No. 664,298.

Patented Dec. 18, 1900.

F. W. & H. L. SHUPERT.

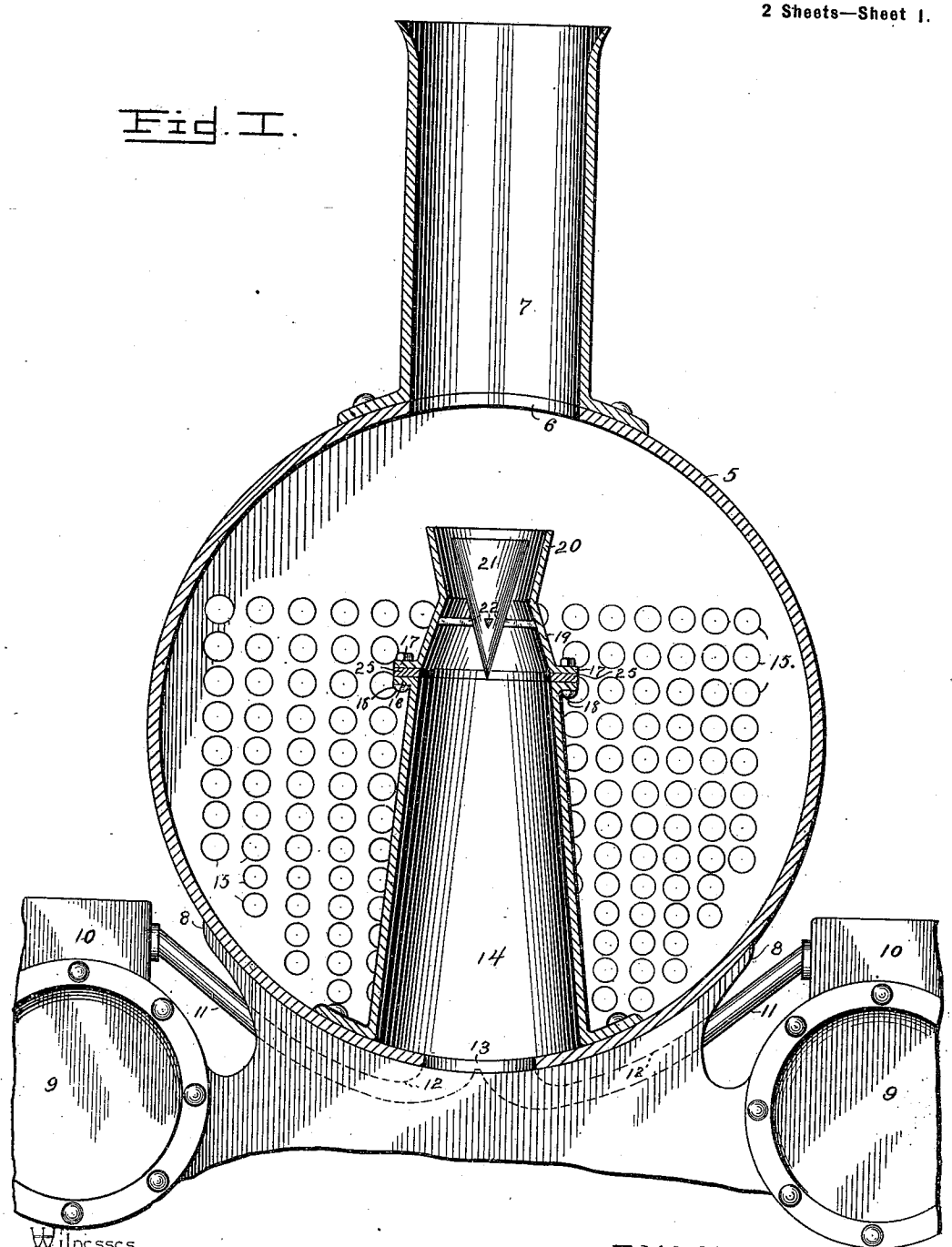
EXHAUST NOZZLE TIP.

(Application filed Apr. 9, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

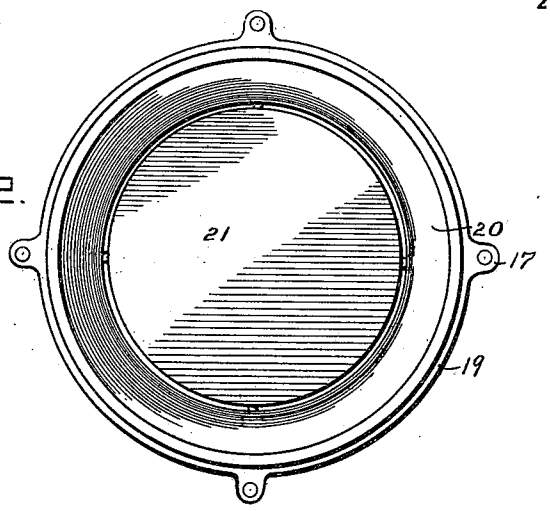


Fig. 3.

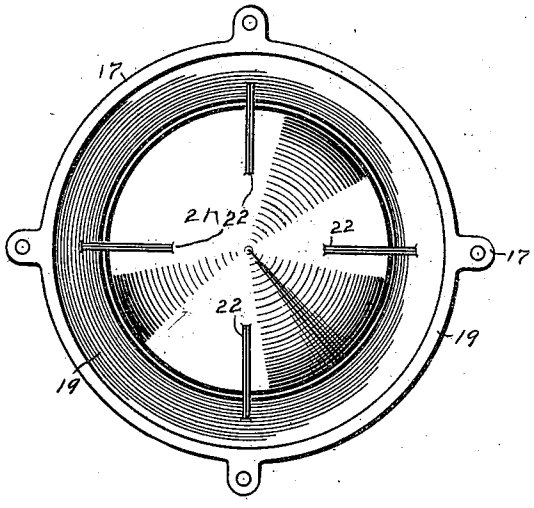
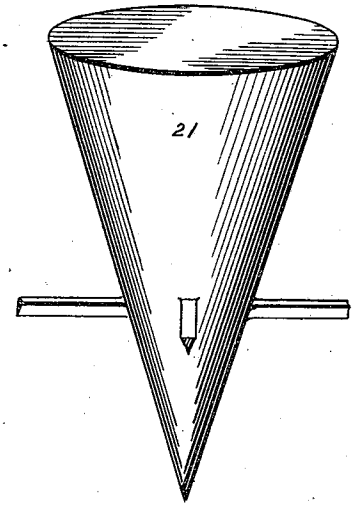


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK W. SHUPERT AND HENRY L. SHUPERT, OF SPOKANE, WASHINGTON.

EXHAUST-NOZZLE TIP.

SPECIFICATION forming part of Letters Patent No. 664,298, dated December 18, 1900.

Application filed April 9, 1900. Serial No. 12,202. (No model.)

To all whom it may concern:

Be it known that we, FRANK W. SHUPERT and HENRY L. SHUPERT, citizens of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented a new and useful Exhaust-Nozzle Tip, of which the following is a specification.

This invention relates to exhaust-nozzles for steam-engines in general and more particularly to the tips therefor; and it has specific reference to the tips for the exhaust-nozzles of locomotive steam-engines, one object of the invention being to provide a cheap and effective construction through the medium of which there will be an even combustion of fuel, there will be an economy of fuel, and in which the steam will be so directed into the smoke-stack as to effectively extinguish all sparks.

A further object of the invention is to provide a construction in which the size of the exhaust-opening of tip may be varied to regulate the exhaust to get the best results under different conditions.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a transverse section taken through the smoke-box of a locomotive and showing the arrangement of the tip of the present invention, the adjacent cylinders being shown in elevation. Fig. 2 is a top plan view of the nozzle-tip. Fig. 3 is a bottom plan view of the nozzle-tip. Fig. 4 is a perspective view showing the deflecting-cone and its hangers.

Referring now to the drawings, there is shown in Fig. 1 a transverse section of a locomotive-boiler, taken through the smoke-box, the boiler-shell being shown at 5 and of the usual tubular type. At the upper side of the smoke-box is formed the usual smoke-opening 6, with which communicates the stack 7. The front end of the boiler is mounted upon the saddles 8, at the outer ends of which are arranged the cylinders 9, having the usual arrangement of steam-chests 10, which communicate in the present instance with the lowermost point of the smoke-box through exhaust-pipes 11, which connect with exhaust-passages 12 in the saddles that have a common vent 13 through the bottom of the smoke-box, as shown, and directly beneath the stack. Bolted to the bottom of the smoke-box and inclosing the vent 13 is the usual exhaust-cone 14, which is hollow and has its upper end cut away, this cone, or rather frustum of a cone, being what is commonly known as the "exhaust-nozzle" for directing the blast of the exhaust-steam upwardly and through the stack to create a draft through the tubes 15 of the boiler to aid combustion of the fuel in the fire-box.

The upper end of the nozzle 14 has an outwardly-directed annular flange 16, which supports the tip of the present invention, this tip having a corresponding flange 17 at its lower end to rest upon the flange 16 and to which it is held firmly by bolts 18, as shown.

The tip comprises a lower or base portion 19, which is frusto-conical in form, the taper thereof being greater than that of the nozzle to which it is to be applied, this base portion carrying the flange 17, above referred to. Extending upwardly from this lower frusto-conical portion of the tip is an upper inverted frusto-conical portion 20, which forms, in effect, a flared mouth for the tip, the walls of the two portions of the tip being formed integral, as shown.

In order to receive the steam from the nozzle and direct it outwardly against the walls of the tip, so that it may be properly discharged, a conical deflector 21 is formed, and this deflector 21 is disposed in the tip in an inverted position, as shown, and is held securely in place by means of integral radiating arms or braces 22, each of which is secured at one end to the face of the cone and at its opposite end to the inner face of the lower section of the tip. The conical deflector is substantially the same height at the tip, the base of the cone being disposed slightly below the upper rim of the tip, so that its point will extend slightly below the lower end of the tip.

As illustrated in the drawings, the nozzle, with the tip, reaches to a point in close proximity to the smoke-stack, so as to discharge the exhaust-steam into the stack, and in order to secure the proper height of the discharge end of the tip relative to the stack a number of rings 25 of different thicknesses may be provided, these rings being adapted

to be interchangeably fitted between the flanges 16 and 17 to raise the tip above the nozzle to different degrees. With this construction it will be seen that the steam is directed against the sides of the stack, and hence any cinders that may be raised into the stack by the action of the steam will be brought violently against the sides of the stack, and this violent contact has been found to be sufficient to effectively extinguish the sparks, so that those cinders that may pass from the stack can do no injury. Furthermore, with the present construction the draft through the boiler-tubes, instead of being sudden and violent when the engine is started, rises gradually from the zero-point, and in consequence the fire is not injured; but the draft is such that there is an economical consumption of fuel, and a clean and free-burning fire can be maintained.

If preferred, the cone may be adjustably mounted in the tip, so that it may be moved vertically to regulate the size of the exhaust-space between the base of the cone and the rim of the tip.

What is claimed is—

1. In a locomotive, the combination with the exhaust-nozzle, of a tip attached thereto, said tip being tapered from the ends thereof toward its center and the minor diameter of the tip being less than the minor diameter of the nozzle, an inverted conical deflector disposed within the tip with its apex below the point of minor diameter of the tip, and supports for the deflector below the mouth of the tip, whereby the exhaust will be discharged from the tip in a flaring, continuous sheet against the interior of the stack.

2. In a locomotive, the combination with the exhaust-nozzle, of a tip attached thereto, said tip being tapered from its ends toward its center and having a minor diameter less than that of the nozzle, an inverted, conical deflector disposed within the tip and with its apex below the point of least diameter of the tip, and supports for the deflector connected with the tip below its point of least diameter, whereby the exhaust will rise and enter the stack in a continuous expanding sheet to engage the inner surface of the stack continuously.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

FRANK W. SHUPERT.
HENRY L. SHUPERT.

Witnesses:
J. W. MERRITT,
WALLACE MOUNT.