O. W. OTT.

SUPERHEATER FOR LOCOMOTIVES.

APPLICATION FILED APR. 8, 1907. RENEWED AUG. 21, 1909.

935,223. Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.

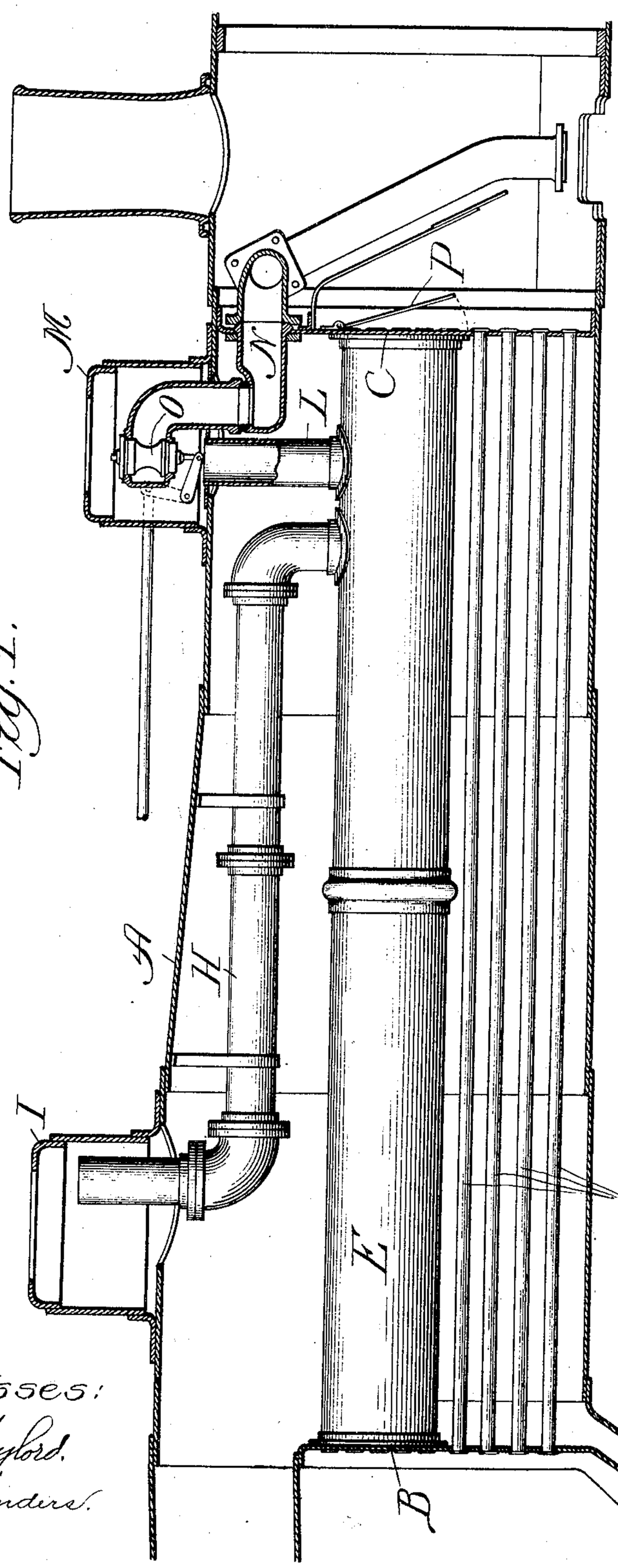

Fig. 1.

Witnesses:
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John Enders.

Inventor:
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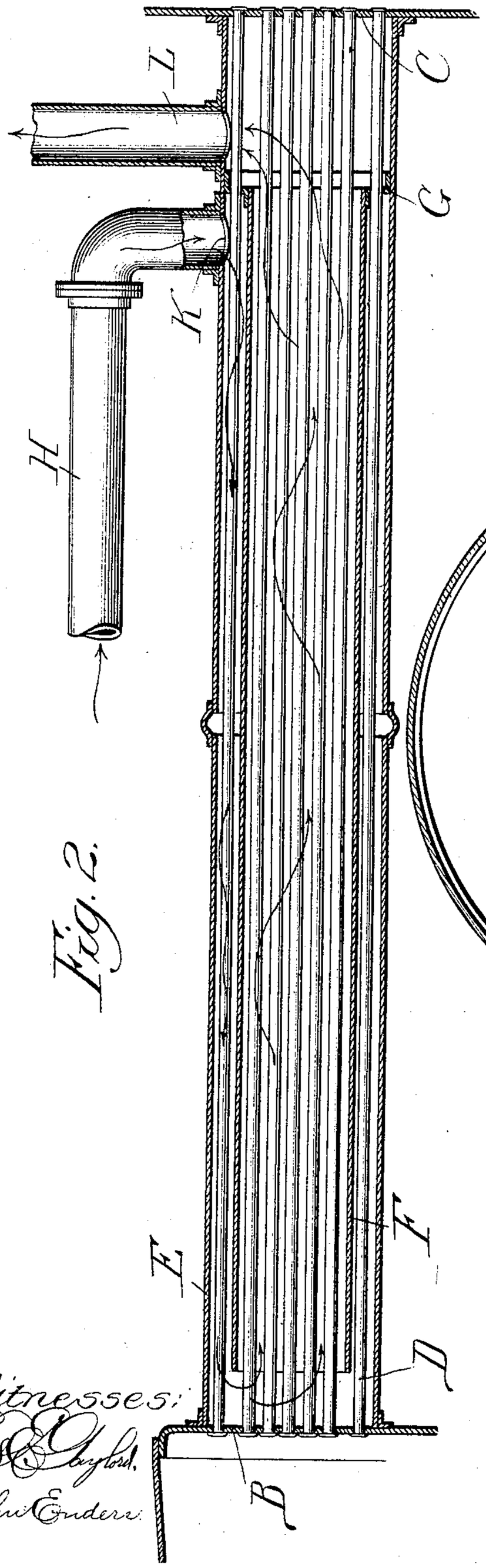

Fig. 2.

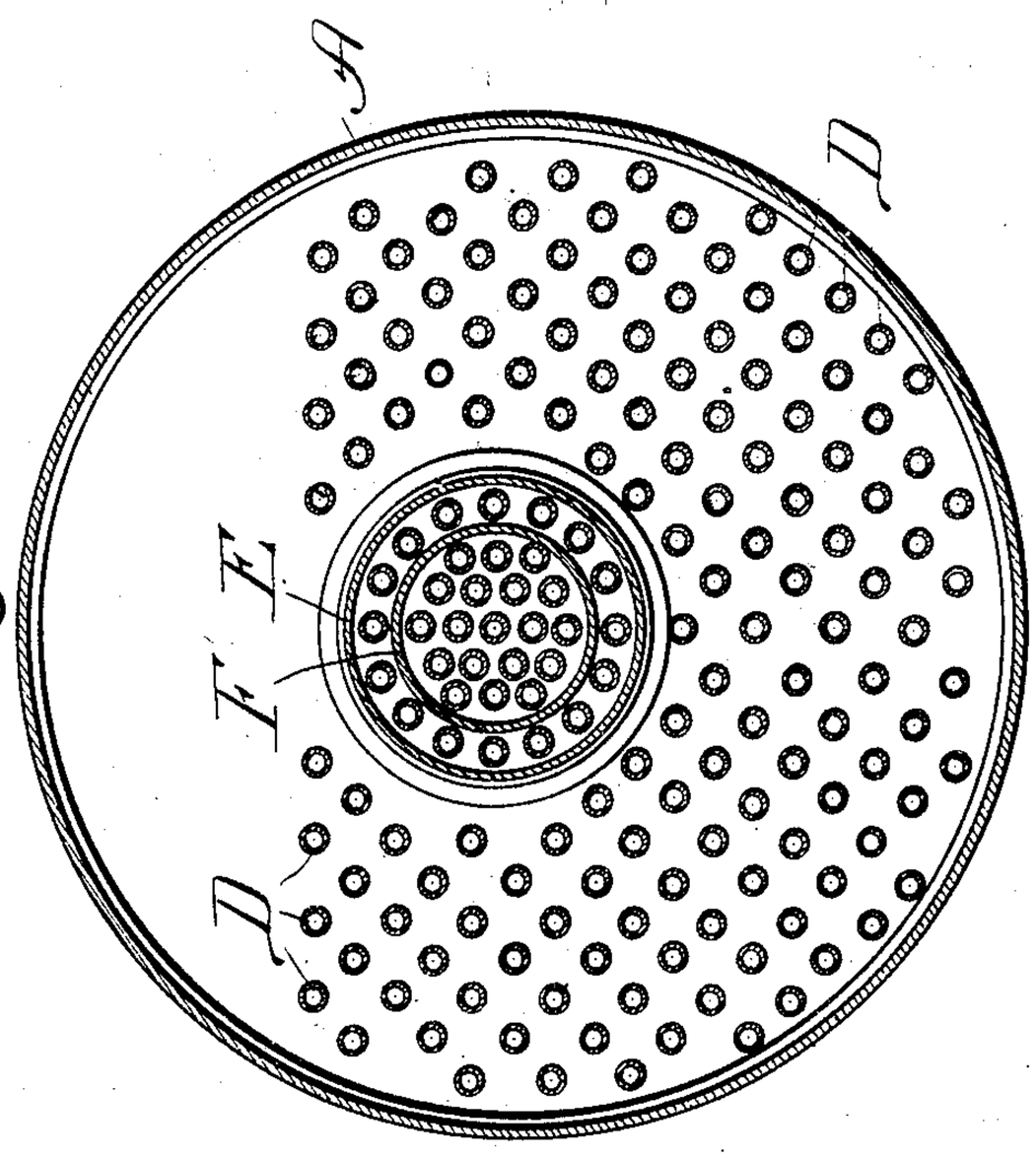

Fig. 3.

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UNITED STATES PATENT OFFICE.

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SUPERHEATER FOR LOCOMOTIVES.

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To all whom it may concern:

Be it known that I, ORAN W. OTT, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Superheaters for Locomotives, of which the following is a specification.

The object of my invention is to provide means to be used in connection with locomotive or other fire tube boilers for superheating steam.

The precise nature of my invention will more clearly appear from the following description and claims.

In the drawings—Figure 1 is a longitudinal section of a locomotive boiler equipped with my invention. Fig. 2 is a longitudinal sectional view of the superheating device; and Fig. 3 is a transverse section of the boiler and superheater.

For the purpose of superheating the steam I utilize a certain number of the flues, jacketing such flues throughout their length. The superheater consists of a chamber extending throughout the length of the boiler and inclosing part of the flues. Steam from the usual steam dome is conducted to the superheating chamber and after traversing the same is led to a second steam dome in which the throttle valve is placed.

I have shown my invention applied to a locomotive boiler A of a common type. Extending between the flue sheets B and C are the usual flues D. Also extending between the flue sheets and secured thereto is the superheater E, preferably cylindrical in form and inclosing as many of the flues as may be necessary for the purpose intended. Inside of the superheating chamber or drum E is a shell F preferably cylindrical in form. The shell F is shorter than the superheating chamber E and communicates therewith through its ends which are open. At one end the shell F is connected to the walls of the superheating chamber E by any suitable means such as the partition ring G, shown in Fig. 2 of the drawings. The shell F incloses part of the flues in the superheating chamber E, the remainder of said flues extending through the annular space between the shell F and the wall E of the superheating chamber. The flues outside of the shell F pass through apertures in the partition ring G. A pipe H leads from the steam dome I and communicates with the superheater through aperture K, adjacent to the partition G. A pipe L is connected to the superheating chamber E on the opposite side of the ring G and leads to a second steam dome M designed to receive the superheated steam. Superheated steam is conducted from the dome M through pipes N to the cylinders in the usual manner. The throttle valve O is located in the pipe N at a point inside of the steam dome M. The drum is preferably constructed in two sections united by a joint S which is designed to permit a slight degree of expansion.

On reference to the drawings it will be observed that I have shown my invention embodied in a locomotive boiler of standard type having a crown sheet above the firebox flue sheet. As a result of this construction all the flues are below the crown sheet and inasmuch as the crown sheet is always covered with water, all the flues are under water. The drum E which surrounds part of this flue for superheating purposes is therefore entirely immersed in water.

In operation steam will flow from the dome I through the pipe H into the superheater E, thence through the space between the outside wall of the superheater and the shell F and back through the inside of the shell F to the dome M. The effectual superheating of the steam is promoted by the shell F, which compels the steam to traverse the length of the superheating chamber twice, and with the outside wall of the superheater forms a steam jacket around the superheated steam during the latter part of its progress through the superheater. The steam upon its first entry into the superheater and during its passage through the space between its internal shell F and the outer wall E of the superheater is jacketed by the water in the boiler. Upon its return passage, however, through the interior of the shell F, the steam is jacketed by incoming steam inclosed in the space between the shell F and the wall E, thus insuring more effectual superheating.

In order to prevent the possibility of an injurious action upon the flues in the superheater when the latter is not in use, I have provided a damper P adapted to cover the forward ends of said flues. Any suitable means may be provided for holding said damper in open position during the operation of the superheater and for closing the same when the superheater is not in use.

My improved superheater, as will appear

from the foregoing, is simple in construction and its design is such that there are a minimum number of joints between the superheater and the flues and other parts of the boiler. Furthermore the arrangement of the steam domes and throttle is such that the pressure upon opposite sides of the walls of the superheater is always balanced whether steam is being used or not, thus reducing to a minimum the tendency to leakage through the joints.

I claim:

1. In an apparatus of the class described a boiler comprising flues, a drum within the shell between the flue sheets inclosing a plurality of said flues throughout their length, an open ended shell inclosing part of the flues in said drum, said shell having its ends within the ends of the drum and having an annular connection at one end with the drum, and a steam inlet to the drum on one side of said connection and a steam outlet from the drum on the other side thereof.

2. In an apparatus of the class described a boiler comprising flues, a drum inclosing part of said flues throughout their length, said drum being entirely comprehended between the flue sheets, a steam dome connected to said boiler, a second steam dome connected to said drum, and a throttle valve in said second steam dome.

3. In an apparatus of the class described a boiler comprising flues, a drum inclosing part of said flues throughout their length, a shell open at both ends inclosing part of the flues in said drum, said shell having a flanged connection adjacent one end with the drum, a steam dome on said boiler, a pipe leading from said dome and communicating with said drum on one side of said connection, a second steam dome, and a pipe leading from said drum on the other side of said connection and communicating with said second steam dome.

4. In an apparatus of the class described, a boiler comprising two flue sheets, flues extending between said sheets, a drum surrounding a plurality of flues throughout their length and having its ends attached respectively to the said flue sheets on the inner sides thereof, inlet and outlet openings for steam in the wall of the drum, said openings both being near one end of the drum, an annular partition between said openings and a tubular extension from the inner edge thereof toward the opposite end of the drum.

5. In an apparatus of the class described, a boiler comprising a superheating chamber within the boiler shell and between the flue sheets thereof, two domes on the boiler, one of them being separated by a partition from the boiler space, a pipe leading from the other dome to the superheating chamber, another pipe from the superheating chamber to the partitioned dome, and a throttle valve in said partitioned dome.

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