S. HOFFMANN.

DAMPER FOR LOCOMOTIVE SUPERHEATERS.

APPLICATION FILED NOV. 23, 1910.

1,011,197.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.

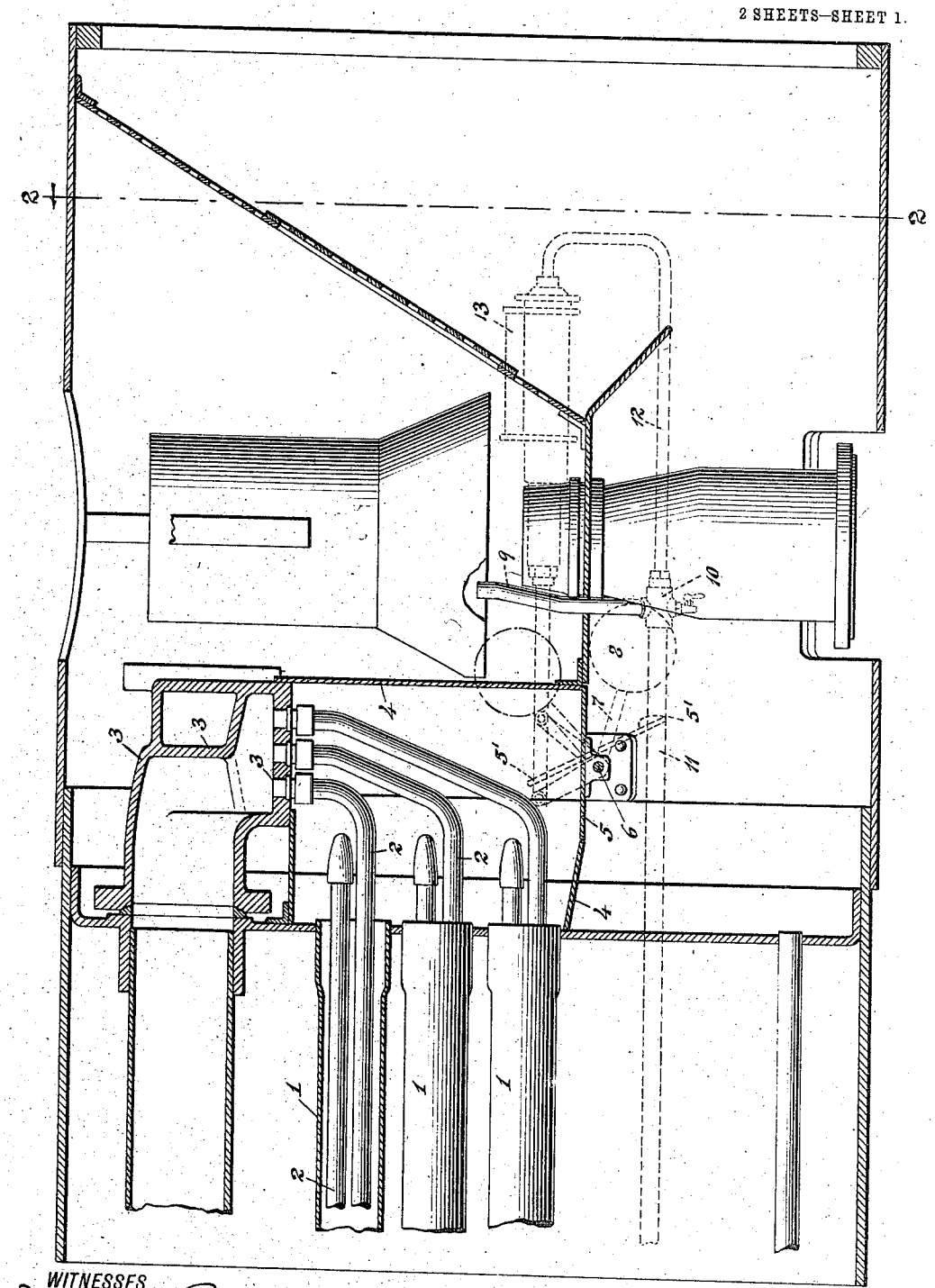

Fig. 1.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

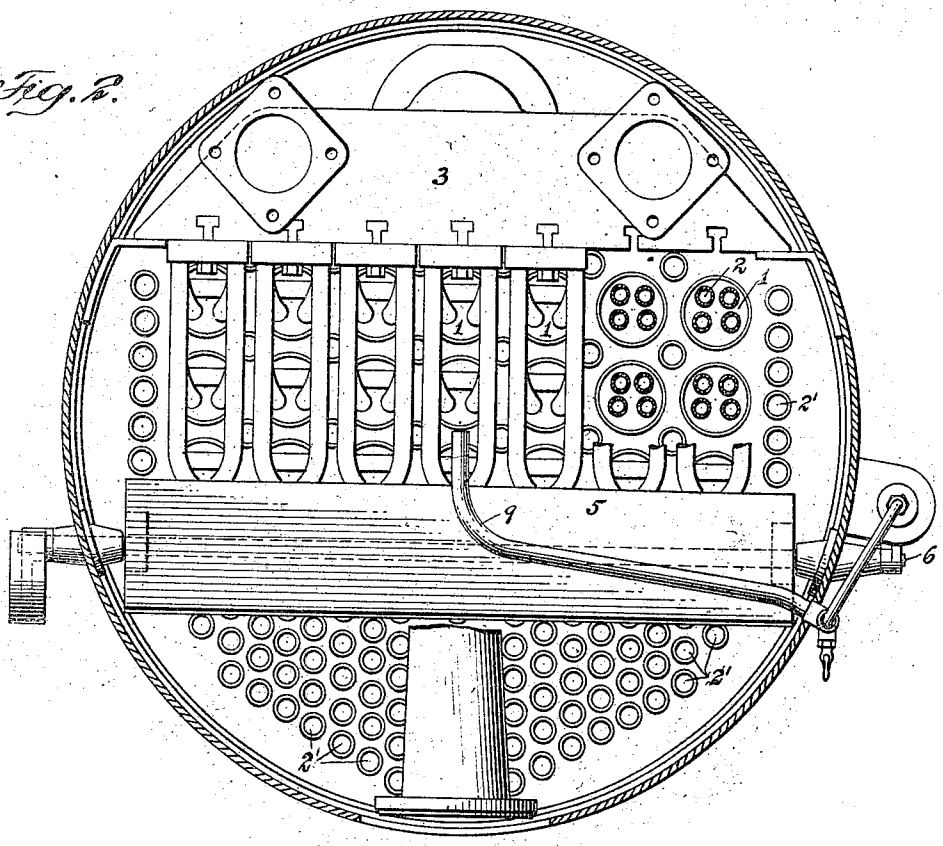
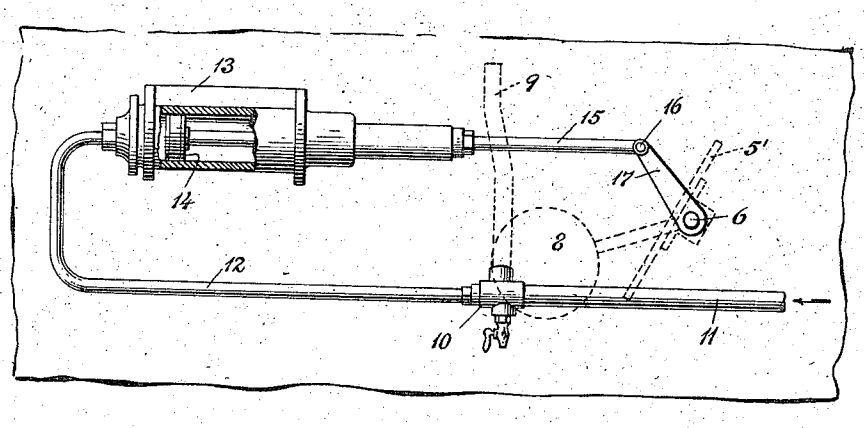


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

SIMON HOFFMANN, OF NEW YORK, N. Y., ASSIGNOR TO LOCOMOTIVE SUPERHEATER CO., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

DAMPER FOR LOCOMOTIVE-SUPERHEATERS.

1,011,197. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed November 23, 1910. Serial No. 593,797.

To all whom it may concern:

Be it known that I, SIMON HOFFMANN, a subject of the Emperor of Austria-Hungary, and resident of New York, county and State of New York, have invented a new and useful Improvement in Dampers for Locomotive-Superheaters, of which the following is a specification.

My invention relates to dampers and means for operating the same in connection with locomotive superheaters of the fire-tube type and has for its object to automatically protect superheater pipes from being overheated and hence from being burned out or damaged.

In carrying out my invention I employ, in connection with a casing surrounding the ends of the superheater pipes where they emerge from the fire or smoke tubes at the front tube sheet, a damper in said casing which is so set or so connected with a counterweight or equivalent device as to be normally open, thus permitting furnace gases to flow through the fire tubes and over the superheater pipes; and a steam pipe leading from the blower which connects with a steam cylinder so that a piston connected with the damper may be actuated in such a way that when the blower is turned on the piston will close the damper against the resistance of the counterweight and thus shut off the flow of furnace gases through the superheater.

In the prior art are to be found automatic devices comprising a damper arranged to control the flow of furnace gases through the fire tubes, said damper being actuated by a piston in a steam cylinder connected with the steam supply to the engine cylinders and controlled by the engine throttle. In such arrangements, however, the damper is closed whenever the steam supply is cut off so that when the engine is standing or drifting without steam the superheater pipes are not receiving any increase of heat units.

According to my invention, the superheater pipes have hot gases flowing over them at all times except when the blower is on whether or not steam is being supplied to the engine cylinders; in this way a higher average of superheat is maintained and a resultant greater fuel efficiency is secured.

A further advantage of my invention is that any steam leakage which may take place in the steam cylinder used for operating the damper can only take place when the blower is working. In the automatic devices of the prior art in which the cylinder actuating the damper always contained steam except when the throttle was closed, leakage in the steam cylinder was possible most of the time. This leakage and the consequent condensed steam usually caused considerable obscuration of the engineer's view thus constituting both an annoyance and a positive danger.

Referring to the drawings, Figure 1 represents a central vertical section through the front part of a locomotive boiler embodying a preferred form of my invention; Fig. 2 represents a vertical transverse section along the line 2—2 of Fig. 1; and Fig. 3 represents an elevation of the steam cylinder and its connections to blower and damper as used in this particular embodiment.

In the drawings, a certain number of fire tubes 1 contain superheater pipes 2, the ends of which terminate in a steam collector casting 3. As shown, the fire tubes which contain the superheater pipes are considerably larger in diameter than the remaining flue tubes 2′, but I may, if I choose, use superheater fire tubes of normal diameter either making the superheater pipes smaller or using a smaller number of such pipes to each fire tube.

Surrounding the entire group of superheater ends as they emerge from the fire tubes is a sheet iron casing 4 in the lower part of which is arranged a damper 5 extending clear across the boiler. Fig. 1 shows the damper in closed position and Fig. 2 in open position; in the former figure 5′ shows the position (dotted construction) which the damper will take when open. When the damper is closed the casing acts as a baffle means which completely cuts off the flow of furnace gases through the fire tubes 1 which contain the superheater pipes and when the damper is open these gases have their maximum freedom of flow. The damper 5 is pivoted upon a longitudinal axis 6 and has attached rigidly to it, by a short arm 7, a counterweight, 8 the position of arm and counterweight being so related to the damper that normally the latter is open. The blower pipe 9 is joined by a T connection 10 to a pipe 11 leading to the steam supply and having somewhere in its length a control cock (not shown) by which the steam

flowing to the blower pipe may be turned on or off. Running forward from the T 10 is a steam pipe 12 leading to a cylinder 13, in which is a piston 14 having a piston rod 15 pivoted at 16 to a link 17 fixed to the damper axis 6. The cylinder 13 may conveniently be affixed to the outside of the boiler.

The operation of my improved damper is as follows: When steam is cut off from the blower, the counterweight 8, as previously stated, maintains the damper in open position thus permitting furnace gases to flow freely through the superheater fire tubes 1 but as soon as the steam is turned into the blower pipe 9 the piston 14 is pushed outwardly (from left to right, Fig. 3) and rotates the damper axis through the connecting rod 15 and link 17 to raise the counterweight and close the damper; this, as has been seen, completely shuts off the flow of furnace gases through flues 1. The moment steam is again turned off from the blower the piston will return to its original position and the damper will again open.

In carrying out my invention I do not confine myself to the exact details shown as *e. g.*, the size and specific location of damper, the location and arrangement of steam cylinder, etc., but claim:

1. In a locomotive provided with a blower and a superheater of the class described, the combination with the superheater tubes, of baffle means including a normally open damper in the path of the furnace gases, and steam actuated means having steam connection with the blower and adapted to close the damper when said blower is operated, substantially as and for the purpose described.

2. In a locomotive provided with a blower and a superheater of the class described, the combination of a casing at one end of the boiler around the superheater pipe ends and their fire tubes, a normally open damper in said casing, and a steam cylinder having steam connection to the blower and provided with a piston connected to the damper for closing the same, substantially as and for the purpose described.

3. In a locomotive provided with a superheater of the class described, the combination of a casing at one end of the boiler around the superheater pipe ends and their fire tubes, a damper in said casing, a counterweight attached to said damper for keeping the same normally open, and a steam cylinder having steam connection to the blower and a piston connected to the damper for closing the same when the blower is operated, substantially as and for the purpose described.

4. In a locomotive provided with a blower and a superheater of the class described, the combination of a casing adjacent to the front tube sheet around the superheater pipe ends and their fire tubes, a damper in said casing, means operated by steam supplied in common to the blower for closing said damper when the blower is operated, and means for opening said damper when the blower is shut off, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

SIMON HOFFMANN.

Witnesses:
ELMER G. WILLYOUNG,
JOHN A. KEHLENBECK.