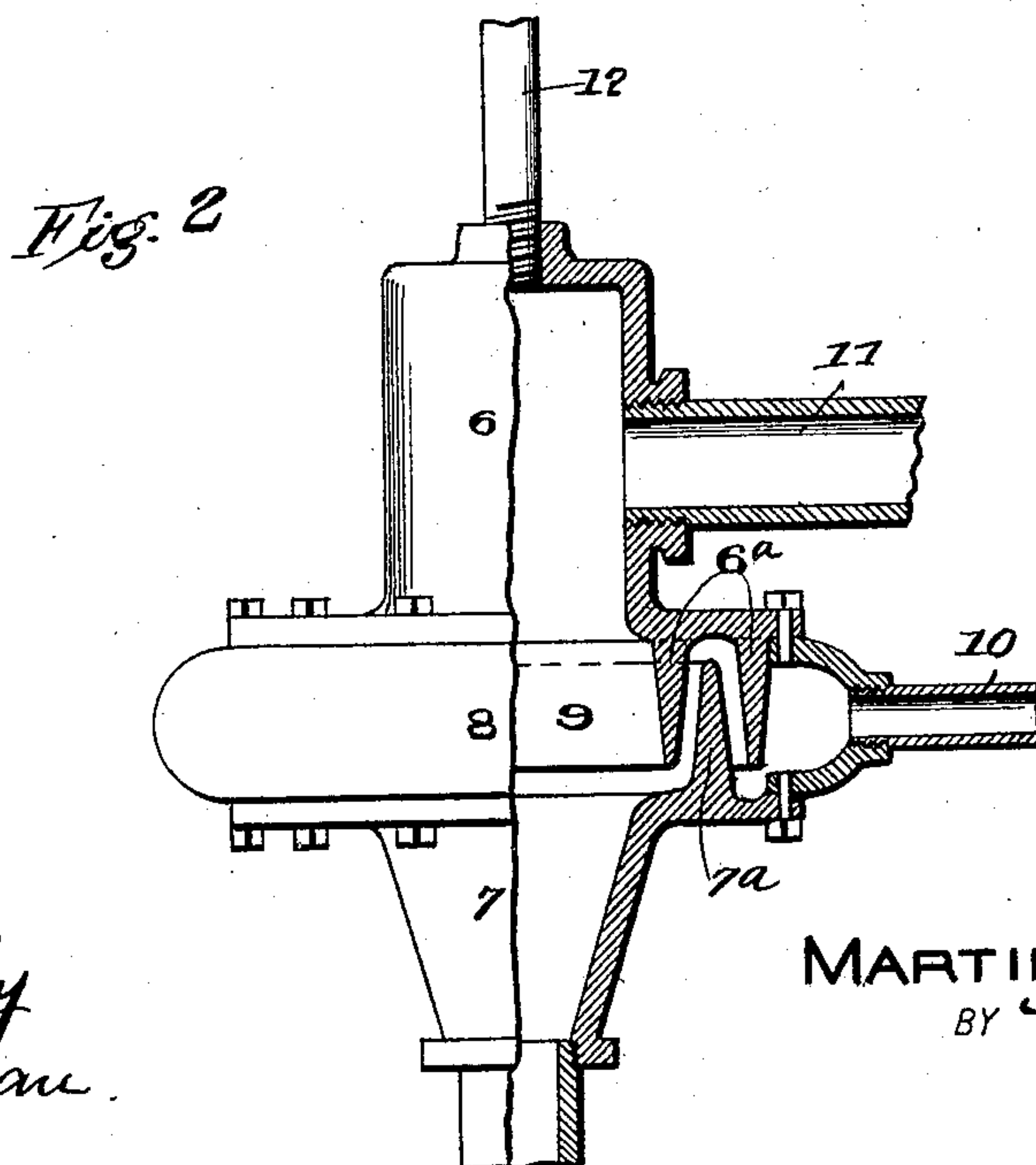
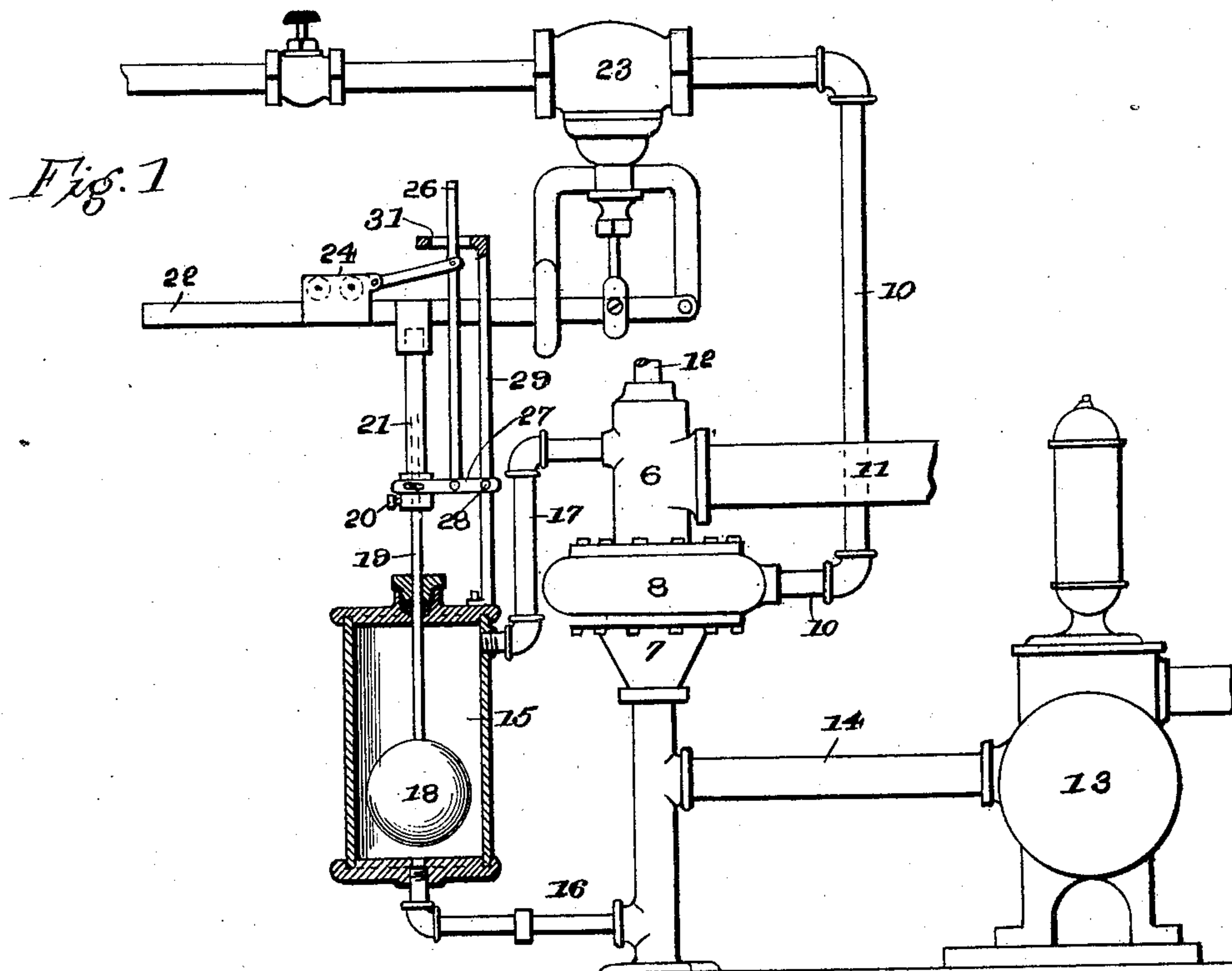


No. 861,949.

PATENTED JULY 30, 1907.

M. L. CABLE.
FEED WATER HEATER.
APPLICATION FILED MAY 23, 1906.



WITNESSES
C. Chaffey
Jos. A. Ryan.

INVENTOR
MARTIN L. CABLE
BY *Munn & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

MARTIN LUTHER CABLE, OF GREENSBORO, NORTH CAROLINA.

FEED-WATER HEATER.

No. 861,949.

Specification of Letters Patent.

Patented July 30, 1907.

Application filed May 23, 1906. Serial No. 318,347.

To all whom it may concern:

Be it known that I, MARTIN LUTHER CABLE, a citizen of the United States, residing at Greensboro, in the county of Guilford and State of North Carolina, have
5 invented a new and useful Improvement in Feed-Water Heaters, of which the following is a specification.

This invention relates to water heating systems designed for use in connection with the feed water for boilers, radiating systems and the like, in which ex-
10 haust or waste steam from an engine or the like is utilized for the purpose of heating water, the steam and water being combined in a suitable heater before being supplied to the feed pipe connected to the boiler or other device.

15 The object of the invention is to get the greatest possible temperature in the feed water with the least amount of steam.

A further object is to govern the temperature and supply of water at all times, by automatic devices as
20 hereinafter more fully described.

The effect of the governing device for feed water heaters, as hereinafter described, is to correct numerous defects incident to changes in the exhaust steam pressure, the water supply pressure, and the supply or feed
25 suction produced by the pump. These defects need not be specified at large, but it may be said that they are such as to require the close attention of the engineer, and then even without avoiding unsatisfactory results, such as flooding of the heater, racing or slowing of the
30 pump, clogging of the heater with sediment, and irregularity in the temperature of the water delivered to the boiler or radiators.

An embodiment of the invention is illustrated in the accompanying drawings, in which

35 Figure 1 is an elevation of the heater and connected parts, a float governor being shown in section. Fig. 2 is a detail in vertical section of the heater.

Referring to the drawings in detail, the heating or mixing and condensing chamber is formed of a head 6,
40 a base 7, bolted upon an annular rim 8, substantially semi-circular in cross section, the rim forming a hollow annular space which communicates with the mixing chamber 9, between the head and base, around all sides thereof. Cold water is supplied into the rim 8
45 through a pipe 10, from any suitable source. The base 7 has an upwardly projecting annular rib 7^a, and the head 6 has two downwardly projecting annular ribs 6^a, forming therebetween a groove into which the rib 7^a projects and producing a narrow inlet space there-
50 between, through which the cold water enters. The purpose and effect of this construction is to cause the water to flow in with a reverse motion, first up and then down, which prevents the deposit of any sediment, and further, causes the water to form a spray or thin
55 film which causes it to mix freely with the steam by providing a large surface for condensation. Back

pressure of the steam upon the water is also prevented by the inner rib.

The exhaust steam is supplied from the engine or other source, through the head 6, by a pipe 11, and a
60 pipe 12 is also connected to the head, for the attachment of any suitable pressure or relief valves and steam drip cock. The heated water is drawn by a pump 13, connected by pipe 14 to the base 7, and fed to the boiler, radiators, or wherever desired. 65

The inflow of cold water is controlled by an automatic governing device, shown herein as a float valve and connections as follows: 15 is a casing connected at the bottom to the base 7, below the suction pipe 14 to the pump, by a pipe 16, and at the top by a pipe 17 to
70 the head 6. The case has therein a float 18 the stem 19 of which is connected by a set screw 20 to an arm 21 of the lever 22 connected to the balance valve 23, of ordinary construction, in the cold water inlet pipe 10. The float may be set at will, by means of the set screw, 75 to vary the supply of cold water and consequently the temperature of the hot water delivered. For high temperature the float is lowered, so as to let in just water enough to prevent racing of the pump; for lower temperature the float should be raised so as to let more
80 water, and consequently less steam, into the heater and suction pipe of the pump. The float, being on a level with the suction pipe to the pump, which is normally not full of water, controls the valve so that it acts as a governor to regulate the cold water supply, in propor- 85 tion to the speed of the pump. The adjustment at the set screw 20 controls the temperature. And it may be stated that if at any time there is a spigot opened at any place beyond the pump, it will lessen the load thereon, causing the pump to work faster, and the float responds 90 at once and replenishes the supply of water. Consequently the heater is suitable for radiating, boiler feeding, or both, or any other system for supplying hot water.

To make the action of the float valve more sensitive, 95 the following devices are provided: 24 indicates a weight movable along the valve lever 22, and connected by a link 25 to an arm 26 projecting upwardly from a lever 27 which is fulcrumed at one end at 28 to a standard 29 supported on the float case and connected 100 at the other end, by slot and pin 30, to the rod 21. The upper end of the standard 29 has a slotted horizontal arm 31 in which the arm 29 is retained and guided.

Any drop of the float causes, by means of the devices shown, the weight 24 to travel further out on the lever, 105 thereby accelerating the movement of the valve to admit or increase the supply of water. Rise of the float has the opposite effect. This produces a very sensitive and quick acting governing device.

The operation of the apparatus is evident from the 110 above description, and it is not limited in its construction to the specific form shown but may be varied or

modified to suit local conditions or otherwise, within the scope of the following claims.

The advantages in using this attachment in connection with engine governors is that it causes the governor to act in advance of the variation of the speed of the engine which enables the engine to retain its normal rate of speed and by this means the engine is protected from sudden strain or exertion to regain speed. This also enables the engine to produce more and better power with considerable less steam consumption and also prevents the engine from racing from the fact that the weight rebounds on the lever and causes the governor to rise easily and cut off the steam supply.

I claim

1. A feed water heater comprising a head having a steam inlet in the top and a peripheral groove around the same, a base having a hot water outlet in the bottom and a peripheral rib projecting into the groove and forming a narrow inlet space therebetween and a hollow rim extending around the edge of the head and base and communicating with the said inlet space, and having a cold water supply pipe thereto.

2. In a feed water heater, a condenser, means for supplying steam to the condenser, means for supplying cold water to the condenser, a valve for controlling the cold

water supply, a lever connected thereto, a float in connection with the condenser and connected with the lever whereby to operate the valve, a weight movable along the lever, and means actuated by the operation of the float to shift the weight along the lever to accelerate the action of the valve.

3. In a feed water heater, a condenser, means for supplying steam to the condenser, means for supplying cold water thereto, a valve for controlling the cold water supply, a lever connected thereto, a float in connection with the condenser, a rod connecting the float and the lever, a weight movable along the lever, and means in connection with the rod and the weight to shift the weight when the rod moves whereby to increase the sensitiveness of the governor.

4. In a feed water heater, a condenser, means for supplying steam to the condenser, means for supplying cold water thereto, a valve for controlling the cold water supply, a lever connected thereto, a float in connection with the condenser, a rod connecting the float and the lever, a weight movable along the lever, a second rod arranged parallel with the first rod and moved longitudinally thereby, and a link connecting the weight and said second rod whereby to move said weight.

MARTIN LUTHER CABLE.

Witnesses:

A. L. MILLIRON,
W. A. HEWITT.