

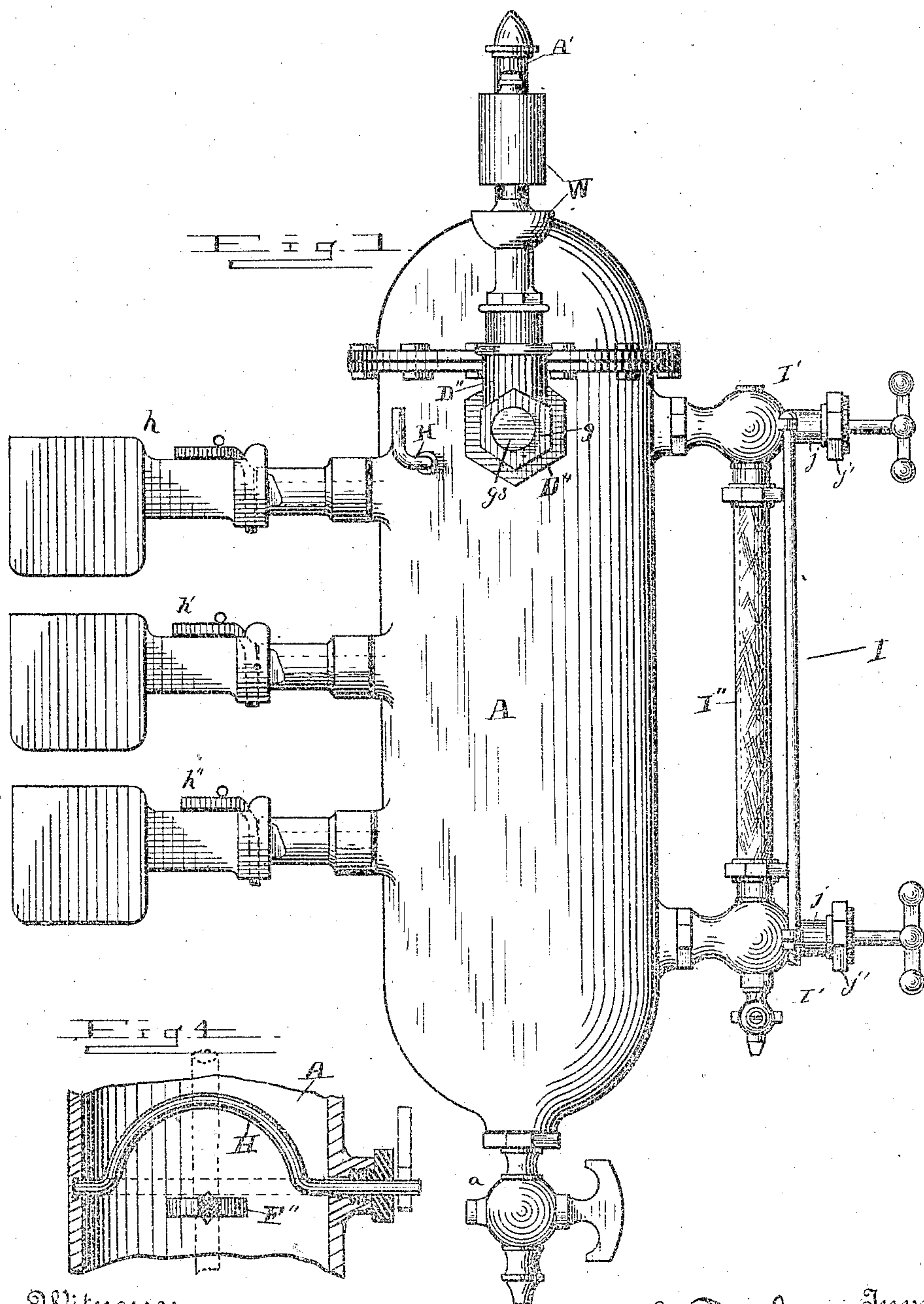
(No Model.)

2 Sheets—Sheet 1.

L. F. SMITH.  
STEAM BOILER ATTACHMENT.

No. 409,617.

Patented Aug. 20, 1889.



Witnesses

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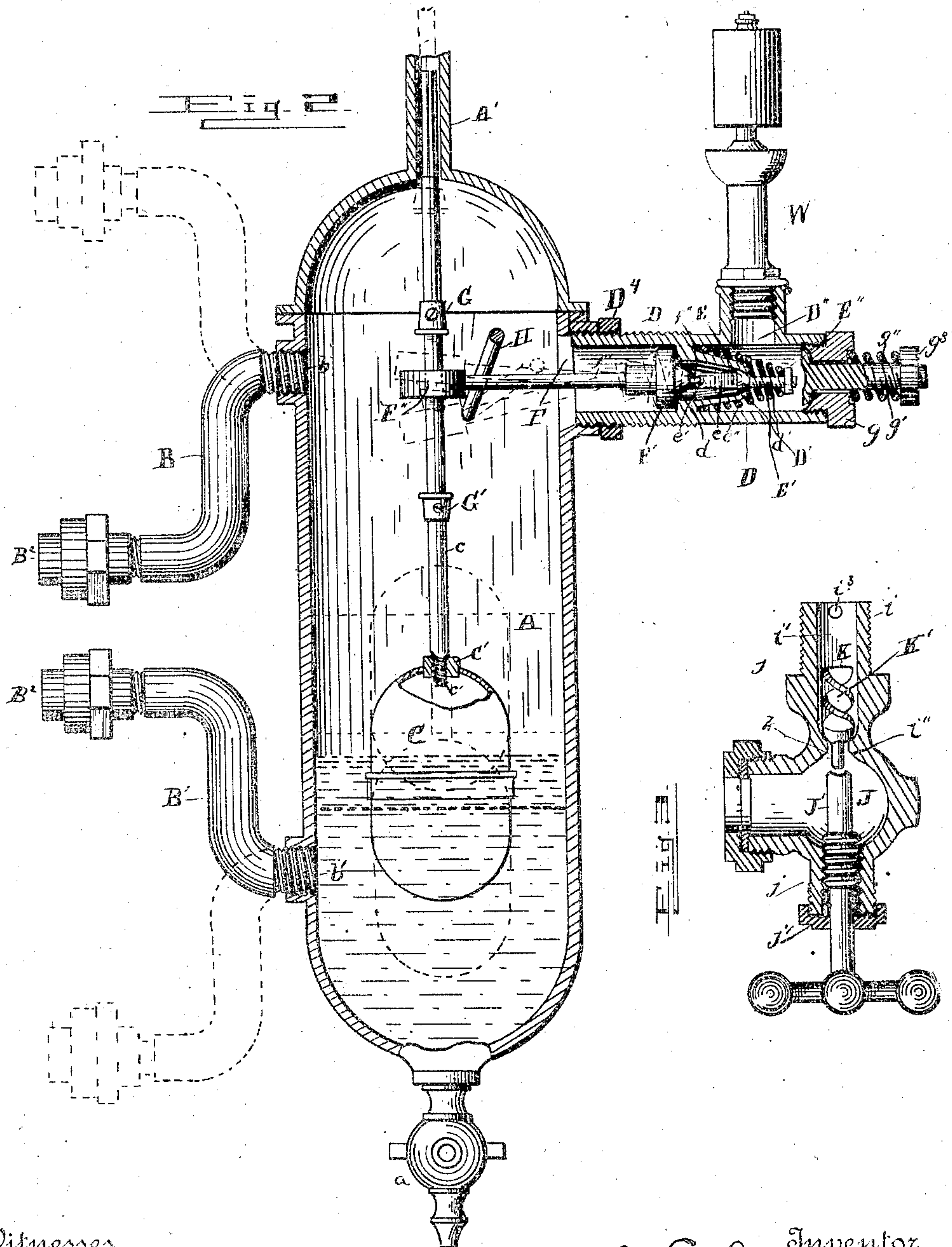
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# UNITED STATES PATENT OFFICE.

LEVI F. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

## STEAM-BOILER ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 409,617, dated August 20, 1889.

Application filed November 5, 1888. Serial No. 289,993. (No model.)

*To all whom it may concern:*

Be it known that I, LEVI F. SMITH, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boiler Attachments; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a side view of my improved water column and indicator for steam-boilers. Fig. 2 is a central vertical section through the same. Fig. 3 is a detail sectional view of one of the glass gage-valves. Fig. 4 is a sectional detail of the float locking-rod.

My invention is an improved attachment for steam-boilers; and its objects are to gage the height of water and to automatically sound an alarm to indicate low or high water; and the invention consists in the novel construction and arrangement of parts, hereinafter described, illustrated in the drawings, and particularly specified in the claims hereto appended.

Referring to the drawings by letter, A designates a cylinder constituting a water-column, provided at bottom with a drain-cock *a*, and at top with a cap having a hollow upstanding stem *A'*.

B is an S-shaped pipe-joint, screw-threaded at its extremities and engaged by one end in a threaded opening *b* near the top of column A, and B' is a similar joint engaging an opening *b'* near the bottom of the column. One or both of these joints may be provided with a union B<sup>2</sup>. By these union-joints the cylinder A is connected with the boiler in a perpendicular position, and as the joints can be swung from or toward each other I can attach the column to different boilers, whether the openings in the boiler-plate for the connections of the gage or column be close or far apart, as indicated in Fig. 2, and can also move the column up or down, right or left, on these swinging S-joints, so that it can be properly adjusted to the desired level of the water in the boiler. These S-joints could be employed to attach an ordinary water-gage to

the boiler, and can be readily adjusted to suit gages of different lengths.

C represents a float moving in cylinder A, and to which is connected a vertical rod *c*, that plays and is guided in the hollow stem *A'*. Rod *c* is preferably connected with the float by providing the latter with a screw-threaded socket *C'*, and having the engaging end *c'* of the rod threaded and conically shouldered, so that when it is engaged with socket *C'* it will form a tight joint therewith. By having such a joint should there be any leakage of water into the float, the rod can be unscrewed and the water poured out. The screw-joint may be wiped with solder to insure its tightness and prevent unscrewing of the rod, which, however, can be readily removed by first heating the socket.

D is a lateral valve-casing screwed into an opening near the upper end of cylinder A. This valve has an annular partition *d* in its interior which is constructed at its front end and extends forward in the form of a conical tube *d'*, in the end of which is formed a conical valve-seat *D'*. Above and in front of partition *d* is an opening *D''*, in which is engaged the stem of an ordinary whistle *W*.

E is a conical valve fitting seat *D'*, and having a forwardly-projecting pin *E'*, which extends beyond the cone *d'* and is screw-threaded for the engagement of a nut *E''*.

*e''* is a coiled spring placed on cone *d'* exterior to valve-stem E, and bearing against nut *E''*, so that it serves to hold the valve-stem up in place and insures its proper return after being opened.

*e* is a rearwardly-extending portion of stem E, having an eye *e'*, by which it is loosely engaged with a link *f''* on the end of a valve-stem F, which has a cylindrical valve *F'* bearing against the partition *d*, and an inwardly-extending portion *f''*, which has a ring *F'''* on its inner end, through which rod *c* plays freely in its movements up and down.

G G' are stops adjustably secured on rod *c*, respectively above and below ring *F'''*, and which are adapted to engage the ring when the float rises to high-water mark or falls to low-water mark. The spring *e''* drawing the valve-stem forward, causes it to assume and



keep a horizontal position, as shown in full lines Fig. 2; but when either stop G or G' engages ring F'' it causes valve F', which fulcrumson partition d, to rock, and valve F then  
 5 draws valve E backward, as is evident, permitting steam to escape through the valve-ports to the whistle, and an alarm is sounded, the valves remaining open until the water in the boiler has been attended to and the float  
 10 resumed its normal position. I thus have a double valve—i. e., a rock-valve and cone-seated valve—between the column and signal whistle, thereby guarding against wear or leakage of steam to the signal, and utilize the  
 15 rock-valve to operate the cone-valve.

In order to permit the whistle to be used as a call and to operate the valves to keep them in working order, I employ the device shown in section, Fig. 2, consisting of a centrally-  
 20 perforated screw-cap g, fitted into the outer end of the casing D, and g' is a short stem projecting through the cap, having its inner end enlarged and its outer end threaded. g<sup>2</sup> is a spring on the outer end of said stem, bearing against cap g, and retained by a nut g<sup>3</sup> on  
 25 the stem, the spring keeping the stem projected by pushing stem g' inward. Its head engages the pin E' and forces the latter backward, unseating valves E and F' and permitting the escape of steam to the whistle. Cas-  
 30 ing D may be fitted with an exterior jam-nut D' to secure it in position.

It is sometimes desirable where the boiler or check-valve leaks to pump the water above  
 35 high-water mark when leaving at night, and in order to prevent the valves being opened by the float rising, I employ a rod H, journaled transversely in the cylinder and having a loop or bend over stem F, and one end passes  
 40 through a suitably-stuffed box in the side of cylinder A, and is provided with a crank-arm which may be weighted. When the loop is turned down, as indicated in dotted lines, the stem and float are prevented from rising and  
 45 the valves opening, as is evident.

h h' h'' are try-cocks on cylinder A, respectively for high, medium, and low water.

I designate a water-gage attached to cylinder A and composed of two valves I', between which is mounted a vertical glass tube I'' in the usual manner. Each valve I' is constructed with a tubular threaded portion i, engaging the threaded opening in the cylinder, and in which is formed a double conical  
 55 valve-seat i''. In front of the valve-seat is a chamber J, provided with an opening for communicating with the end of the glass tube, and in front of this chamber is a cylindrical forwardly-extending portion j, which is internally and externally threaded.  
 60

J' is a threaded valve-stem passing through portion j and engaging the threaded ends thereof, and j' is a threaded cap on said stem and engaging the external threads of portion  
 65 j to keep a close joint therewith and prevent careless withdrawal of the valve-stem. The inner end of stem J' is made conical, as

shown, to engage the outer cone face of seat i'' when the valve is turned inward, so that water can be shut out when the glass is removed for cleaning, &c.

K is a valve playing freely and loosely in the portion i', and it has a conical front end, from which projects a stud k, that extends through seat i'' when the valve is closed. 75 Valve K is formed with a twist or screw portion K' in rear of its conical end, which will cause the valve to revolve when a current is passing until it has seated itself, and thus the valve will be self-cleaning by preventing and  
 80 breaking up any deposits that might collect in portion i'.

In practice the valve-stems J' are retracted, and the weight of valves K prevents the slight currents passing through the gage from  
 85 seating them; but should the glass be broken a current of water or steam under the boiler-pressure would take place through cocks I sufficient to cause valves K to revolve, and also to seat them, thus automatically cutting  
 90 off the water and steam and preventing leakage until the glass is replaced. To replace the glass, valves J' are screwed in, forcing back valves K, but cutting off the current, so that danger of scalding the workmen is obviated. 95 The projecting studs k of valves K, engaging stems J', hold valves K open until after stems J' have been disengaged from their seats, so that the tube will be filled with water before the valve K is entirely free to act. The inner  
 100 end of portion i' is provided with a stop lug or pin l' to prevent the escape of valves K rearward. The lower valve I' is provided with a drain-cock, as usual.

Having described my invention, I claim— 105

1. The combination of the water-cylinder and the float and its rod therein, with the valve-casing attached to said column, having a conical valve-seat, a conical spring-controlled valve and its stem therein, and the  
 110 rocking stem in said casing and connected to said valve and actuated by stops on the float-rod, substantially as and for the purpose described.

2. The combination of the water-cylinder 115 and its float, having a rod provided with adjustable stops, with the valve-casing having an annular partition, a cone-shaped valve-seat, and a spring surrounding the same, the conical valve controlled by said spring, and  
 120 the rocking valve fitted against the annular partition and connected to said conical valve and having a rearwardly-extending stem engaging the float-rod stops, substantially as described. 125

3. The combination of the casing D, having an interior conical valve-seat and cone d', a spring-controlled valve E within cone d', with the screw-cap g, having a spring-controlled stem g', adapted to unseat valve E  
 130 when pushed inward, substantially as described.

4. The combination of the casing D, having an annular partition d and the cone d',



with the conical spring-controlled valve E, engaging a seat in cone *d'*, and the rocking valve-stem F and its valve F', seated against partition *d* and engaging and operating valve E, and the float and its rod for operating stem F, all substantially as described.

5. The combination of the float and its rod provided with stops, with the valve-casing D, having an annular partition *d* and cone *d'*, and the alarm-whistle on said casing, the cone-valve E, spring *e''*, rock-valve F', and its stem, all substantially as described.

6. The combination of the water-cylinder and its S-joint connections, the float therein, the rod *c*, detachably secured to said float, and the adjustable stops thereon, with the valve-casing D, having the cone-valve E, rock-valve F', engaging valve E, rock-valve stem F, engaging rod *c*, and the alarm-whistle, all substantially as described.

7. The combination of the water-cylinder,

the float and the vertical rod therein, and the rocking valve engaging said stem, with a rod adapted to engage the stem and prevent its rising when the boiler is to be pumped full of water, substantially as described.

8. The combination of the water-cylinder, the float and rod therein, and the stops on said rod, with the valve-casing D, having an annular partition *d* and cone *d'*, the conical valve E, spring *e''* therefor, rocking valve F' and its stem, the whistle and the screw-cap *g*, and its push-stem *g'*, all substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

LEVI F. SMITH.

Witnesses:

A. E. DOWELL,  
P. L. BROOKS.