

(No Model.)

J. P. SERVE.
LOCOMOTIVE FEED HEATER.

No. 546,683.

Patented Sept. 24. 1895.

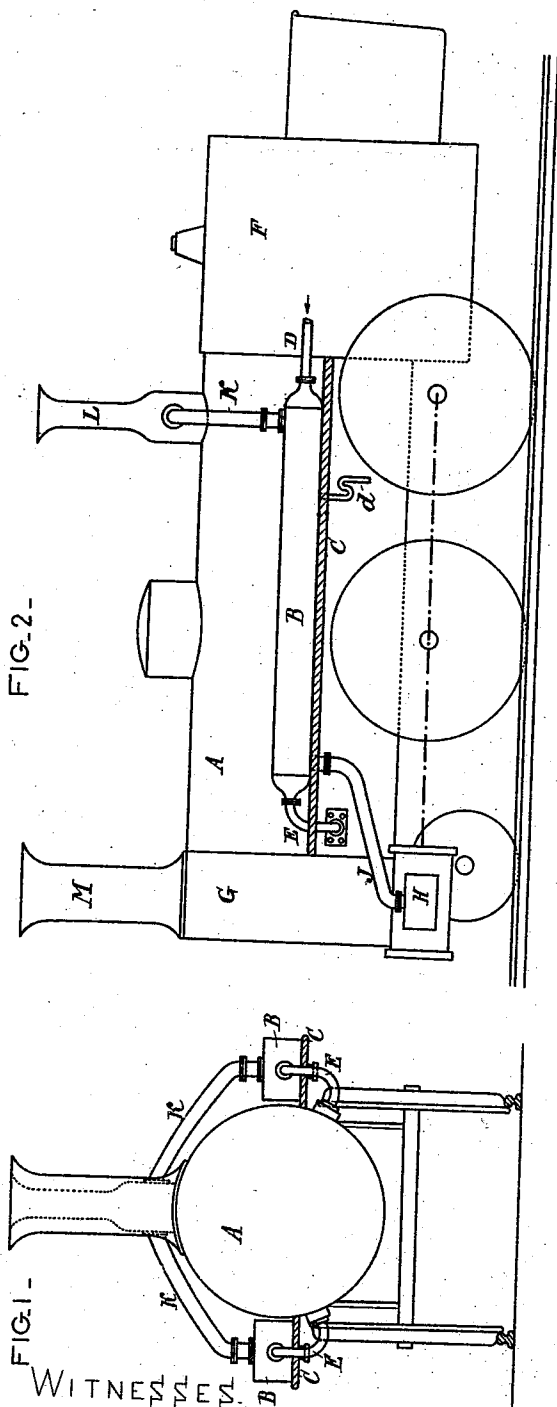


FIG. 1-

WITNESSES.

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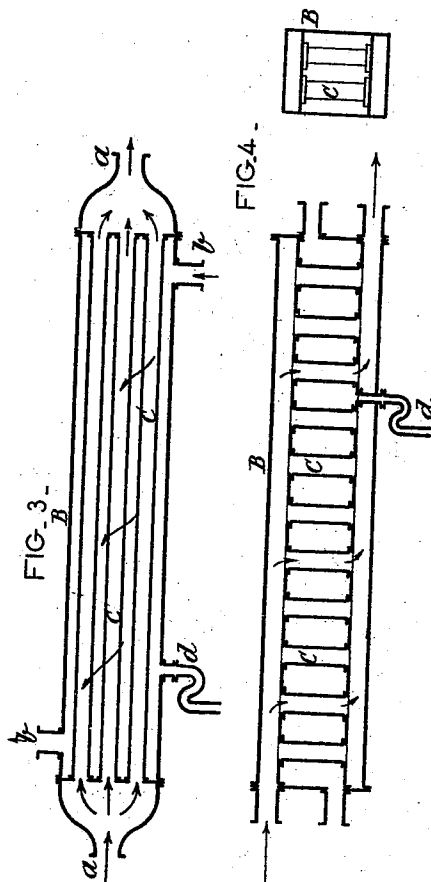


FIG. 3-

FIG. 4-

INVENTOR.

Jean P. Serve.

By his attorney

Edward P. Thompson

UNITED STATES PATENT OFFICE.

JEAN PIERRE SERVE, OF LYONS, FRANCE.

LOCOMOTIVE FEED-HEATER.

SPECIFICATION forming part of Letters Patent No. 546,683, dated September 24, 1895.

Application filed August 29, 1893. Serial No. 484,276. (No model.) Patented in France July 20, 1892, No. 223,113.

To all whom it may concern:

Be it known that I, JEAN PIERRE SERVE, engineer, a citizen of the Republic of France, residing at Lyons, in the said Republic of France, have invented certain new and useful Improvements in Locomotive Feed-Heaters, (for which I have obtained a patent in France, dated July 20, 1892, No. 223,113,) of which the following is a specification.

This invention relates to means for utilizing waste steam in locomotives when the draft is effected mechanically by means of fans in the manner more particularly described and claimed in my patent of May 23, 1893, No. 498,034. In this case, in fact, the escape or waste steam is completely at disposal for whatsoever use it may be wanted, and it is a matter of importance to utilize it in order to obtain a saving in the fuel used, and at the same time to increase the adherence and stability of the locomotive. I have attained this result by arranging at each side of the locomotive a tubular reheater arranged and fitted in the manner which will be hereinafter described, and which is shown in the accompanying drawings, in which—

Figure 1 is a view of a side elevation of a locomotive fitted with this arrangement of feed-water heater. Fig. 2 is an end view of the same locomotive. Fig. 3 is a longitudinal section on a larger scale of the arrangement of heater employed. Fig. 4 is a longitudinal and transverse section of a modification of this apparatus.

In order to carry out my invention, I arrange horizontally on or below the platforms or ways C, which are generally found at each side of the cylindrical body A of locomotives, two feed-water heaters B, of the so-called "tubular" system and of a sufficient length and of small height in order not to interfere with the service of the locomotive.

The water passing from the feed-pump or from an injector up the pipe D preferably enters the group of tubes forming the heater B by its end which is nearest to the furnace F of the boiler and flows out by its opposite extremity, where it enters the boiler A by means of the tube E at a point near the smoke-box G. On the contrary, the waste steam escaping from the cylinder H by the tube J passes into the casing B, which surrounds the tubes

from the side of the smoke-box G, and passes away by the other extremity of the apparatus. The excess of uncondensed steam may be discharged at this point by the tube K into an auxiliary chimney L, arranged for the purpose, or it even may be returned into the ordinary chimney M, or even, if preferred, may be employed for various other special uses.

On the drawings I have shown that the heaters B may be placed on the ways C, arranged on each side of the boiler A, and I have made them rectangular in form. The only effect of this is to raise the ways C, for instance, which is of no inconvenience for the service.

Fig. 3 shows a vertical section of the heater B, which I preferably employ. In this figure *a a* are the tubes for admitting and for discharging the water, *b b* are the tubes for admitting and discharging the steam, and *c c* are the tubes which the current of water forced in by the feed-pump traverses, and, finally, *d* is a small tube bent in form of a siphon intended to allow the waters of condensation to escape. In this arrangement, as the casing B only receives expanded steam, its flat faces are not subjected to any internal pressure and have no tendency to be forced out of shape.

Fig. 4 represents another arrangement of the heater, in which the tubes *c c* are arranged transversely. The same letters of reference annexed to the tubes allow of the course of the circulation of the water and of the steam being understood, which is also further indicated by means of the arrows. It is, of course, understood that in both these modifications the steam would equally well circulate in the tubes and the feed-water round the tubes, or these tubes could be made in coils. A single heater may also be employed, if necessary.

The principal advantages of an arrangement of this kind are as follows: First, by making the heaters of sufficient area or size the water can be heated to a sufficiently high temperature to cause the larger part of the salts contained in solution to be precipitated, and thus avoid the scaling of the tubes of the boiler, while the heaters, being easily taken to pieces, may be easily cleaned when necessary; second, the system allows of the feed apparatus, such as pumps or injectors, being used with cold water, seeing that the water,

on its exit from this apparatus, penetrates into the heaters and from there into the boilers; third, it presents advantages in certain cases for increasing adherence on the rails and the stability of the locomotive by the action of the useful weight with which it is thus symmetrically loaded at each side.

I am aware that there have already been proposed means for heating feed-water in the boilers of locomotives; but to my knowledge, no one has made use of two tubular heaters arranged in the manner hereinbefore indicated and placed horizontally on or under the platforms or ways C, arranged laterally on the cylindrical body of the locomotive, and, finally, arranged in such a way as to receive the whole of the waste steam rendered available by the use of suction-fans, the excess of which is dis-

charged by means of a special chimney or may be employed for other purposes, substantially as has been hereinbefore described.

I declare that what I claim is--

In a locomotive, the combination with the chimney and steam cylinder, of a feed water heater communicating with the steam exhaust tube of said cylinder, and mechanical means, independent of the exhaust steam, for increasing a draft in said chimney.

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

JEAN PIERRE SERVE.

Witnesses;

EUGENE DUMAS,

CHARLES BAILLY.