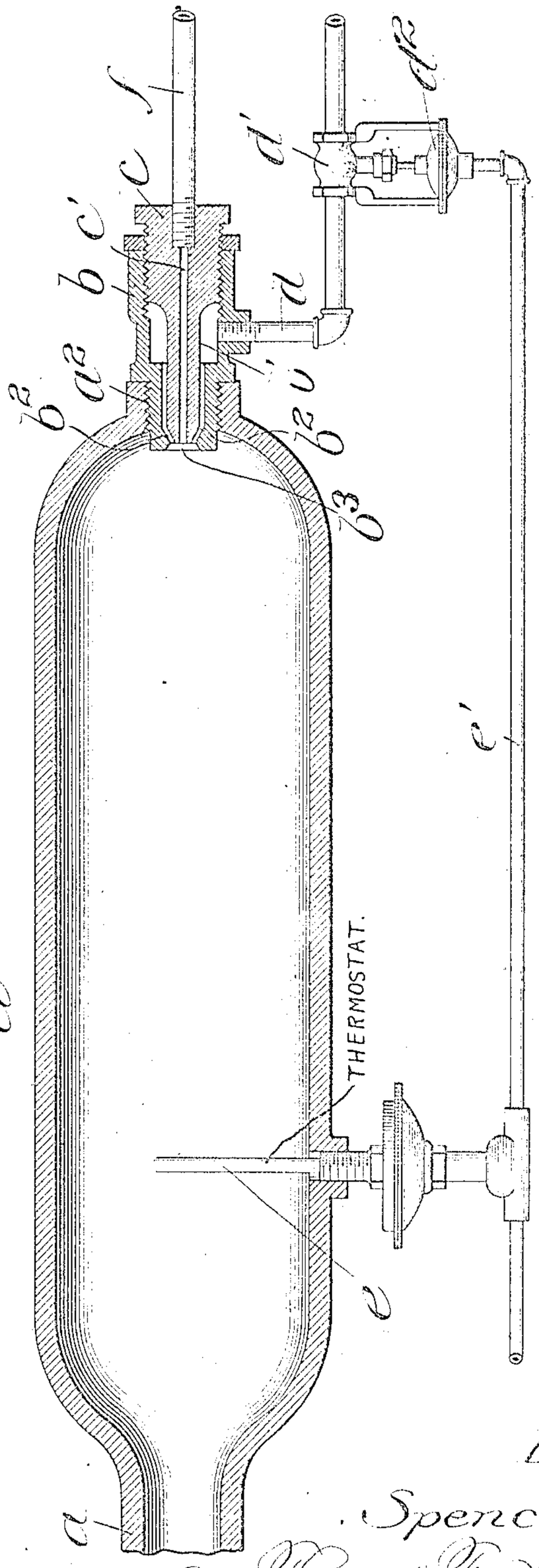
No. 869,454. PATENTED OCT. 29, 1907.

S. OTIS.

STEAM TRANSFORMER.

APPLICATION FILED JUNE 8, 1906.



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UNITED STATES PATENT OFFICE.

SPENCER OTIS, OF CHICAGO, ILLINOIS, ASSIGNOR TO NATIONAL P ,TENT HOLDING COMPANY, OF RAPID CITY, SOUTH DAKOTA, A CORPORATION OF SOUTH DAKOTA.

STEAM-TRANSFORMER.

No. 869,454. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed June 8, 1906. Serial No. 320,761.

To all whom it may concern:

Be it known that I, SPENCER OTIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Transformers, of which the following is a specification.

My invention relates to steam transformers; and has for its object to produce a device in which superheated steam at high pressure may be reduced in temperature, the pressure lowered, and at the same time the amount of working fluid increased. To this end my invention consists in the combinations and details hereinafter set forth and claimed.

In the figure of the drawing, I have shown a longitudinal elevation, partly in section, of my improved transformer.

Referring to the drawing in which I have shown my device specifically applied to a nozzle for the introduction of steam to the working parts of a steam turbine, a represents the end of the nozzle at the point where the steam is admitted to the turbine.

a' represents an expansion chamber formed adjacent the nozzle. Steam is introduced into the end a^2 of the expansion chamber, this end being opposite the nozzle end. The walls of the opening a^2 are suitably screw threaded and receive a casing b, suitably screw threaded at one end. This casing b is hollowed as shown and receives a block c formed with a longitudinal passageway c'. The block c is circumferentially reduced at its forward end, thereby forming a chamber b' in the casing b. I also provide passageways b^2 leading from the chamber b' to the orifice b^3, and it will be observed that the passageway c' also communicates with this orifice. Suitably connected with the passageway c' is a steam-pipe f, and suitably connected with the chamber b' is a water-supply pipe d.

In operation, superheated steam at high temperature and at high pressure, such as, for instance, is generated in boilers of the "flasher" type, is admitted to the expansion chamber a' through the passageway c'. As is well-known boilers of the flasher type are adapted for the production of small quantities of steam at high pressure and temperature. It is not essential that steam at this temperature be used for the purpose of operating a steam turbine, consequently, in order to reduce the temperature of the steam and at the same time increase the quantity of working fluid, I propose to admit through the pipe d a sufficient quantity of water which will be drawn through the passages d^2 by the steam entering the chamber through the passageway c' in the form of fine spray. The water at this point will be converted into steam by the abstraction of part of the heat from the superheated steam, as will be readily understood.

In order to regulate the supply of water to the temperature of the steam within the chamber, so that the supply of water may not be greater than can be converted into steam without reducing the temperature of the steam within the chamber below the desired point, I provide in the water supply pipe d a valve d', which may be conveniently operated through a diaphragm a^2 connected with a thermostatic regulating device e by a pipe e'. When the temperature within the chamber falls below a predetermined point the thermostat e within the chamber will cause the operation of the valve d' to shut off the supply of water. When the temperature rises in like manner, the thermostat will operate to open the valve d', thus reëstablishing the water supply.

It will be seen that I have provided a device in which I use to advantage the excess temperature of superheated steam to convert the water supplied to the chamber into steam, thus furnishing an additional quantity of working fluid to be supplied to the engine. It will also be seen that my device is automatic in its operation.

I claim:

1. In a steam transformer, a chamber, a steam inlet leading thereto, a water inlet surrounding the steam inlet, a water supply pipe connected to the water inlet, a valve in the water supply pipe, a thermostat within the chamber, and means connecting the thermostat with the valve to operate the valve.

2. In a steam transformer, a closed chamber, a steam supply, means whereby the steam supply causes a flow of water into the chamber, and means governed by the temperature within the chamber for regulating the amount of water delivered thereto.

SPENCER OTIS.

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