(No Model.)

2 Sheets—Sheet 1.

J. E. BOYLE.

CUT-OFF FOR KITCHEN BOILERS.

No. 305,504. Patented Sept. 23, 1884.

Fig. 2.

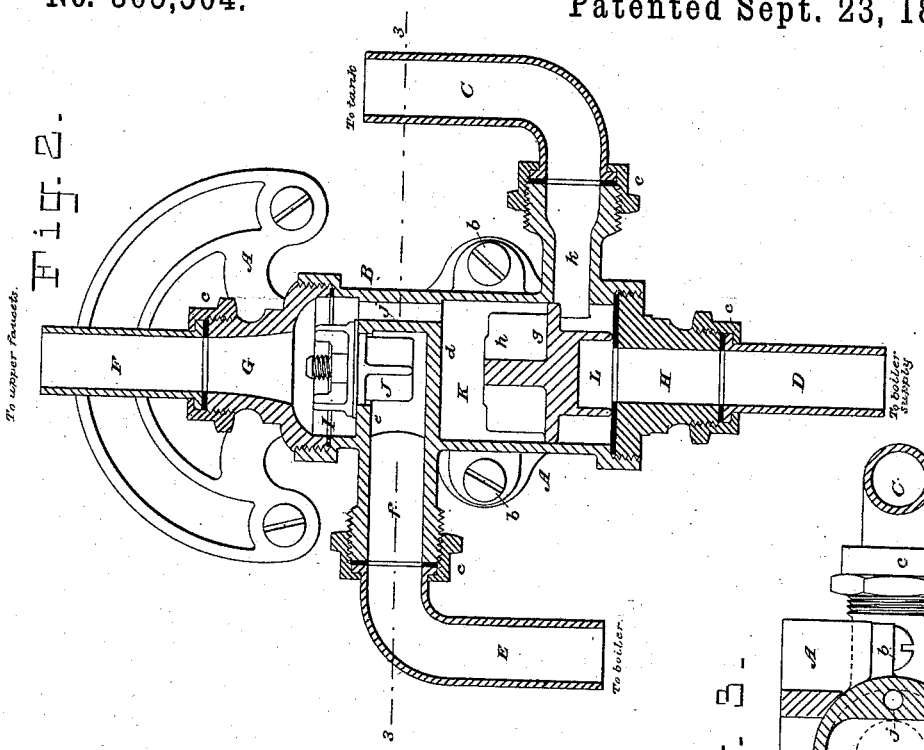


Fig. 3.

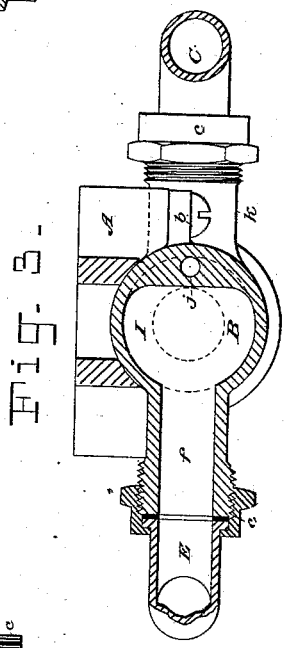
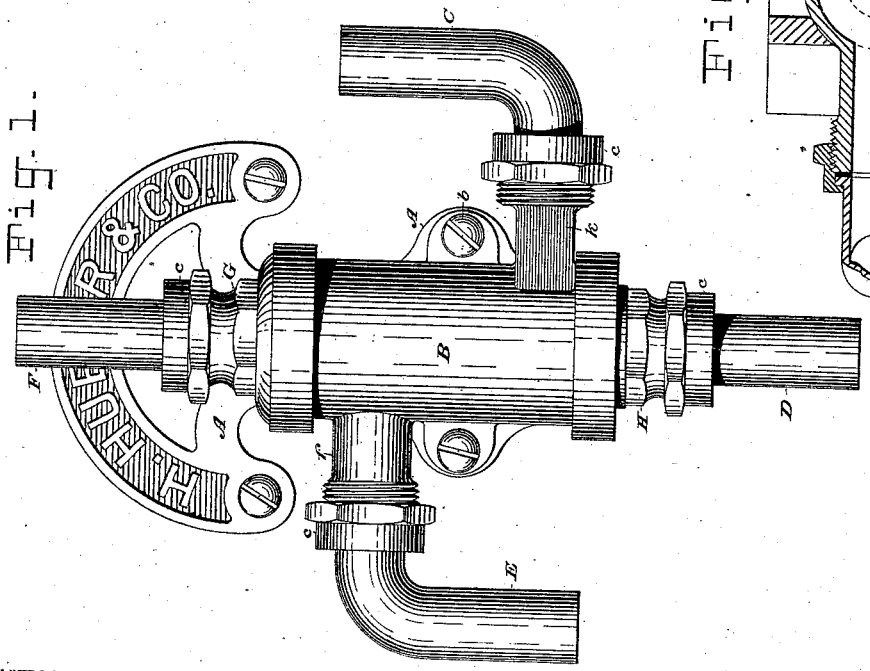


Fig. 1.



WITNESSES:

E. B. Bolton.

Geo. H. Fraser.

INVENTOR:

James E. Boyle

By his Attorneys,

Burke, Fraser & Bennett

(No Model.) 2 Sheets—Sheet 2.

J. E. BOYLE.

CUT-OFF FOR KITCHEN BOILERS.

No. 305,504. Patented Sept. 23, 1884.

Fig. 4.

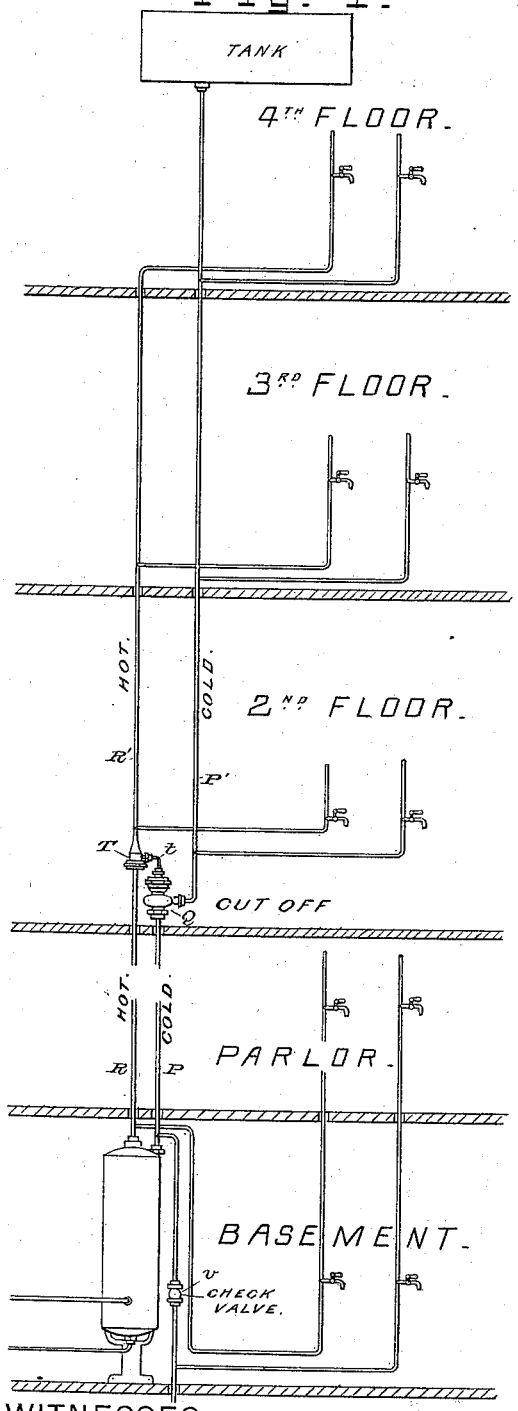
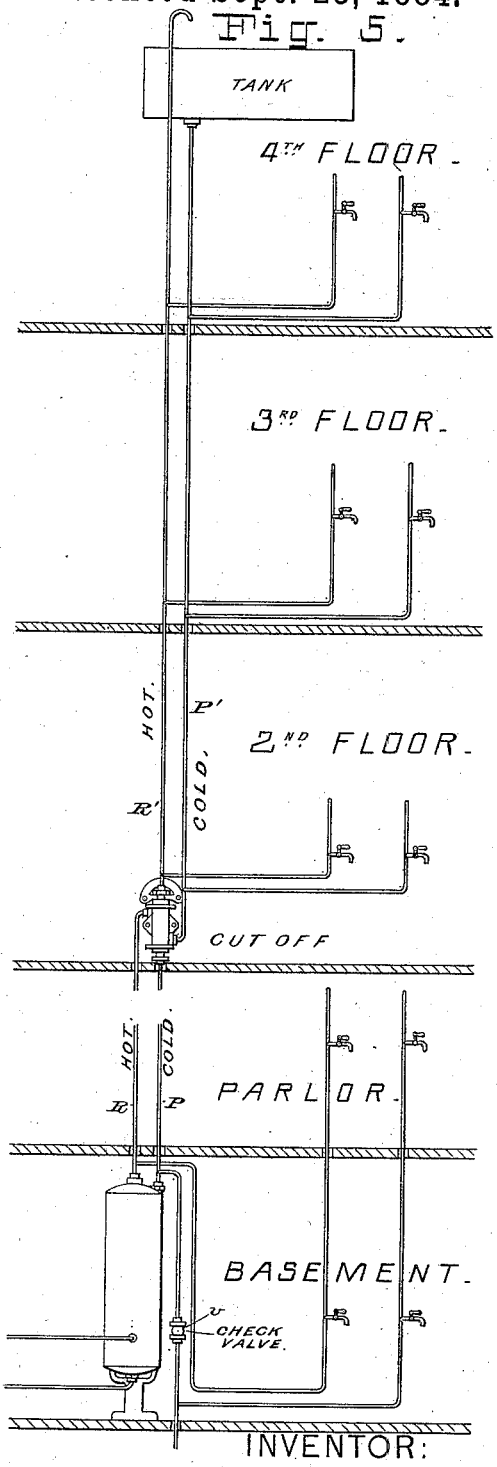


Fig. 5.



WITNESSES:

E. B. Bolton

Geo. Gaintons.

INVENTOR:

James E. Boyle

By his Attorneys,

Burby Fraser & Connett

UNITED STATES. PATENT OFFICE.

JAMES E. BOYLE, OF BROOKLYN, NEW YORK.

CUT-OFF FOR KITCHEN-BOILERS.

SPECIFICATION forming part of Letters Patent No. 305,504, dated September 23, 1884.

Application filed September 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. BOYLE, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Cut-Offs for Kitchen-Boilers, of which the following is a specification.

This invention is an improvement upon what is known to the trade as the "Carr Patent Cut-Off" for kitchen-boilers, its object being to avoid certain practical defects of that cut-off as heretofore constructed.

Figure 1 of the accompanying drawings is a front elevation of my improved cut-off. Fig. 2 is a vertical mid-section thereof, looking from the front, and Fig. 3 is a horizontal section on the plane of the line 3 3 in Fig. 2. Figs. 4 and 5 are two diagrams of the water-supply pipes used in ordinary house-plumbing, the former showing the application of the old Carr cut-off, and the latter illustrating in like manner the connection of my improved cut-off.

In dwellings where the water from the street-main is not under sufficient pressure to deliver water at the faucets in the upper part of the house it is customary to supply the upper portion of the house from an elevated service-tank, into which the water flows through a float-valve when the pressure is sufficient, (as at night,) and which is at other times supplied with water at intervals by pumping. This arrangement answers well for cold water; but the employment of the tank, with its distinct delivery-pipes, does not enable heated water from the kitchen-boiler to be delivered to the upper floors of the building. It was obviously necessary to connect the hot-water system with the tank in order to gain pressure enough to lift hot water to the higher floors; but to do this alone would insure the lower as well as the upper hot-water faucets being supplied from the tank, thereby wasting the high-pressure water for the supply of faucets that could as readily be supplied from the street-pressure. To avoid this the adoption of two distinct hot-water systems was proposed, and this has to some extent been put in use, two boilers being employed, one within the other, one holding hot water under high pressure supplied from the tank and connected with the faucets on the upper floors, and the other being the usual low-pressure boiler connected with the street-main. To save the complication and excessive cost of the two boilers and their connections, the Carr cut-off was devised. Fig. 4 shows the manner of applying it to the plumbing of a house. The supply-pipe from the street-main, which enters the boiler, is provided with a check-valve, *v*, Fig. 4, placed between the branch pipe supplying the lower cold-water faucets and the boiler, and between this valve and the boiler a pipe, P, is connected, which leads from the elevated tank, being a downward continuation of the pipe P′, supplying the upper cold-water faucets. In this downward continuation a cut-off valve, Q, is placed at any point below the high-pressure cold-water faucets and above the low-pressure hot-water faucets. This cut-off valve consists of a piston-valve working in a chamber, the upper portion of which communicates, through a small tube, *t*, with the hot-water pipe R′, supplying the high-pressure hot-water faucets. This pipe is an upward continuation of the usual pipe, R, supplying the low-pressure hot-water faucets, and in it is placed a check-valve, T, at any point above the low-pressure faucets and below the high-pressure faucets. When no hot water is being drawn, or when hot water is being drawn only at low pressure, the cut-off valve Q and hot-water check-valve T are both closed by reason of their weight and the superior pressure above them keeping them on their seats; but when any of the high-pressure hot-water faucets is opened the pressure above the cut-off valve is reduced, the superior pressure below it lifts it, and water flows from the tank down into the boiler, forcing hot water to ascend to the upper hot-water faucets, and lifting the hot-water check-valve as it passes.

When properly set, the Carr cut-off is effective and usually satisfactory in its operation; but it possesses the defects of being constructed of many pieces, and of bearing no outward indication of its proper position or arrangement, so that a plumber who is not already thoroughly familiar with its construction is liable to transpose certain of the parts and render the device inoperative, and any

plumber will encounter considerable difficulty and consume an excessive amount of time in setting it. My present invention is designed to remedy these defects and perfect the details of the cut-off, so that even stupid and careless plumbers will have no difficulty in setting it properly.

I will now describe my improved construction of cut-off, referring to Figs. 1, 2, 3, and 5 of the accompanying drawings.

A is the base-plate, adapted to be screwed to the wall, and bearing lettering which serves to indicate to the plumber which side up it is to be set.

B is a cylinder or shell, fixed to said plate by screws *b b* or otherwise. This shell contains the cut-off valve and hot-water check-valve, and to it are coupled four spuds for connection with four lead pipes. The spud C (which may be called the "tank-spud") is for connection with the pipe P′, leading up to the elevated service-tank, Fig. 5, and the spud D (which may be called the "boiler-spud") is for connection with the pipe P, leading downward to the supply-pipe which enters the boiler. The spud E (which may be called the "hot-service spud") is for connection with the hot-water service-pipe R, leading upward from the top of the boiler, and the spud F (which may be called the "hot-supply spud") is for connection with the hot-water pipe R′, leading upward to the upper hot-water faucets. All of these spuds are flanged, and are coupled to shell B by means of union-nuts *c c*, gaskets being interposed to make tight joints. The lead pipes are to be joined to these spuds by wiped joints either before or after the spuds are united to the shell. The spuds C and E are bent, respectively, up and down to avoid bending the lead pipes. The spuds D and F are not coupled directly to the shell B, but to screw-caps G and H, which close the ends of the shell. The shell B is divided by a transverse partition, *d*, into two chambers—an upper chamber, I, containing the hot-water check-valve J, and a lower cylindrical chamber, K, containing the cut-off valve L. The chamber I is divided by a horizontal diaphragm, *e*, through which is formed the aperture which is covered by the check-valve J, and from the chamber beneath this diaphragm a tubular branch, *f*, extends laterally and joins the spud E. The cap H forms the bottom of the chamber K and the seat for the valve L, it being faced with rubber to provide a tight joint at its union with the shell and an elastic seat for the valve. The valve L is a piston-valve, being formed integrally with a piston, *g*, guided in the cylinder by projecting ribs *h*. Beneath the lowest position of the piston *g* a tubular branch, *k*, projects laterally and unites with the spud C. The upper part of the chamber K communicates with the chamber I, above the valve J, by means of a duct, *j*. (Shown in Figs. 2 and 3.)

When connected, as described, with the service-pipes, and no hot water is being drawn from the faucets on the floors above, the pressure in the pipe R′, connected to F, is equal to that in the pipe P′, connected to C, and, being communicated through duct *j*, the pressure above piston *g* is equal to that below it, and hence the valve L remains seated. The same is true of the valve J, which is also seated. Any decrease of pressure in the pipes P or R due to drawing water below will serve only to draw the valves L and J more firmly to their seats; but if any hot-water faucet above be opened the water in R′, F, G, and *j* will escape, and the pressure of the water beneath the piston *g* will lift the valve L, whereupon water from the tank will flow through P′, C, *k*, H, D, and P, the water in the boiler will be put under the higher pressure in the tank, and the column of hot water in the pipe R will flow up through R, E, *f*, *e*, (lifting valve J,) G, F, and R′, and thence to the open faucet above. The operation just described is the same as in the old-fashioned Carr cut-off.

My improved cut-off employs only one shell where two have been used before, has a bored duct or passage, *j*, instead of a separate external pipe requiring coupling at both ends, is incapable of having its valves transposed, as has frequently occurred in setting the old form, is not liable to be inverted, is reduced to a minimum of parts and connections, and presents a neat, compact, and workmanlike appearance.

I claim as my invention—

1. The combination, to form a cut-off for kitchen-boilers, of a shell or casing with a diaphragm dividing it into two chambers, and with a duct or passage extending from the upper chamber to the upper part of the lower chamber, a check-valve seated in the upper chamber, inlet and outlet passages entering said chamber below and above said valve, a cut-off piston-valve arranged to play in the lower chamber, an inlet-passage entering said chamber below the piston of said valve, and an outlet-passage communicating with said chamber through the seat thereof, substantially as set forth.

2. A cut-off for kitchen-boilers, consisting of a tubular shell, B, formed with a diaphragm dividing its interior into two chambers, I and K, with a duct or passage, *j*, affording communication between said chambers, and the tubular branches *f* and *k*, opening into the opposite chambers, in combination with caps G and H, closing the ends of said shell, a check-valve, J, seated in said chamber I, a cut-off valve, L, working in said chamber K, and with four spuds, C, D, E, and F, and unions or couplings for connecting them respectively to said branch *k*, cap H, branch *f*, and cap G, substantially as set forth.

3. A cut-off for kitchen-boilers, consisting of shell B, formed with diaphragm *d*, seat *e*, duct *j*, and branches *f* and *k*, in combination

with caps G and H, closing the ends of said shell, check-valve J, and cut-off valve L, formed with piston *g*, substantially as set forth.

4. In a cut-off for kitchen-boilers, the combination, with shell B, forming cylindrical chamber K, and having tubular branch or passage *k* entering said chamber, of cut-off valve L, formed with piston *g*, working in said chamber, cap H, closing the lower end of said shell, outlet-passage through said cap, adapted to be covered by said valve, and an elastic facing for said cap, serving as a gasket to pack the joint between the cap and shell, and to form a yielding seat for said valves, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES E. BOYLE.

Witnesses:

ARTHUR C. FRASER,

GEORGE H. FRASER.