

No. 847,915.

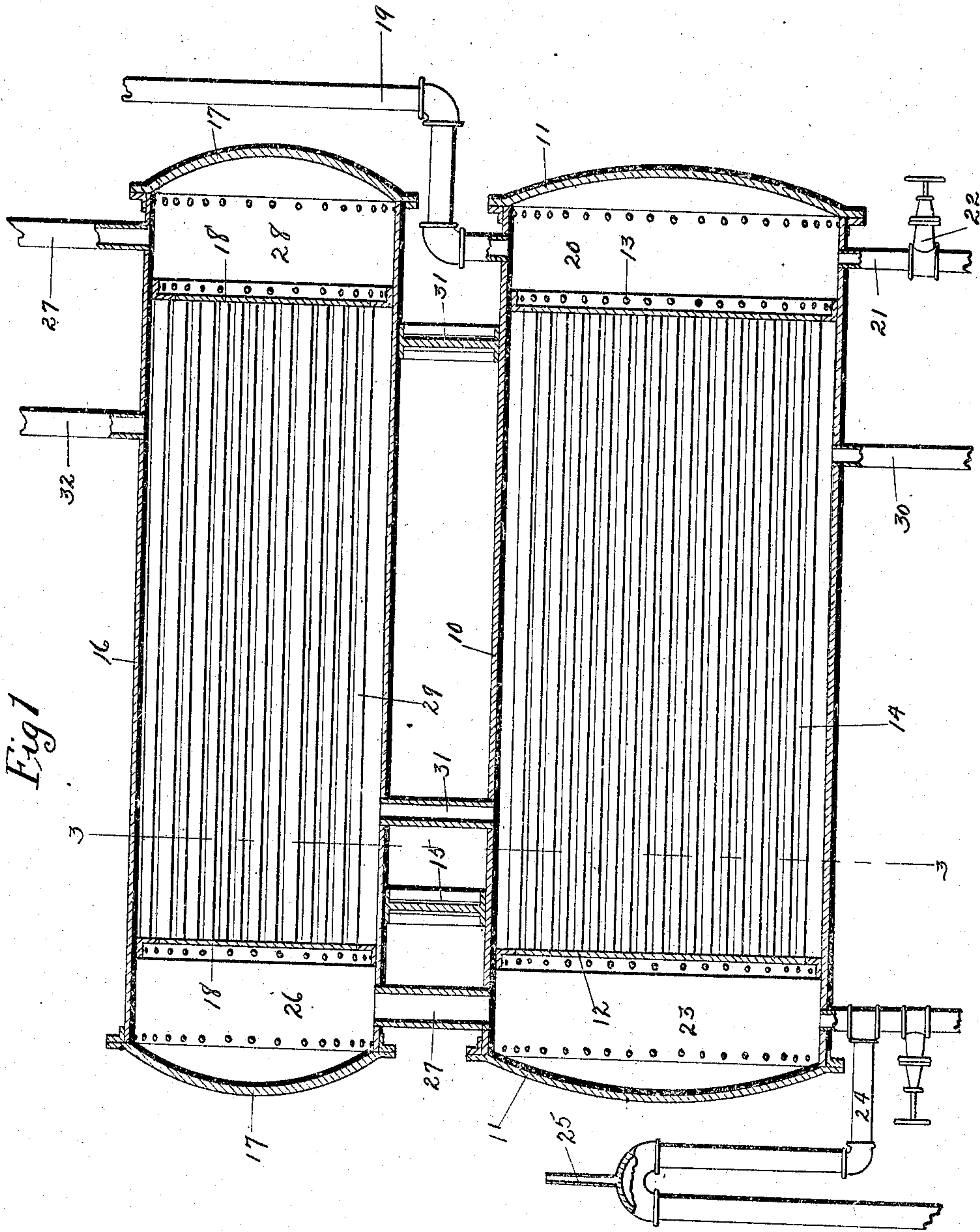
PATENTED MAR. 19, 1907.

D. W. CUNNINGHAM.

WATER HEATER FOR LOCOMOTIVES.

APPLICATION FILED JULY 6, 1906.

2 SHEETS—SHEET 1.



Witnesses
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2 SHEETS—SHEET 2.

Fig 2

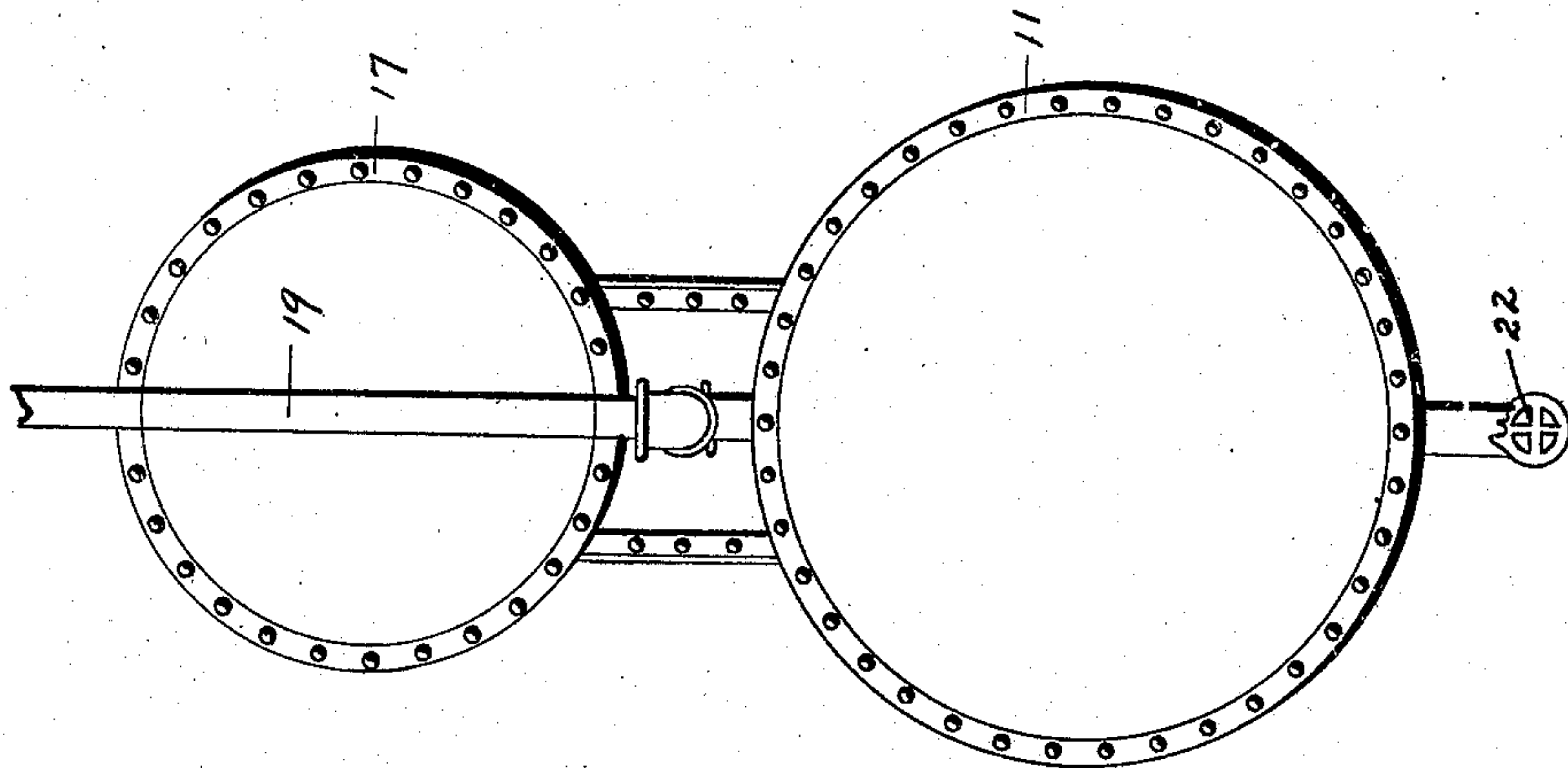


Fig 4

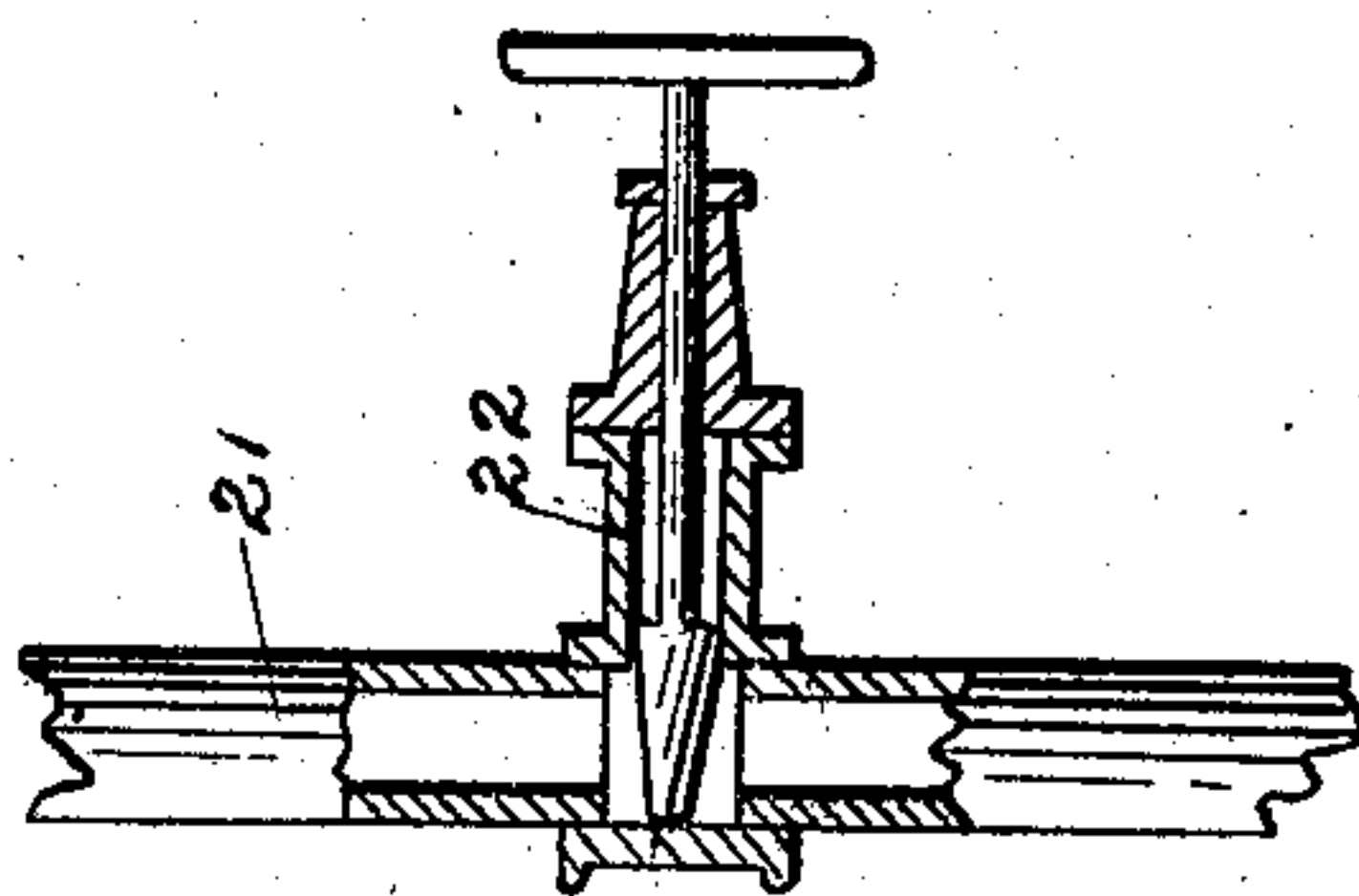
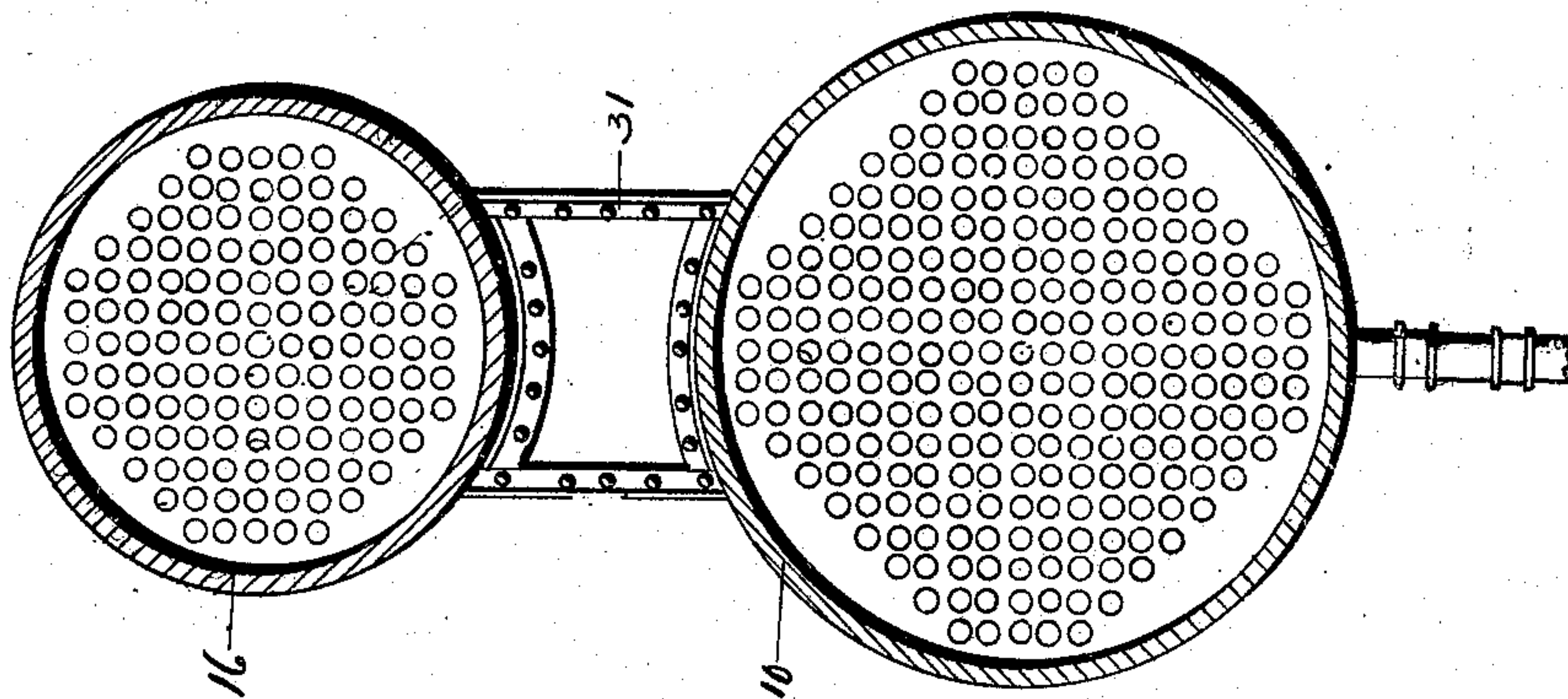


Fig 3



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DAVID W. CUNNINGHAM, OF DES MOINES, IOWA.

WATER-HEATER FOR LOCOMOTIVES.

No. 847,915.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed July 6, 1906. Serial No. 325,395

To all whom it may concern:

Be it known that I, DAVID W. CUNNINGHAM, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a certain new and useful Water-Heater for Locomotive-Boilers, of which the following is a specification.

The object of my invention is to provide a water-heater of simple, durable, and inexpensive construction designed to utilize the steam and hot water discharged from the blow-off pipes of locomotives for heating water for cleaning locomotives and refilling their boilers; and, more specifically, it is my object to provide a device of this kind in which the blow-off steam and water will be utilized to its maximum efficiency in heating the water to be used in cleaning and refilling the locomotive-boilers.

My invention consists in the construction, arrangement, and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical longitudinal sectional view of the complete heater embodying my invention. Fig. 2 shows a front end elevation of same. Fig. 3 shows a sectional view on the line 3 3 of Fig. 1, and Fig. 4 shows a detail view illustrating one of the gate-valves of the cleaning-out pipes.

Referring to the accompanying drawings, the heater is composed of a main cylinder 10, having cylinder-heads 11 at both ends and also having transverse partitions 12 spaced apart some distance from the cylinder-heads. These transverse partitions support the boiler-tubes 14, which communicate with the chambers at the ends of the cylinder between the partitions and the cylinder-heads. Mounted on top of the cylinder 10 are the supporting-brackets 15, and resting on said brackets is the superheating-cylinder 16, having the cylinder-heads 17 therein and also having the transverse partitions 18 spaced apart from the heads 17 to form chambers.

The reference-numeral 19 indicates a steam and water pipe to receive the steam and water from the blow-off pipes of a locomotive-boiler. This pipe 19 communicates with the chamber 20 at the front of the cylinder 10. Leading from the bottom of the chamber 20 is a cleaning-out pipe 21, provided with a gate-valve 22, of ordinary construction, which

gate-valve is clearly illustrated in Fig. 4. A similar cleaning-out pipe communicates with the chamber 23 at the rear of the cylinder 10, and a drain-pipe 24 is connected with the said cleaning-out pipe above the gate-valve therein. This drain-pipe 24 extends upwardly to a point above the center of the cylinder 10 and then downwardly and is provided with an air-vent tube 25 at its upper portion. In this way the water-level of the cylinder 10 is maintained at the level of the upper portion of the said drain-pipe, and siphonage of the water through the drain-pipe is prevented by the air-vent tube 25.

I have arranged for providing communication between the chamber 23 of the main cylinder and the chamber 26 of the superheater-cylinder by means of the pipe 27, and I have provided for discharging the steam after passing through the tubes by the steam-discharge pipe 27, which communicates with the chamber 28 at the front of the superheater. The chambers 26 and 28 of the superheater communicate by means of the tubes 29, which pass through the partitions 18. The spaces between the partitions 12 of the main cylinder and the partitions 18 of the superheater-cylinder are filled with water by means of the water-inlet pipe 30 at the bottom of the cylinder 10. Communication is established between the water-chambers of the two cylinders by means of the pipe 31, and the heated water may be withdrawn from the top of the superheater through the pipe 32.

In practical use the blow-off pipe of a locomotive-boiler is connected with the pipe 19, and, assuming that the water-chambers of the cylinders have been previously filled with water, the steam and water from the pipe 19 will enter the chamber 20 and the water will drop to the bottom of said chamber, while the steam will rise to the top, and both will flow through the tubes 14 to the chamber 23 at the other end. The water will remain in said tubes and impart its heat to the water surrounding the tubes, while the steam will rise through the pipe 27 to the chamber 26 and then flow through the tubes 29 to the chamber 28 and finally to the steam-discharge pipe 27. By means of the drain-pipe arranged as shown the water-level in the chambers 20 and 23 and their connecting-tubes is always maintained at the level of the top of the drain-pipe, so that there is plenty of room above the water-level to permit the passage of steam through the upper tubes,

and the cooled water at the bottom of the chamber 23 will pass out through the drain-pipe, as the heated water from the locomotive-boiler enters the front chamber 20, so that practically all of the heat from the water of the boiler will be utilized in heating the water within the heater. If it is desired to clean out the sediment that may gather in the bottom of the cylinder 10, the valves 22 may be opened and all of the water contained within the tubes and the chambers be discharged through the pipes 21. By thus causing the steam and hot water from the locomotive-boiler to pass back and forth through the tubes in close contact with the water in the cylinders the said water in the cylinders is quickly heated, and shortly after the water and steam have been blown from a locomotive-boiler the operator may connect a pipe with the pipe 32 and use the water in the heater for washing out a locomotive-boiler, and after it has been washed out he may then refill the locomotive-boiler with hot water, so that shortly after a fire is started in the locomotive fire-box steam may be obtained and the locomotive be ready for use.

By means of my improved heating device a locomotive may be cleaned out and refilled and ready for use in a comparatively short time and with comparatively little work, and by using hot water for cleaning the locomotive-boilers all undue contraction of the affected parts is avoided. In places where cold water is used for this purpose there is often considerable damage done to the boiler and boiler-tubes.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. In a heater of the class described, the combination of a heater-body having closed ends, partitions within the body spaced apart from the ends to form compartments at the ends, tubes extended through the body portion and communicating with the chambers at the ends, a blow-off pipe communicating with the chamber at one end, a steam-discharge pipe communicating with the chamber at the other end, and a drain-pipe communicating with the bottom of one of the chambers and extended upwardly to a point near the center of the heater-body and

then downwardly and having a vent-opening near its upper portion.

2. In a water-heater for locomotive-boilers, the combination of a main heater-body and a superheater-body connected with each other and each having closed ends, partitions within each body portion spaced apart from the ends, tubes in each body portion communicating with the chambers beyond the partitions, a blow-off pipe communicating with the chamber at one end of the main body portion, a steam-pipe communicating between the ends of the main heater and the superheater-body portions opposite from the blow-off pipe, a steam-discharge pipe communicating with the chamber at the other end of the superheater, cleaning-out pipes communicating with the bottoms of the chambers at the ends of the main body, a water-inlet pipe communicating with the bottom of the main body, a pipe communicating between the body portions of the heater and the superheater, a water-discharge pipe communicating with the top of the superheater and a drain-pipe connected with one of the cleaning-out pipes extended upwardly to a point near the center of the heater body and then downwardly and formed with an air-vent opening at its upper portion.

3. In a heater, of the class described, the combination of a heater-body having closed ends, partitions within the body spaced apart from the ends to form compartments at the ends, tubes extended through the body portion and communicating with the chambers at the ends, a blow-off pipe communicating with the chamber at one end and designed to conduct steam and water from a locomotive-engine to said chamber, a steam-discharge pipe communicating with the pipe at the other end and a drain device leading from one of said chambers and arranged to prevent the escape of water or steam from the chamber when the water-level is below the central portion of the chamber and to permit the escape of water when the water-level is above the central portion of the chamber.

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Witnesses:

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