J. H. TATE.

SMOKE CONSUMER.

APPLICATION FILED MAY 22, 1911.

1,041,899. Patented Oct. 22, 1912.

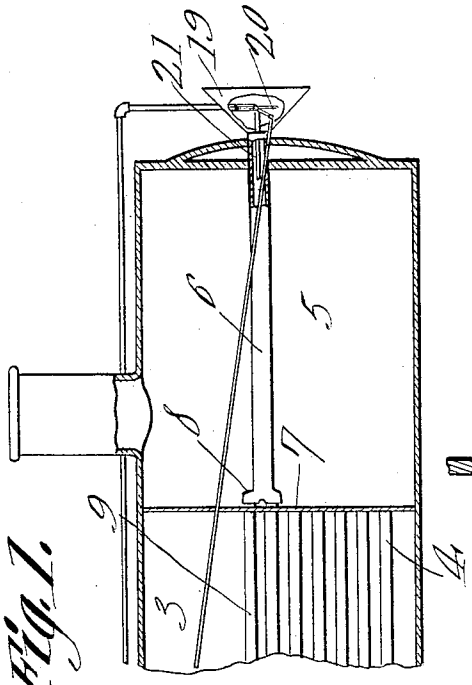


Fig. 1.

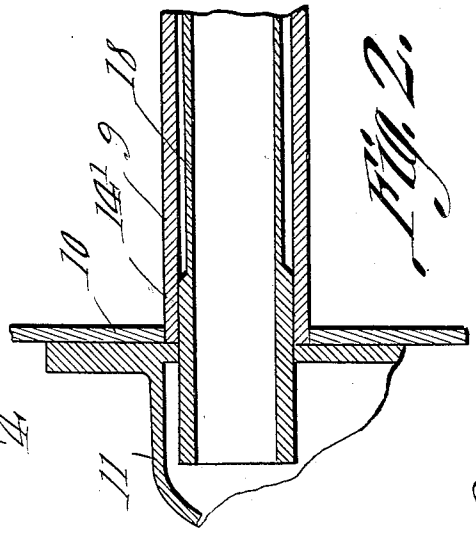
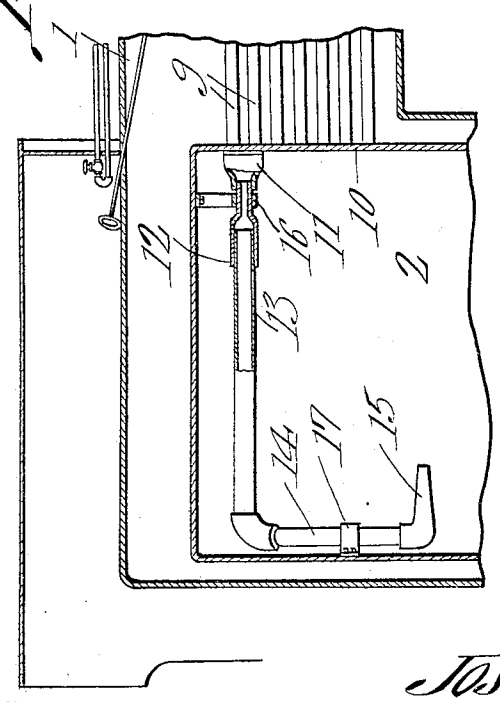


Fig. 2.



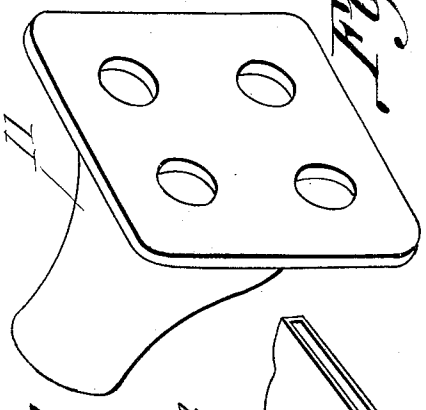


Fig. 3.

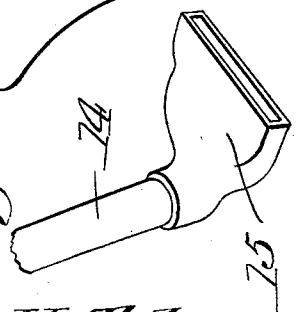


Fig. 4.

Witnesses

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SMOKE-CONSUMER.

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To all whom it may concern:

Be it known that I, JOSEPH H. TATE, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented a new and useful Smoke-Consumer, of which the following is a specification.

This invention relates to an improvement in smoke consumers, the primary object of the invention being the provision of an air-supplying or accelerating means adapted to be used in conjunction with locomotives, or sectional tube steam boilers, and so disposed in relation thereto, and its fire-box, as to convey the air through the heating portion of the boiler adjacent to the flue thereof, and conduct it near to but below the dome of a fire-box, and project it at the inlet end of the fire-box above the fire therein, thus supplying to the fire or combustion chamber, superheated combustion assisting air.

A further object of this invention is to combine with the air-conveying or accelerating means, a steam jet device which will assist in forcing the air draft or blast through said device.

A still further object of this invention is the provision of a damper device controlling the entrance end of the air-conducting conduit so that the volume of air may be regulated to suit conditions.

A still further object of this invention is the provision of a smoke-consuming device adapted to be built in the body of the sectional boiler of a locomotive, or to be made as an attachment for the locomotive boilers now in use, in which case a certain number of the flue pipes of the locomotive boiler are utilized as the air-conveying means, the same being provided with means for taking up the expansion and contraction of the flue pipes, so as not to affect the proper feeding or direction of the superheated combustion assisting air.

With the foregoing and other subjects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:—Figure 1 is a longitudinal section through a locomotive boiler, fore-shortened, with the present invention operably connected therewith. Fig. 2 is an enlarged detail sectional view of the connection at the end of a flue tube and air conducting pipe. Fig. 3 is a perspective view of a casing to connect a series of the air conducting pipes. Fig. 4 is a perspective view of the nozzle.

Referring to the drawings, the numeral 1 designates a locomotive boiler, provided with the fire-box or combustion chamber 2, the water-containing compartment 3, the horizontal flues 4, and the forward outlet smoke compartment 5 of the locomotive.

The device is adapted to be applied to locomotives in use. The conduit for conveying the air to the fire-box is divided into the section 6, which is connected to the front portion of the flue-supporting plate 7 by means of a casing 8, whose inner face surrounds and has leading thereto, the outer ends of the flue pipes 9 in the upper portion of the flue pipe compartment of the boiler. Secured about the inner ends of said flue pipes 9 and to the fire-box end wall 10 is a casing 11, which is similar to the casing 8 thereby permitting the air which enters the section 6 to pass through the flues 9 and the casing 11 and into the expansible joint 12, located between the horizontal pipe or conduit 13 and the casing 11, and carrying the downwardly depending pipe 14 with its nozzle 15 which is adapted to project the superheated air toward the flues above the fire in the fire-box. The brackets 16 and 17 properly support the conduit within the fire-box near the dome or crown-sheet thereof and in the front wall thereof, as clearly illustrated. By means of the expansible joint 12 any contraction or expansion caused by the heating of the air in the pipe will be taken care of.

Should it not be desired to use the upper flue pipes 9 for the conveying of the air, this being often the case on account of the intense heat of the said flue pipes 9, each of said pipes may be lined with the reduced air-conducting pipe 18 whose end is larger as at 14′ to snugly fit in the ends of the flue pipe 9, thus providing the mounting of the pipe 18 concentrically with the pipe 9 and thereby providing a space thereabout so that the expansion and contraction may be taken care of, thus preventing injury to the flue pipes or leakage of the boiler. The forward end of the section 6 in this case is pro-

vided with the funnel inlet opening 19 provided with the damper 20, which is controllable at the fire box or cab of the engine; and also with the steam inlet nozzle 21 which is also controllable at the fire-box or cab of the engine.

By this device the air supplied to the fire-box above the fire therein will properly accelerate and cause all of the products of combustion to be consumed before the same leaves the fire-box or out of the flues of the locomotive boiler.

From the foregoing description taken in connection with the drawings, it is evident that a smoke-consuming device for locomotive or stationary tubular boilers, is provided and one which will carry into the fire-box or combustion chamber thereof, the outside atmosphere superheated so as to convey into the fire-box a heated air and not a cool air, therefore causing a complete combustion of the smoke or gases arising from the top of the fire and which may be carried through the flues and out of the smoke stack of the boiler. By providing the damper mechanism it is possible to regulate the supply of air according to the fire desired and by reason of the steam jet arrangement, the feeding of the air through the conduit may be accelerated when desired.

When the locomotive is running the steam accelerating device may not be necessary, but when at a standstill it may be found desirable.

What is claimed is:—

The combination with a horizontal tube boiler having a central flue compartment, a rear fire box, and a forward smoke compartment, of a smoke consumer, comprising a plurality of tubes disposed within the upper flues of the flue compartment with their ends projecting beyond the ends of the flues into the respective fire box and smoke compartment, the body portions of said tubes being reduced and out of contact with the flues while their ends are enlarged and plug the ends of the respective flues, two casings, one in the fire box and one in the smoke compartment, each of said casings having an apertured base to fit upon the projecting ends of the tubes and having a tapered mouth projecting into its respective fire box, or smoke compartment, a conduit having a flaring mouth exteriorly of the smoke compartment and having its inner end connected to the casing within the smoke compartment, an air conducting nozzle disposed in the fire box, and an expansible conduit connected to the nozzle and to the casing within the fire box.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOSEPH H. TATE.

Witnesses:
FRANK B. OCHSENREITER,
C. E. DOYLE.