *e''*, and also joining the floors *i'* and *j*; then at one eighth more around the valve, to the northwest, is the partition *n''* in the middle 105 section as joining the floor *i'* with the floor *j*; then at one-eighth more around the valve, to the north side, (see Fig. 8,) is the partition *o* in the upper section as joining the floor *j* with the cover *e''*; then at one-eighth more around 110 the valve, to the northeast, is the partition *p* in the middle section as joining the floor *i'* with the floor *j'*; then at the east side (see Fig. 9) is the partition *p'* in the upper section as joining the floor *j'* with the cover *e''*; then at the 115 southeast side is the partition *m''* in the middle section as joining the floor *i'* with the floor *j''*.

It will be observed that the pipe *e'*, with the several partitions, floors, and cover in the said valve C, form several chambers, as follows: The 120 central chamber, *e*; then the chamber D in the upper section for receiving the gas from the central chamber and distributing or passing it outward to the first box of the series of purifying-boxes; then the three directing-cham- 125 bers E, F, and *k*, for receiving the gas from one box and passing it to another box; then the returning-chamber *k*, for receiving the gas after its passing the several boxes and passing it out of the valve below. The peculiar form 130 or configuration of said chambers is outlined by the partitions and floors, and will be understood by inspecting the drawings, and it will be observed that the chamber D is located

solely at the northwest quarter of the upper part; that the chamber E is located in part in the northeast quarter of the upper part, and a part extending down and under the floor *j* into the north quarter-section of the middle part; that the chamber F is located in part in the southwest quarter of the upper part, and a part extending down and under the floor *j'* into the east quarter-section of the middle part; that the chamber *k'* is located in the east half of the southwest quarter from the top to the bottom of the valve, with a recess extending under the floor *j''* into the middle part, and that the chamber *k* is located in the north half of the southwest quarter from the top to the bottom of the valve. The chambers G and H are blanks, and, having no connection with the flowing gas, need not be described. The top end of the said valve may be provided with a square head, *r*, to which a wrench or lever may be applied to rotate the valve; and *s* represents a spring-bar having its ends seated in ears *t*, attached to the seat, and a nutted screw-rod, *u*, extending from the said head through a perforation in the spring-bar, by which the operator may relieve the valve of too great a weight in its seat and the valve is less liable to stick or set too tight, as will be understood by the drawings.

In operation the center seal is first set in position and connected with the purifying-boxes, as represented in Fig. 10, in which figure the arrows show the direction of flow of the gas, which, after entering at thimble *a*, will rise through the central chamber, *e*, and pass thence through chamber D, thimble 1, and pipe *d'*, into box No. 1; thence returning through pipe *d''*, thimble 2, into chamber E, under the floor *j*; thence moving up to the upper part of the chamber E, and pass out through thimble 3 and pipe *d'* into box No. 2; thence returning through pipe *d''* and thimble 4 into chamber F, under the floor *j'*; thence moving to the upper part of the chamber F, and passing out through thimble 5 and pipe *d'* into box No. 3; thence returning through pipe *d''* and thimble 6 into the chamber *k'*, under the floor *j''*; thence moving to the upper part of the chamber *k'*, and passing out through thimble 7 and pipe *d'* into box No. 4; thence returning through pipe *d''* and thimble 8 into the chamber *k*; thence moving to the bottom of the chamber and pass out through the opening *d* (see Fig. 5) into the annular chamber *c*, and thence away through the thimble *b*. Then whenever it is desired to shut off a box the valve is moved, rotating

one-eighth part of a revolution in the direction of the arrow *f*, (see Fig. 11,) when the valve in its new position will guide and flow the gas the same as before, except that it will pass box No. 1 and first enter box No. 2, as shown by the arrows in Fig. 11, thence the same as before until it arrives in chamber *k'*, in which chamber it this time will move and pass down to the bottom of the chamber and pass out through the opening *d*, the same as before. Then when the box has been cleaned and it is desired to connect it again, the valve will be again turned, the same as before, a one-eighth move, which will bring all the chambers into the same relative position as at first, except that the valve has been rotated one-quarter of a revolution, and the first box of the new series will now be box No. 2 and the last box of the new series box No. 1, and so on indefinitely, step after step and revolution after revolution.

Having thus set forth my invention, I claim—

1. In a center seal for gas-works, the seat B, provided with a central opening, an annular chamber, and two series of thimbles, one of said series set above and zigzag with the other series, substantially as and for the purpose set forth.

2. In a center seal for gas-works, the valve C, provided with a central chamber having an opening near its top end, the distributing-chamber D, the three directing-chambers E, F, and *k'*, and the connecting-chamber *k*, substantially as and for the purpose shown.

3. In a center seal for gas-works, the valve C, provided with a central chamber in the central part of the valve, and extending from the bottom to the top of the valve, the chamber D in the upper part of the valve, the two chambers E and F in both the upper and middle part of the valve, the chamber *k'*, extending from the bottom to the top, and with a recess in the middle part of the valve, and the chamber *k*, extending from the bottom to the top of the valve, substantially as and for the purpose set forth.

4. The combination of the valve C, provided with a central chamber having a series of exterior chambers, with the seat B, having an annular chamber and two series of thimbles, and with the tub A, having the thimble *a*, substantially as and for the purpose set forth.

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Witnesses:

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