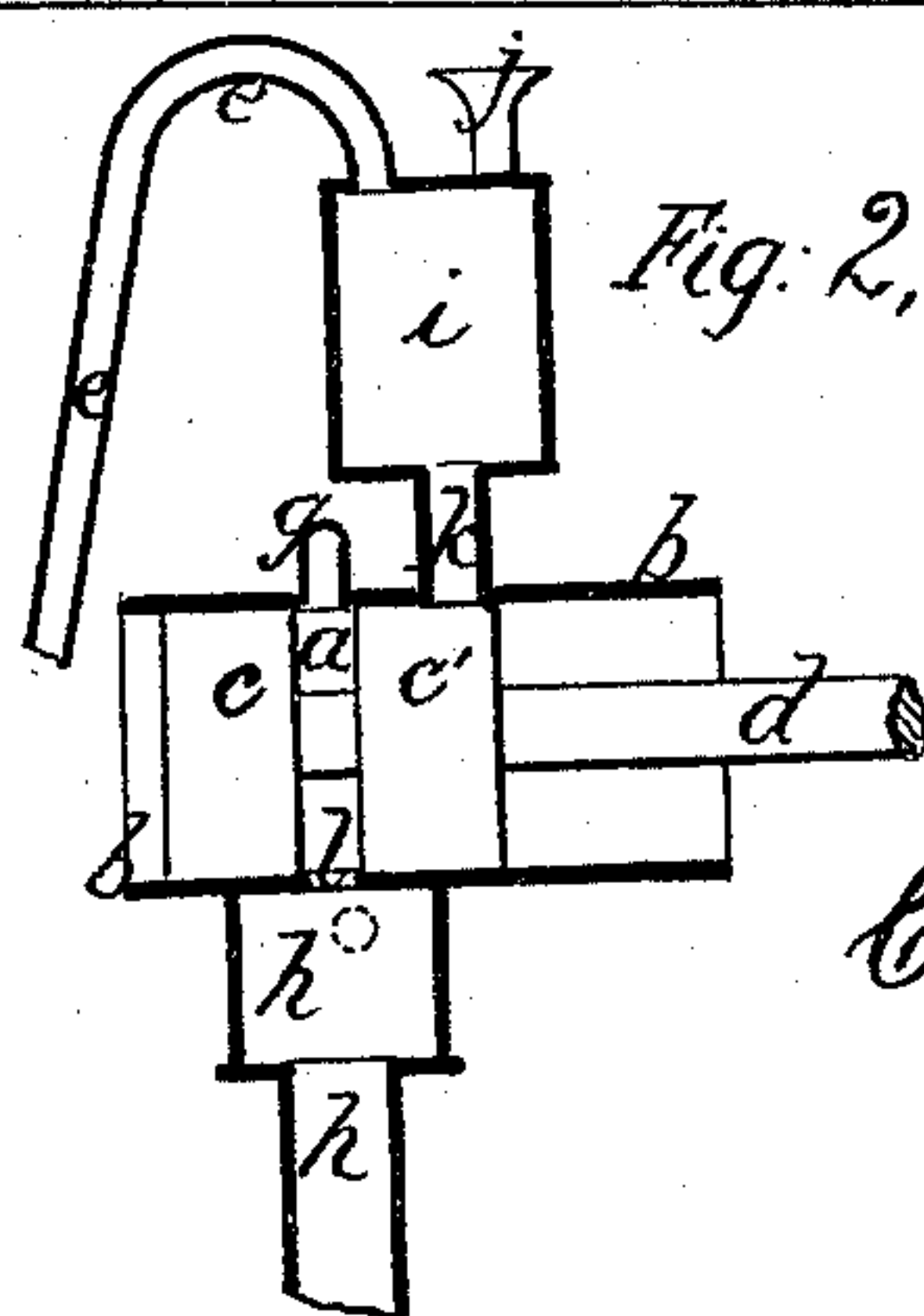
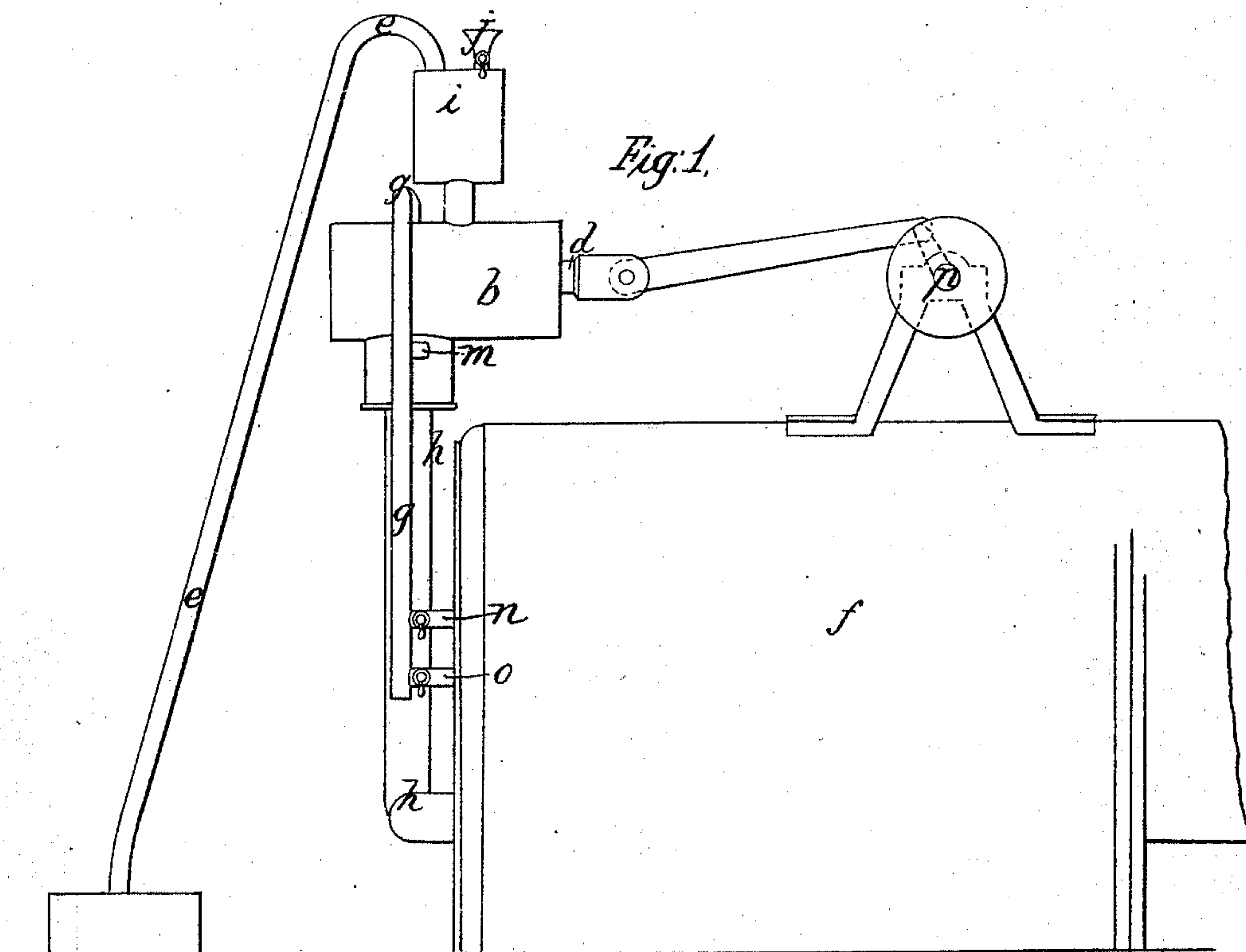


C. H. GRIFFIN.  
BOILER FEEDER.

No. 59,909.

Patented Nov. 20, 1866.



Witnesses;  
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Sarah B. Welch.

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Crosby & Gould

# United States Patent Office.

## IMPROVEMENT IN BOILER FEEDERS.

CALEB H. GRIFFIN, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO HIMSELF  
AND W. E. P. SMYTH.

*Letters Patent No. 59,909, dated November 20, 1866.*

### SPECIFICATION.

#### TO ALL WHOM IT MAY CONCERN:

Be it known that I, CALEB H. GRIFFIN, of Chelsea, in the county of Suffolk, and State of Massachusetts, have invented an improved Water-Feed for Steam Boilers; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practise it.

The object of my invention is to produce a water-feed for steam boilers which shall be certain in its action, economical of consumption of power and heat, and automatic in its operation. My invention is an improvement in that class of apparatus in which the condensation of steam is employed for the formation of a vacuum in a chamber, so that it will be filled with water consequent upon atmospheric pressure, and from which the water is forced by the pressure of steam to supply feed water to a steam boiler, or for any other purpose.

My invention consists in the arrangement of parts by which, in giving motion to the chamber, it shall be alternately brought under the steam and water supply passages, to operate in connection therewith, as will be hereinafter described, and in certain details of arrangement by which the discharge of the water from the chamber is made rapid and effective, and by which the water in the boiler is prevented from rising beyond a fixed level.

Of the drawings illustrating my invention—

Figure 1 is a side elevation, showing one form of arrangement of an apparatus designed to raise water from a cistern or well, and

Figure 2 is a vertical central section taken through the chamber before alluded to, and showing the relation of the steam and water passages thereunto.

Said chamber is marked *a*, and is formed by and between the bore of the cylinder, *b*, and the heads, *c c'*, on the piston-rod, *d*. The water-suction pipe, communicating with a well or cistern, is marked *e*, the steam-supply pipe from the steam boiler, *f*, is marked *g*, and the pipe, which from the chamber, *a*, supplies the boiler with water, is marked *h*. Above the cylinder, *b*, is located a small reservoir, *i*, provided with a faucet at *j*, through which it can be filled with water preliminary to setting the apparatus at work. From this reservoir, into which the pipe *e* discharges, is an opening or port, *k*, communicating with the cylinder, *b*. The length of the heads, *c c'*, the width of the openings *g* and *k*, into the cylinder *b*, and the length of the stroke of the piston-rod *d*, are so proportioned that when the chamber, *a*, is in position to receive steam from *g*, the passage *k* is closed by the head *c'*; and when the chamber is in position to receive water from the passage *k*, the head, *c*, closes the passage *g*. From the bottom of the chamber *a*, and in the same plane with the passage *g*, is an opening or port, *l*, leading into the pipe *h*; and this port, *l*, is, of course, opened and closed by the head, *c*, whenever the opening or port of the pipe *g* is opened and closed by said head. From the steam pipe *g* there is a branch, *m*, entering the pipe *h*, as near its junction with the cylinder *b* as possible, the function of said branch being set forth hereafter in the description of the operation of the apparatus. There may also be seen in fig. 1 two branch-pipes, *n* and *o*, from the boiler, leading into the steam-pipe *g*, these branches being supplied with stop-valves, to be used as explained beyond in the operation. Means for reciprocating the piston-rod, *d*, are shown in fig. 1, the shaft, *p*, being made to rotate from any convenient motor at the speed required.

The operation of the apparatus is as follows:

The chamber, *a*, being in the position shown at fig. 2, and the reservoir, *i*, being filled with water, and steam being raised in the boiler, one of the valves in *n* or *o* is opened, according as the water level in the boiler is high or low, so as to admit steam through the pipe, *g*, into the chamber *a*. Rotation being now given to the shaft, *p*, the chamber, *a*, filled with steam, is moved so as to communicate with the reservoir *i* through port *k*, and the water, descending from *i*, will condense the steam in *a*, which will then become filled with water. Continued rotation of shaft *p* will now move the chamber *a* back to its first position, so as to communicate with the passages *g* and *l*; and the water will, by its gravity, flow through the passage *l* into the pipe *h*, and thence into the boiler, leaving the chamber *a* filled with steam, to be again brought under port *k*, to be again condensed and have its place supplied with water, as before described.

This condensation of steam of course leaves a vacuum to be supplied by water from the well, which, by atmospheric pressure, will be forced up the pipe *e* into the reservoir *i*, taking the place of the water which has



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passed into the chamber *a*, it being observed that the conditions of the pipe *e* are such as it is well known must be applied wherever water is to be raised by suction, so called.

The object of the branch *m*, from the steam-pipe *g*, is to introduce steam under pressure into the upper part of the feed-water pipe *h*, so as to facilitate the passage of the water delivered from the chamber *a* into the boiler. If the water in the boiler rises to such a height as to cover the inlets into *n* and *o*, then, as there can be no steam supplied to the chamber *a*, there can be no vacuum formed therein, and the water supply will cease, even though the reciprocations of the piston-rod, *d*, are continued; but whenever the level of the water falls in the boiler so as to admit steam into the pipe *g*, the feeding of water to the boiler will commence, and continue, as before described, till the water in the boiler cuts off entrance of steam therefrom into the pipe *g*. Hence it is obvious that if the described apparatus is so proportioned as to size and movement as to be able to supply more water to the boiler when moving constantly than the boiler is able to evaporate, that the water level in the boiler can never rise higher than the level of an opening from the boiler into the steam-pipe. Therefore, to keep the water from rising beyond a given height in the boiler, it is only needed that the highest opening from the boiler to the steam-pipe shall be placed at the height of the highest admissible point at which the water may be filled into the boiler.

Many changes may be made in the arrangement of this apparatus not affecting the gist of the invention, as for example, the piston *d* might be held stationary and motion imparted to the cylinder instead; but this would involve the use of a flexible water-suction pipe, and would otherwise complicate the matter without corresponding advantages. The area of the chamber *a* may be enlarged in capacity without giving more travel to the piston-rod *d*, by simply making each or either of the heads, *c c'*, dishing or concave on the sides forming the chamber boundaries. The cylinder is bored true and smooth, and the packing of the heads, *c c'*, may be effected in any known way, such metallic packings as are used for steam-engine pistons being preferred.

It will be obvious that the only power needed for working the apparatus is that which is consumed in overcoming the friction of the parts in moving the small distance needed to cover and uncover the ports, and that of the heat of the steam used none is lost except that escaping by radiation, the rest being returned to the boiler with the feed water.

I claim the arrangement of the pistons *c c'*, chamber *a*, well-pipe *e*, steam-pipe *g*, port *h*, reservoir *i*, and feed-pipe *h*, with reference to each other and the boilers, whereby to operate as and for the purpose set forth.

Also, in connection therewith, the arrangement of the pipes *n* and *o*, whereby to regulate the height of water in the boiler, as set forth.

CALEB H. GRIFFIN.

Witnesses:

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