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F. O. WHEALON.

APPARATUS FOR RETURNING WASTE WATER ON LOCOMOTIVES.

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[illegible][illegible]

Fig. 4.

Witnesses:

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APPARATUS FOR RETURNING WASTE WATER ON LOCOMOTIVES.

No. 801,701.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANCIS O. WHEALON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Apparatus for Returning Waste Water from Boilers to Water-Tanks on Locomotives, of which the following is a specification.

My invention relates to improvements in apparatus for returning waste water from boilers to water-tanks on locomotives and preventing the water-feed passage-ways from freezing in cold weather.

Heretofore in cold weather the water wasted by the operation of the injectors has caused an accumulation of ice on the working parts of locomotives and between and along the sides of the track-rails, especially at roundhouses and stations. Also the water-supply pipes leading from the injectors to the boiler have frequently frozen.

The object of this invention is to overcome these objections. This I accomplish by returning the waste water to the tank carried by the tender and by producing circulation of hot water through the water-feed connections with the boiler when the injecting mechanism is operated. Thus greater saving of water which has heretofore flowed on the track or the working parts of the locomotive (such as the links and valve mechanism) is effected and the hazard caused by frozen pipes and the accumulation of said ice is reduced.

In the accompanying drawings, forming part of this specification, Figure 1 is a diagrammatic view of a locomotive, showing my invention. Figs. 2 and 3 are detail views of the boiler-checks with which the water-feed pipes leading from the injectors are connected, and Fig. 4 is a sectional view of one of the check-valves in the water-feed pipes.

In the drawings, A represents a locomotive-boiler, B the tender, C and D the injectors, and E the boiler-checks; all of which parts are of ordinary construction.

The injectors C and D are connected with the boiler A and receive steam by means of the pipes 2 and 3 and union 4. These injectors are also connected with the boiler to feed water in the ordinary manner by means of the pipes 5 and 6, which communicate with the boiler-checks E. The water-tank F on the tender is connected with the injectors C and D by means of the water-supply pipes 7 and 8 and flexible couplings 9 and 10. The injectors have overflow-outlets 11 and 17, which

connect with the top of the water-tank on the tender by means of the trunk-pipe 13, flexible coupling 14, and branches 12 and 18 to return the overflow-water from said injectors to said tank. The pipe 13 has a branch 15, containing a valve 16, leading outside the water-tank when it is not desired to return the waste water from the injectors into said tank. A branch outlet-pipe 19, containing a valve 20, (preferably located in the cab,) is connected with the pipe 18, so that in case of an emergency the valve 20 may be opened and the water overflowing from the injectors permitted to egress in the ordinary manner. The water-feed pipes 5 and 6, respectively, have intermediate check-valves 21 and 22 connected therewith, each of which is of ordinary construction, except that a small opening 23 is made near the center of the valve to cause a circulation of hot water through said water-feed pipes, as hereinafter described. A pipe 24, forming a by-passage-way, is connected with the feed-pipes 5 and 6 and has a branch 25 connected thereto. This branch contains a valve 26, and the by-passage-way 24 has valves 27 and 28 connected on either side of said branch.

In operation either one of the injectors may be used. Normally the check-valves E, 21, and 22 and valves 16 and 26 are closed. Assuming that the injector D is operated, the parts thereof are manipulated in the ordinary manner. Water is drawn from the water-tank through the supply-pipe 10 by steam passing through pipe 3 and injected into the boiler through feed-pipe 6 in the ordinary manner. Any water overflowing from said injector D through the outlet 11 is forced by the pressure of steam from the boiler through branch 12, flexible coupling 14, and trunk-pipe 13 back into the water-tank. Should it be desired to produce circulation of hot water through the feed-pipe 5 to prevent freezing, the valves 27 and 28 are opened and a small amount of hot water, sufficient to keep the pipe 5 warm, flows through the by-passage-way 24, feed-pipe 5, passage 23 in valve 21, injector C, overflow-outlet 17, and branch 18 leading into the trunk-pipe. If it is desired to operate the injector C, water is drawn from the tank through the water-supply pipe 7 and coupling 9 by steam passing through the pipe 2 and injected into the boiler through the feed-pipe 5 in the ordinary manner. Any water overflowing from said injector C passes through the outlet 17, pipe 18, and trunk-pipe 13 back into the tank. To circulate hot water

through the pipe 6 when the injector C is used, the valves 27 and 28 are opened and a small amount of hot water passes through the by-passage-way 24, opening 23 in the valve 22, injector D, overflow-outlet 11, branch 12, and back into the tank through trunk-pipe 13. Normally the valve 20 is closed, although it may be opened and the overflow from the injectors permitted to escape. In an emergency the valve 26 may be opened to relieve the boiler-checks should they happen to stick and refuse to operate. The valves 27 and 28 may also be closed when there is no danger of the feed-pipes freezing. The sizes of the passage-ways 23 in the intermediate check-valves 21 and 22, of the overflow connections with the injectors and tank, and of the by-passage-way 24 are regulated to govern the amount of water necessarily passing through them when this apparatus is in use.

It is obvious that this apparatus may be variously modified and used on stationary boilers and parts thereof omitted without affecting the broad idea of this invention, and I do not wish to confine myself to the exact construction specified.

Having described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. Apparatus of the class set forth, comprising, in combination with an injector having an overflow-outlet and water supply and feed pipes leading respectively to the water-feed tank and the boiler of the locomotive, a return passage-way from the overflow-outlet of said injector to said water-feed tank.

2. Apparatus of the class set forth, comprising, in combination with an injector having an overflow-outlet and water supply and feed pipes leading respectively from the water-tank and the boiler of the locomotive, means for returning the water overflowing from said injector to the top of said water-tank.

3. Apparatus of the class set forth, comprising, in combination with a pair of injectors having overflow-outlets and water supply and feed pipes leading respectively from the water-

feed tank and the boiler of the locomotive, a return passage-way to said water-feed tank connected with said overflow-outlets of said injectors, a by-passage-way between said pipes near their ends connecting with said boiler, and an intermediate check-valve in said feed-pipes having a return-way, for the purposes specified.

4. Apparatus of the class set forth, comprising, in combination with a pair of injectors having overflow and water supply and feed connections with the locomotive-boiler and the water-supply tank thereof, means for producing circulation of hot water through said water-feed connections when either of said injectors is operated, for the purposes specified.

5. Apparatus of the class set forth, comprising, in combination with injector mechanism connected with the boiler and water-feed tank thereof and having an overflow-outlet, means for returning the water overflowing from said injector mechanism into said tank, and means for producing a return-current of hot water through the connections between said injector mechanism and boiler.

6. Apparatus of the class set forth, comprising, in combination with injector mechanism connected with the locomotive-boiler and its water-feed tank and having an overflow-outlet, a return-passage connected with said injector mechanism and tank to produce a current of hot water through said connections and return the water overflowing from said injector mechanism into said tank.

7. Apparatus of the class set forth, comprising, in combination with injector mechanism connected with a boiler and having an overflow-outlet, a water-tank, and means for conveying the water overflowing from said injector into said tank.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS O. WHEALON.

Witnesses:

E. M. BOESEL,

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