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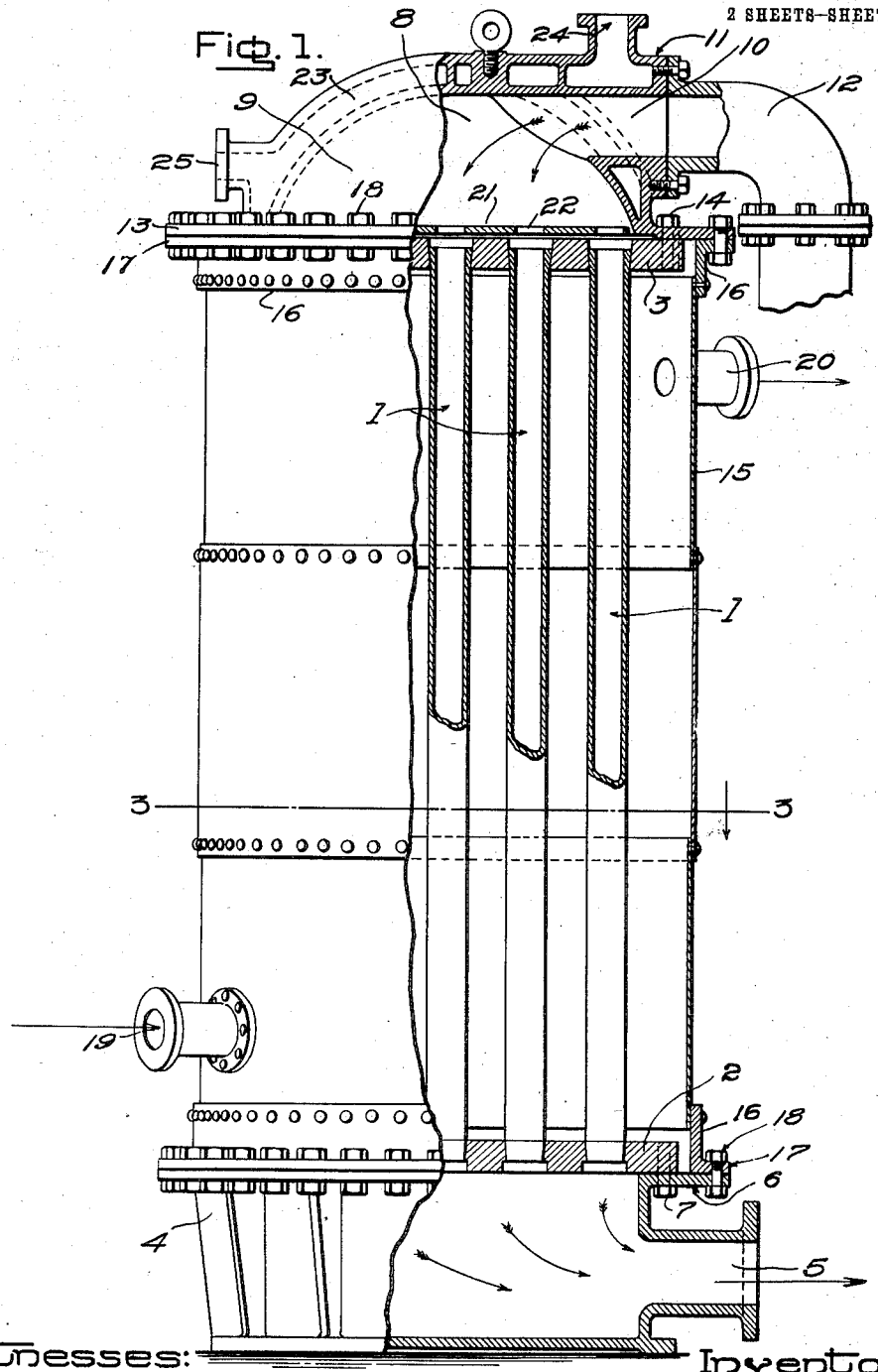
WATER HEATER.

APPLICATION FILED NOV. 15, 1909.

1,067,861. Patented July 22, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



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WATER HEATER.

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2 SHEETS—SHEET 2.

Fig. 2.

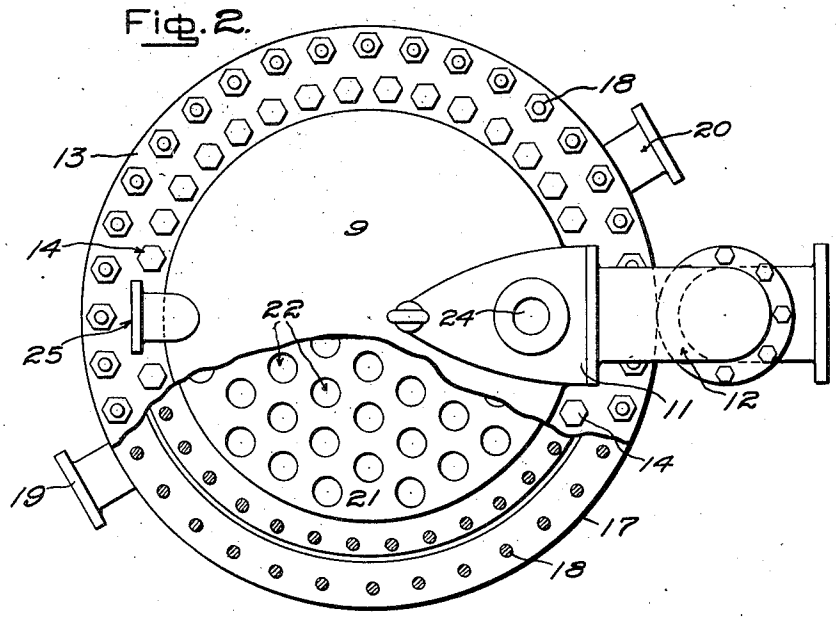
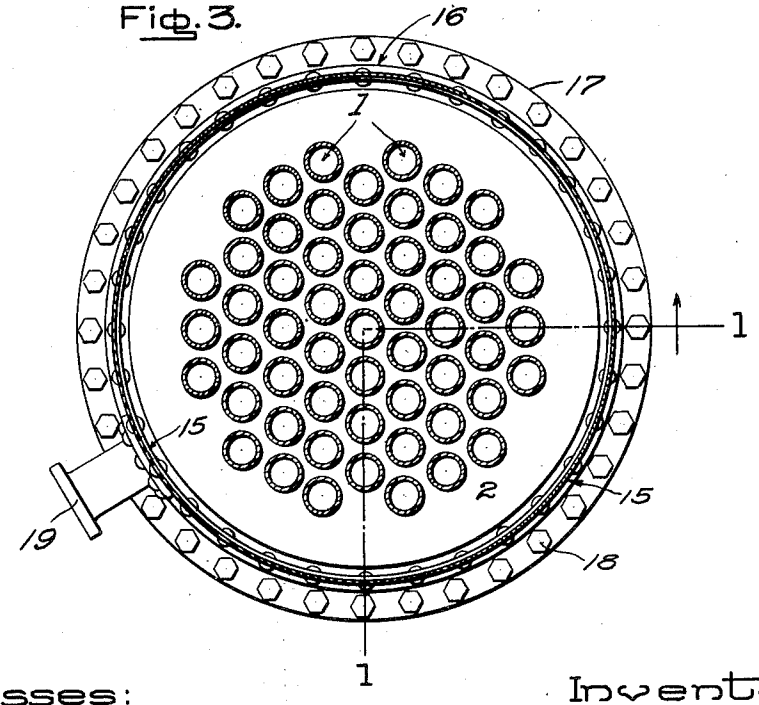


Fig. 3.



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UNITED STATES PATENT OFFICE.

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WATER-HEATER.

1,067,861. Specification of Letters Patent. Patented July 22, 1913.

Application filed November 15, 1909. Serial No. 528,041.

To all whom it may concern:

Be it known that I, HARRY O. BREAKER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Water-Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to water heaters, and more particularly to a heater adapted to utilize the waste heat in the exhaust gases from internal combustion engines.

The object of the invention is to provide a water heater of this character which is well adapted to resist the action of the acids and other compounds usually contained within the exhaust gases from gas and other internal combustion engines, and to also provide a heater the parts of which may be readily and conveniently manufactured and assembled, and may be readily repaired without requiring the dismantling of the heater.

To this end the invention consists in the features of construction and combination of parts hereinafter described and set forth in the claims.

The various features of the invention will be readily understood from an inspection of the accompanying drawings and the following detailed description of the heater shown therein.

In the drawings Figure 1 is an elevation partly in section of a heater embodying the invention, the section being taken on line 1—1, Fig. 3; Fig. 2 is a plan view with a part of the inlet chamber broken away; and Fig. 3 is a horizontal section on line 3—3, Fig. 1.

The heater shown in the drawings comprises generally inlet and outlet chambers connected by pipes through which the exhaust gases pass, and a casing surrounding the pipes to form a water chamber through which the water to be heated flows, and by which it is brought into contact with the pipes. The heater is formed in sections so constructed that they may be readily manufactured and assembled, and so connected together that convenient access may be had to any parts requiring inspection or repair without the necessity of dismantling the heater. The inlet, outlet, and pipe sections are formed of cast iron, and are so constructed and arranged that only cast iron surfaces which will effectively resist the action of the acids and other corrosive compounds therein are subjected to the action of the gases.

As shown in the drawings the pipe section comprises a series of cast iron pipes 1, the lower ends of which are secured in a circular cast iron plate 2, and the upper ends of which are secured in a similar plate 3. The pipes are connected with the plates by taper metal joints, and the holes through the upper plate are of sufficient size to enable the pipes to be passed through them. This construction enables any defective pipe to be readily removed through the upper plate, and a new pipe substituted therefor. The outlet chamber is formed within the cast iron base or outlet section 4 which is provided with a discharge outlet 5. The base section is provided with a horizontal flange 6 surrounding the outlet chamber and the plate 2 of the pipe section is secured to this flange by a series of bolts 7. The cast iron plate 2 thus forms the top wall of the outlet chamber. The inlet chamber 8 is formed within a top or inlet section 9, and is provided with a supply opening 10. The supply opening is surrounded by a flange 11 to which a pipe 12 leading from the exhaust of an internal combustion engine may be secured. The top section is provided with a flange 13 which is secured to the plate 3 of the pipe section by bolts 14. The cast iron plate 3 thus forms the bottom wall of the inlet chamber.

The casing section which surrounds the pipe section is formed of plates of sheet metal 15 and is provided at its upper and lower ends with cast iron rings 16 to which the metal plates are riveted. These rings are provided with horizontal flanges 17 which are secured to the flanges 6 and 13 of the lower and upper end sections by bolts 18. Water is supplied to the chamber within the casing 15 through a pipe connected with an inlet 19 and passes out of said chamber through a pipe connected with an outlet 20. With this construction the sections of the heater may be conveniently

manufactured and readily assembled. In case any repairs are necessary, the top section may be readily removed without disturbing either the casing or pipe section, and any defective pipe may be readily replaced with a new pipe without removing either the pipe or casing sections. If necessary the casing section may be readily removed without disturbing the pipe section or its connection with the base section.

In order to prevent the inflowing gases from impinging against the joints in the upper plate 3 of the pipe section, a baffle plate 21 is placed within the inlet chamber over the plate 3, and is provided with openings 22 registering with the ends of the pipes 1. These openings are of smaller diameter than the holes in the plate 3 so that the steam is directed away from the joints.

Owing to the high temperature of the gases entering the inlet chamber, the top section is liable to become heated to a materially higher degree than the pipe section which is in contact with the water. This is liable to cause unequal expansion of the parts, resulting in injury or such distortion of the parts as to produce leakage. To avoid this, the top section is provided with a water jacket 23 which may communicate with circulating pipes through flanged openings 24 and 25.

While it is preferred to employ the specific construction and arrangement of the parts shown and described, it will be understood that this construction and arrangement is not essential except so far as it is set forth in the claims, and may be varied without departing from the invention.

Having explained the nature and object of the invention, and specifically described one construction of heater in which it may be embodied, what I claim is:—

1. A water heater comprising a pipe section consisting of a series of pipes having their ends secured in end plates, an inlet section provided with a flange to which one end plate is secured, an outlet end section provided with a flange to which the other end plate of the pipe section is secured, and a casing section provided with end flanges secured to the flanges of the inlet and outlet sections outside the end plates of the pipe section, substantially as described.

2. A water heater comprising a pipe section consisting of a series of pipes having their ends secured in end plates, an inlet section secured to one of said end plates and provided with an inlet for exhaust gases, a baffle plate arranged over the end plate of the pipe section and provided with holes registering with the ends of the pipes which are smaller in diameter than the holes in the end plate, an outlet section secured to the other end plate and provided with an outlet for the exhaust gases, and a casing section surrounding the pipe section and provided with a water inlet and outlet, substantially as described.

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