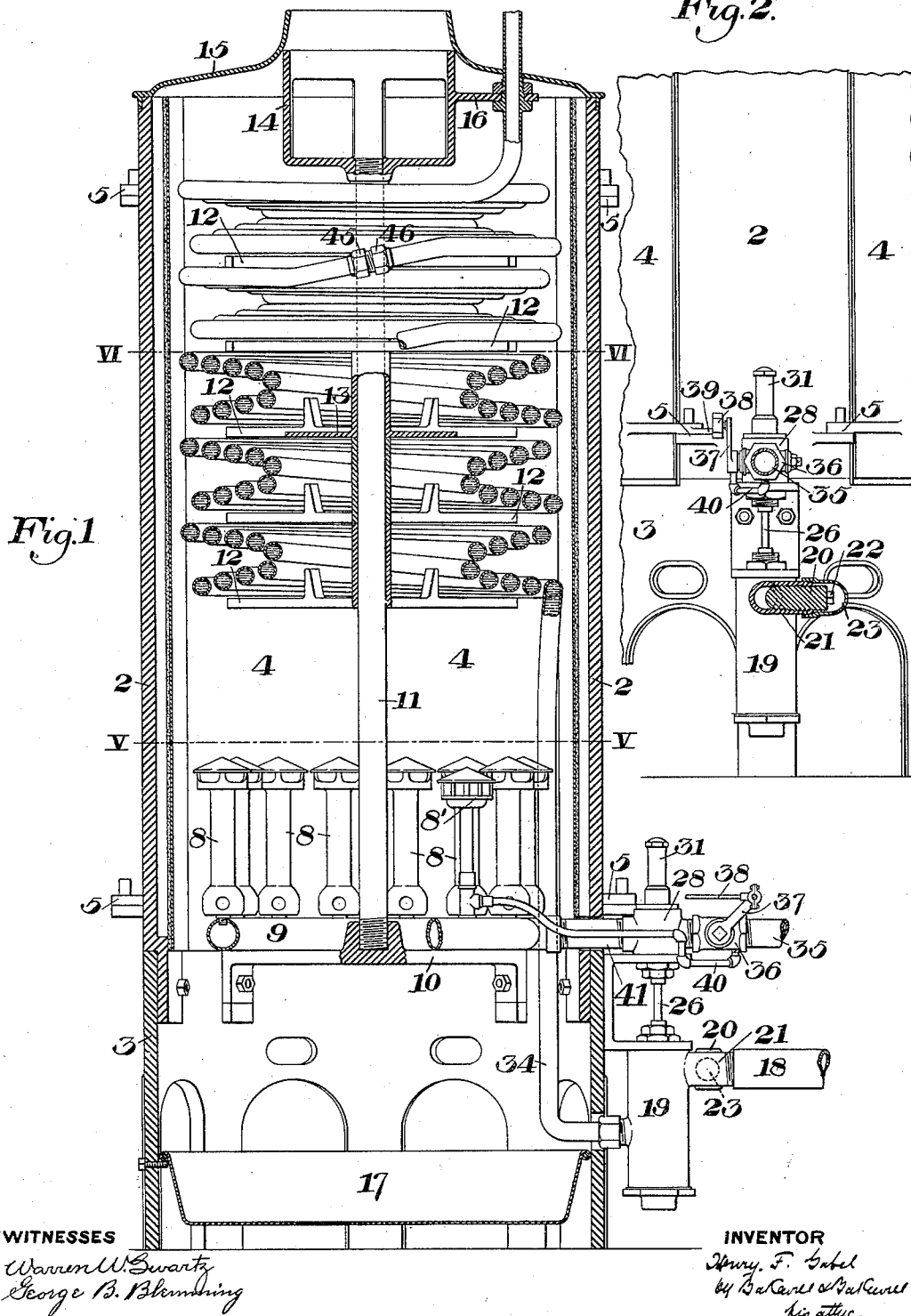


H. F. GABEL.
WATER HEATER.

(Application filed Mar. 22, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES

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3 Sheets—Sheet 2.

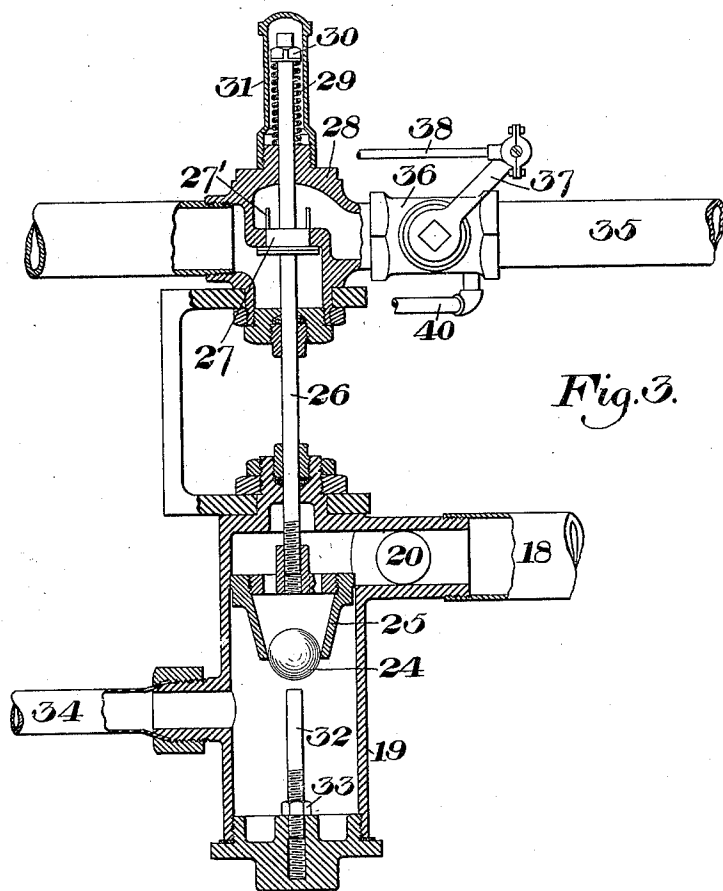


Fig. 3.

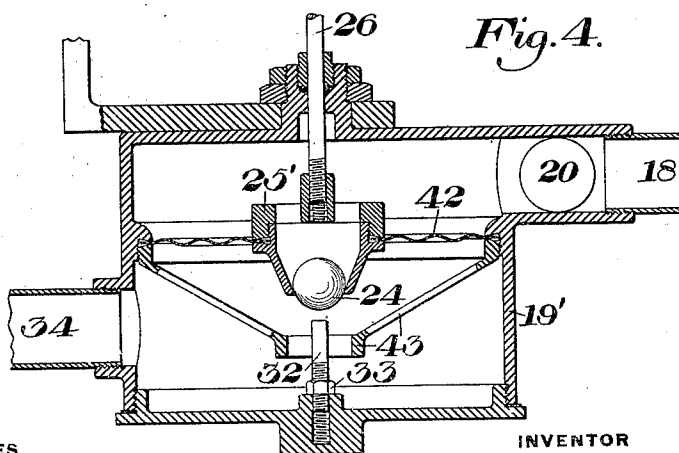


Fig. 4.

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No. 652,176.

Patented June 19, 1900.

H. F. GABEL.
WATER HEATER.

(Application filed Mar. 22, 1899.)

(No Model.)

3 Sheets—Sheet 3.

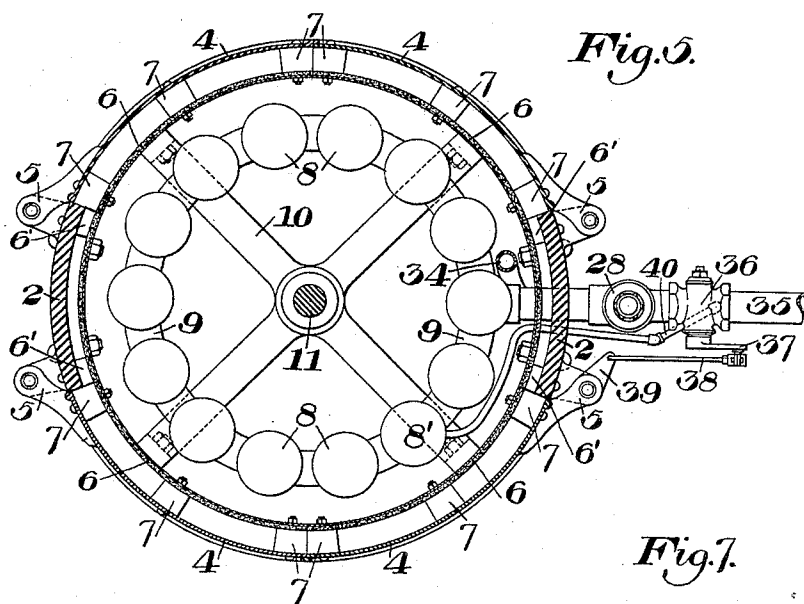


Fig. 7.

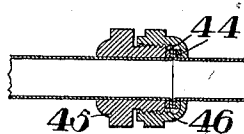
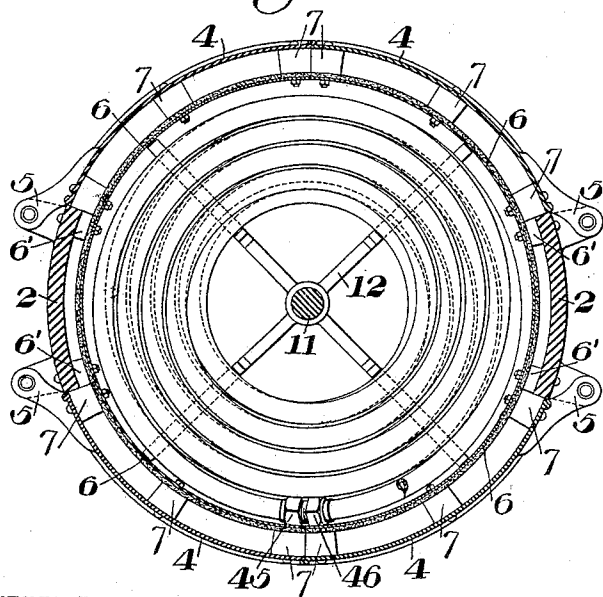


Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY F. GABEL, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE
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WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 652,176, dated June 19, 1900.

Application filed March 22, 1899. Serial No. 710,025. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. GABEL, of
Pittsburg, in the county of Allegheny and
State of Pennsylvania, have invented a new
and useful Improvement in Water-Heaters,
of which the following is a full, clear, and ex-
act description, reference being had to the ac-
companying drawings, forming part of this
specification, in which—

Figure 1 is a sectional side elevation of my
improved heater. Fig. 2 is a partial side ele-
vation at right angles to that of Fig. 1 and
broken away to show the throttling-valve for
the water-supply pipe. Fig. 3 is an enlarged
sectional elevation of the valve mechanism.
Fig. 4 is a similar view showing a modified
form of the water-valve. Figs. 5 and 6 are
cross-sections on the lines V V and VI VI,
respectively, of Fig. 1; and Fig. 7 is a detail
view of the coil-joint.

My invention relates to automatic water-
heaters, and is designed to improve the valve
system therefor, as well as the general con-
struction of the heater, and, further, to pro-
vide relief-doors which will prevent injury
from explosions, and to provide connections
whereby the gas-supply to the main burner
is cut off when the casing-door is opened for
igniting the pilot-light.

In the drawings, 2 2 represent vertical posts
or standards which are secured to opposite
sides of a base-casting 3. The casing of the
heater is formed by curved doors 4, which
are pivoted to the standards by suitable
hinges 5, and to which inner curved sections
6 of the lining are secured with interposed
spacing-blocks 7 between them, as shown.
Stationary portions 6' of the lining are simi-
larly secured to the inner faces of the stand-
ards and complete the inner lining of the
heater. The casing-doors 4 are not locked
in closed position; but the pivotal points of
the lower hinges are outside those of the up-
per hinges, as shown in Fig. 1, so that the
action of gravity tends to keep the doors
closed. They will, however, open under sud-
den or excessive pressure within the heater
and avoid the dangerous effects of accidental
explosions, as they will yield and swing out-
wardly in such case.

The main gas-burners 8 are mounted on a

circular gas-reservoir 9, which is supported
by the spider 10, secured within the circular
base 3. A vertical standard 11 is centrally
secured to the spider and carries upon it a
series of spiders 12, having collars which sur-
round this rod. The heating-coil consists of
a pipe which is coiled in reverse spirals which
are inclined alternately in opposite directions,
as shown. The lower spiders 12 are of skele-
ton form, leaving a free open central space,
into which the flames may pass freely, while
the upper spiders are provided with plates
13, which act as baffle-plates to direct the
products of combustion into contact with the
coils. To the upper end of the central stand-
ard is secured a cage 14, of skeleton form,
which supports the top 15 of the heater and
is provided with a side lug 16, which carries
the hot-water-outlet pipe of the heater.

17 is a drip-pan in the bottom of the heater,
which will catch any condensation from the
coils.

The water-supply pipe 18 leads into a valve-
chamber 19 and is provided with a throttle-
valve consisting of a plug 20, which is screwed
into an elbow 21 and is adjusted by apply-
ing a wrench to a squared portion 22 at its
outer end. This plug may be covered by a
screw casing or cap 23. The valve-chamber
19, as shown in Fig. 3, is provided with a
ball-valve 24, which rests within a vertically-
movable cage 25, which is hollow and open
at its top and contains in its lower portion
the valve-seat, upon which the ball 24 is sup-
ported. This cage fits neatly within the cas-
ing 19 and is connected by rod 26 with the
gas-valve 27 within the valve-chamber 28.
The valve 27 consists of a short cylinder with
a flange at its lower end and provided with
projecting prongs 27', which guide the valve
when opened. By this construction I pre-
vent any sudden pulsation or current in the
water-pipe from throwing open the gas-valve
accidentally, as it must be moved a certain
distance before it opens.

The upper end of the stem 26 projects
through chamber 28 and is provided with a
spiral spring 29, which bears on a nut at its
upper end and exerts a lifting pressure upon
the valves. This upper part of the stem is
inclosed by a suitable casing 31. In the lower

end of the casing 19 is placed an adjustable vertical pin 32, which may be secured in adjusted position by a nut 33 and which will lift the ball-valve from its seat whenever the

5 cage 25 is sufficiently lowered.

34 is the water-supply pipe, which leads from the casing 19 to the heater-coil.

The gas-supply pipe 35, which leads to the chamber 28, is provided with a regulating-
10 valve 36, the projecting stem of which carries an arm 37, having a pivotal link connection 38 with an arm 39, secured to the casing-door, which gives access to the pilot-light 8'. These parts are so arranged that whenever this
15 door is opened the gas-supply to the main burners will thereby be cut off. A branch pipe 40 leads from the gas-pipe 35 in the rear of the valve to the pilot-light burner 36.

41 is the gas-supply pipe leading from the
20 valve-chamber 28 to the gas-reservoir 9 in the heater.

The operation of the valve system is as follows: The valves being normally in the position shown in Fig. 3, when the hot-water
25 spigots of the house system are opened, the pressure being reduced within the valve-chamber 19, the water-pressure in pipe 18 will enter and force down the cage 25, and thereby open the valve 24, so that water will flow
30 to the heater, the gas-valve 27 being opened by this same movement. When the spigots are closed, the pressure in pipes 18 and 34 will equalize and the spring 29 will lift the valves into their normal position. If any ex-
35 cessive pressure is generated in the heater, it will lift the loose valve 24 and pass out into the main, thus relieving the heater.

Instead of fitting the cage 25 within the valve-casing 19 I may secure the cage to a
40 flexible diaphragm. Thus in Fig. 4 I show the cage 25' as centrally secured to a flexible diaphragm 42, the edges of which are secured between an annular flange on the valve-chamber 19' and the rim of a spider 43,
45 screwed within the chamber. The action in this case will be the same as above described, the pressures upon the diaphragm moving the cage and the valve vertically.

In Fig. 7 I show an improved joint for the
50 pipes of the coils, the ends of the pipes having packing-rings 44 threaded thereon and being flanged outwardly, the flanges abutting against each other. A hollow screw-plug 45
55 surrounds one pipe in the rear of the packing-ring and a flanged nut 46 surrounds the other pipe and engages the screw-plug, its flange pressing upon the packing-ring. A strong and simple joint is thus afforded.

The advantages of my invention will be ap-
60 parent to those skilled in the art. The connecting of the gas-regulating valve with the door which gives access to the pilot-light insures the cutting off of the gas-supply to the main burner when the pilot-light is being
65 ignited, thus avoiding danger of explosion from a heavy flow of gas into the combustion-

chamber from the main burner if it were supplied with gas. The use of the movable cage containing the loose valve gives an effective regulation of the gas-supply, while at the same
70 time no sediment can collect in the valve-casing and any excessive back pressure will lift the valve and allow the fluid to pass back into the main, thus avoiding danger from excessive pressure in the heater. The yielding
75 casing-doors will relieve the heater in the case of explosion and prevent injury to the parts. The forming of the heater-coil with a free inner space within the lower coils allows the flames to pass up within this space, the
80 products then being deflected among the tubes. The whole construction is compact and strong and may be easily made and assembled.

Many variations may be made in the form
85 and arrangement of the valves, the heating-coil, the burners, and the other parts without departing from my invention, since

I claim—

1. A water-heater having a main burner 90 and a pilot-light burner, and provided with a door to give access to the pilot-light burner, a gas-regulating valve in the pipe leading to the main burner, actuating connections between the door and said valve, arranged to
95 cut off the gas to the main burner when the door is open, and a supply-pipe leading to the pilot-light burner and independent of the regulating-valve; substantially as described.

2. A water-heater having a vertically-ex-
100 tending water-coil supported on grids, the lower portion of the coil having an open inner space, and a central baffle-plate above this open portion; substantially as described.

3. A water-heater having a central vertical
105 standard, spiders secured thereto, and a vertical water-coil having the different portions thereof supported upon the spiders, said coil having a central baffle-plate; substantially as described. 110

4. In a regulator for water-heaters, a valve-chamber containing a movable cage having a loose valve inclosed therein, a projecting pin arranged to contact with the valve and open
115 it when the cage is moved, a water-supply pipe leading into the chamber on one side of the cage, an outlet leading from the other side of the cage, and a gas-valve connected to the cage; substantially as described.

5. In a regulator for water-heaters, a ver-
120 tically-movable cage containing a loose downwardly-seating ball-valve, a centrally-projecting pin arranged to contact with the ball when the cage is moved down, and a gas-valve connected to the cage; substantially as described. 125

In testimony whereof I have hereunto set my hand.

HENRY F. GABEL.

Witnesses:

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H. M. CORWIN.