No. 661,387. Patented Nov. 6, 1900.

J. J. SWAINE.

VENTILATING ATTACHMENT FOR RAILWAY TUNNELS.

(Application filed May 22, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

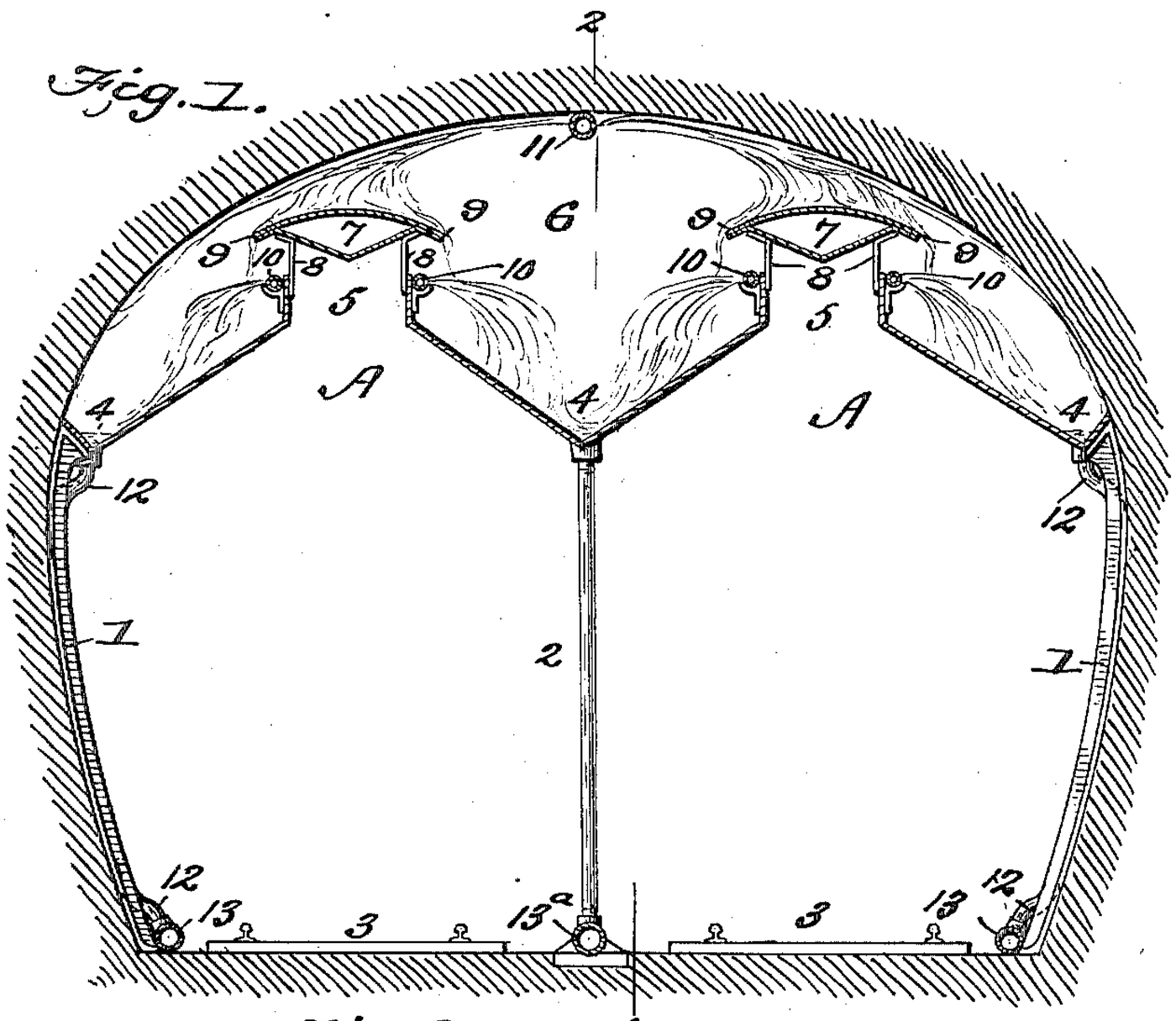
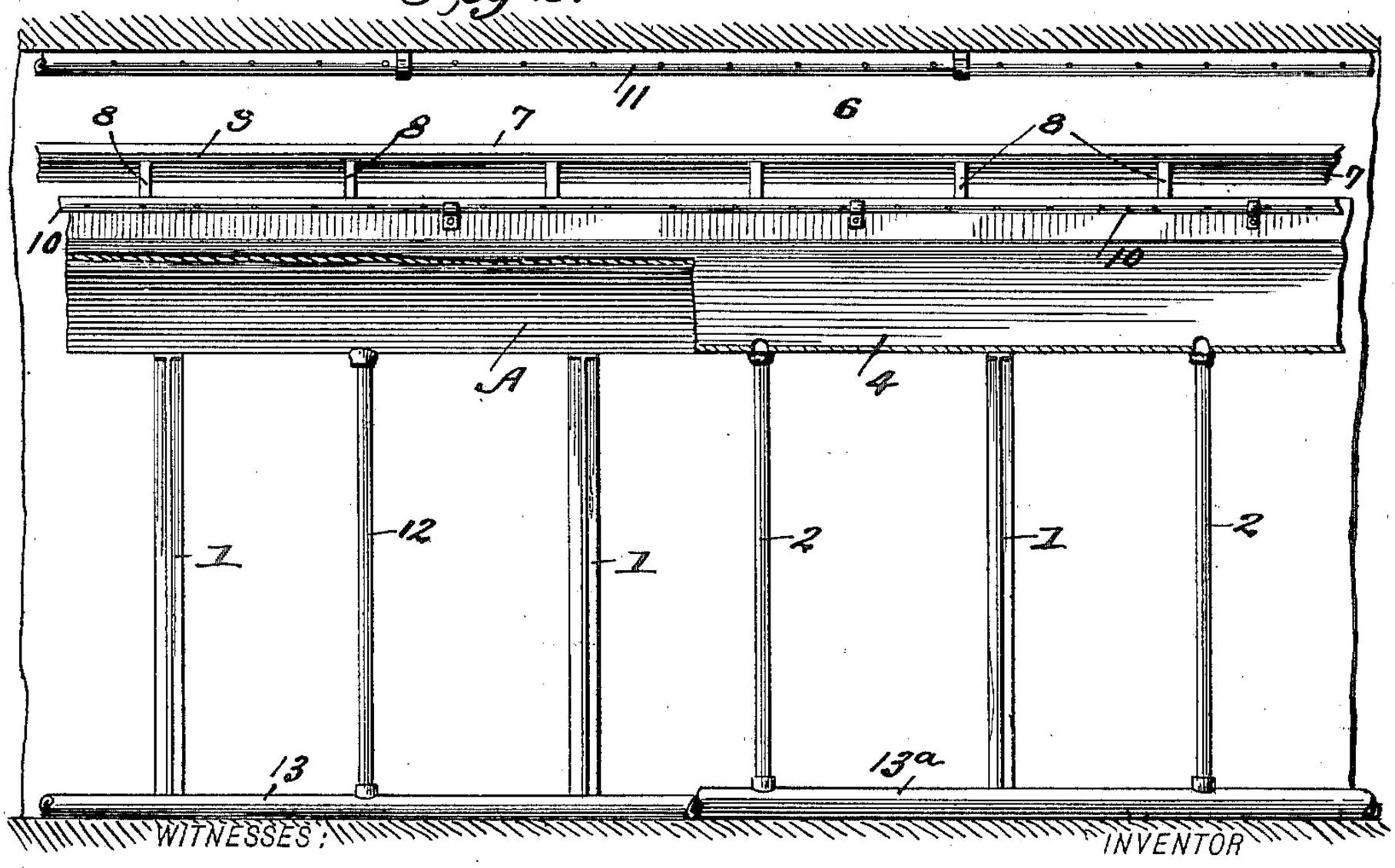


Fig. 2.



WITNESSES:

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Fig. 4.

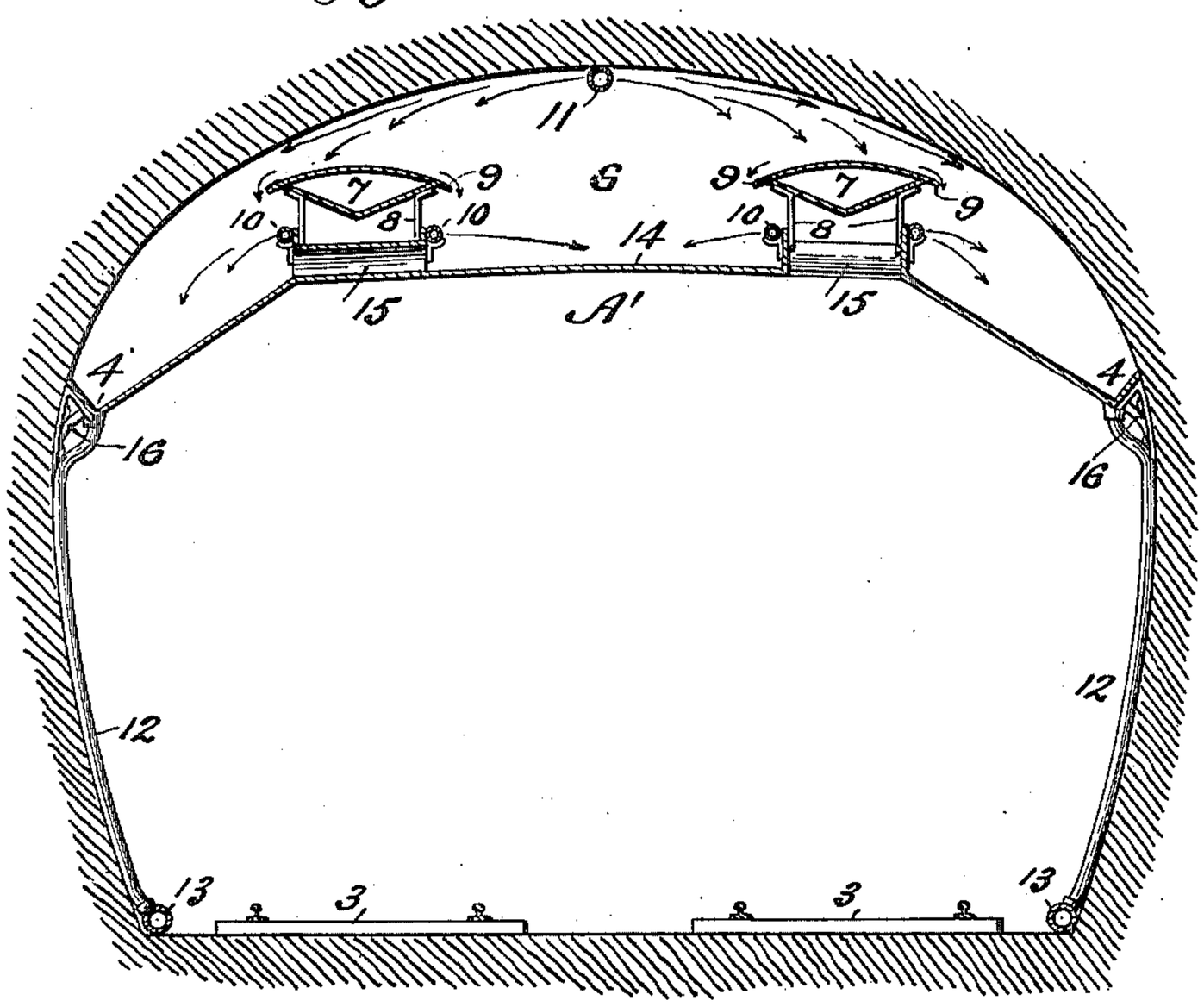

Fig. 3.

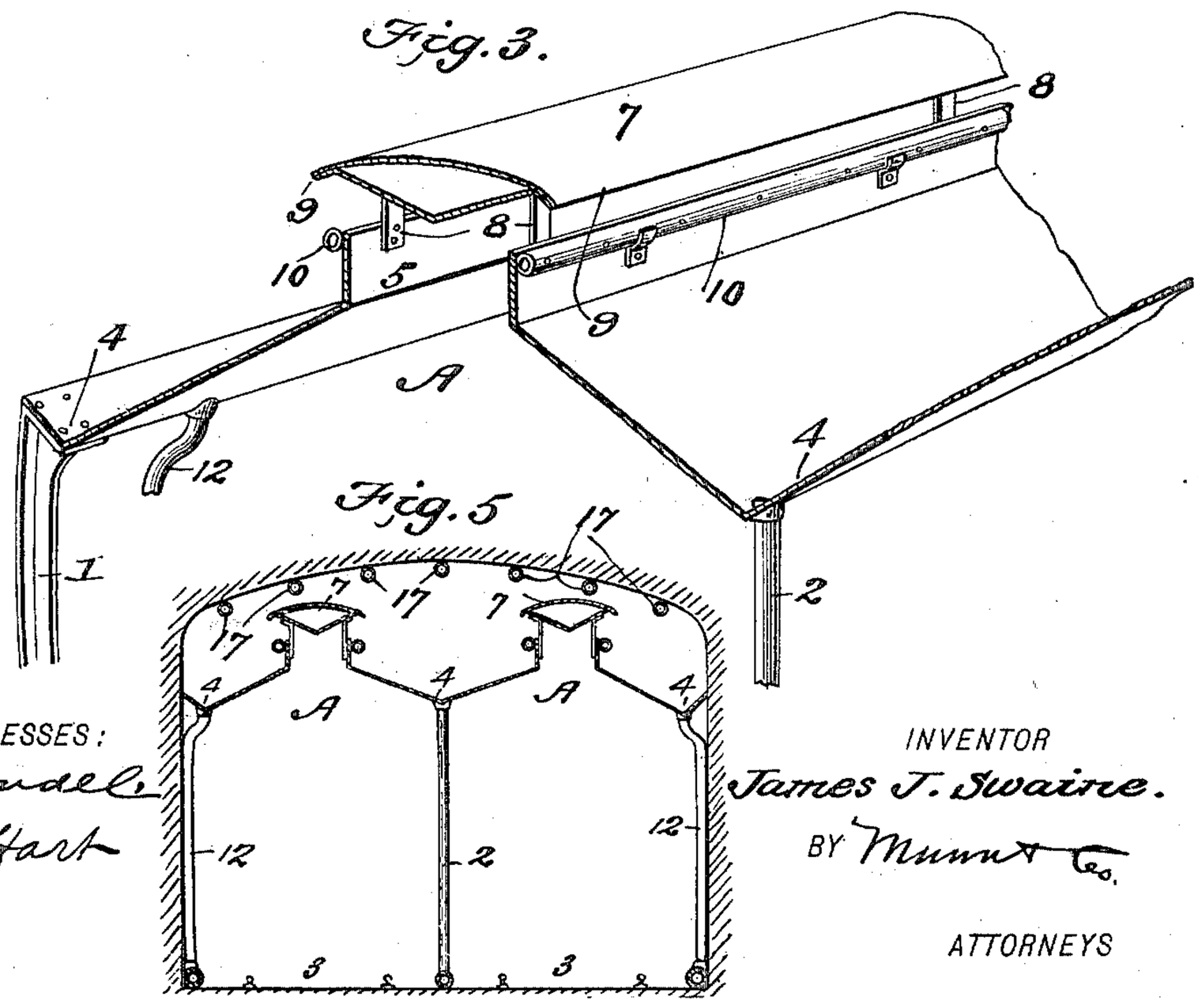

Fig. 5

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UNITED STATES PATENT OFFICE.

JAMES JOHN SWAINE, OF BALTIMORE, MARYLAND.

VENTILATING ATTACHMENT FOR RAILWAY-TUNNELS.

SPECIFICATION forming part of Letters Patent No. 661,387, dated November 6, 1900.

Application filed May 22, 1900. Serial No. 17,566. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOHN SWAINE, of Baltimore city, in the State of Maryland, have invented a new and Improved Ventilating Attachment for Railway-Tunnels, of which the following is a specification.

The object of my invention is to provide an improved attachment for railway-tunnels for the purpose of removing from the latter the smoke, cinders, steam, and other gases discharged from locomotives in passing through them. To this end I provide a supplemental arch or roof for such tunnels which is arranged longitudinally and transversely thereof a short distance below the true arch or roof, and I construct it with a lengthwise opening in its highest part, through which smoke and mingled cinders, gases of combustion, and steam are discharged from the locomotive-stack into the space or chamber formed above said arch, where they are condensed and concentrated and whence they are removed by the means hereinafter described.

In the accompanying drawings, two sheets, Figure 1 is a vertical transverse section of a railway-tunnel provided with my improved ventilating attachment. Fig. 2 is a vertical longitudinal section on line 2 2 of Fig. 1. Fig. 3 is a perspective view of a portion of my tunnel attachment. Fig. 4 is a vertical transverse section of a tunnel, showing a modification. Fig. 5 is a similar view showing another modification.

Referring in the first instance to Figs. 1, 2, and 3, my supplemental tunnel roof or arch A extends lengthwise of the tunnel from side to side of the same and is supported by legs 1 2 a short distance below the true roof or top of the tunnel. As shown in Figs. 1 to 4, there are two tracks 3 in the tunnel, and hence the supplemental arch A has a corresponding or double form—that is to say, there are practically two arches A A, one over each track 3, but united and supported as one structure.

I propose to employ any suitable material in the construction of my arch or partition; but in this instance I show it formed of metal plates, which may be galvanized or otherwise protected from oxidation or other form of corrosion. The arch is inclined downward laterally on each side from a central longitudinal line which is directly over the middle of each track 3, and there is a gutter or trough 4 on each side. A longitudinal opening or passage 5 extends along the middle, through which the smoke and other gases, the cinders, and steam discharged from a locomotive-stack pass upward into the space 6 above the arch. Directly over such longitudinal opening 5 is arranged a deflector 7, consisting of an obtuse-angled baffle-plate supported by vertical brackets 8, attached to the arch proper.

The deflector 7 is arched or crowning on top and its side edges 9 are continued outward and downward far enough to overhang the opening 5 and carry off the drip or water of condensation which would otherwise tend to creep down on the under side of the deflector. The latter also serves to connect and rigidly brace the parallel sides of the arch A. A perforated pipe 10 is arranged on each side of the central opening or passage 5 for conducting and discharging water laterally upon the inclined sides of the arch A. A pipe or series of pipes 11 are arranged along the upper portion of the tunnel-arch and perforated on each side to provide for lateral discharge of water, which, falling upon the arched tops of the deflectors 7, pours over the sides of the same in a sheet. The water thus discharged from pipes 10 and 11 serves to condense the steam and gases and wash away the cinders deposited on the supplemental arch A. At suitable intervals I provide vertical pipes 12, which are connected with the gutters 4 and lead downward to other pipes 13 along the middle and lower angles of the tunnel. The central arch-supports 2 are also formed of pipes which similarly connect with pipes 13^a. Water may be forced from any suitable source of supply through the pipes 13 and 13^a to carry off the wash received from the gutters 4 of arch A.

In place of water I may force air through the pipes 10 and 11 for effecting condensation, concentration, and removal of the gases, cinders, &c. In such case, in virtue of a well-known physical law, the air will be rendered cool or cold by expansion from the small orifices of the pipes, and thus effect the desired condensation and as effectively as water.

In Fig. 4 I show a construction of arch A′, in which there is no central depression or gutter between its two like parts, the space between the longitudinal openings or passages 5 being spanned by a metal sheet 14, which is slightly crowned to facilitate lateral discharge of water and cinders. In such case it becomes necessary to provide tubes 15 at intervals for passage of water and cinders from the center to the side gutters 4. In this instance also I show wall-brackets 16 for supporting the arch A′.

In Fig. 5 I show a series of pipes 17, arranged beneath the tunnel-arch, and in them I propose to circulate liquids in pipes passing through the brine-tank of a refrigerating apparatus for the purpose of producing the degree of cold required for effective condensation of steam and other gases.

By my improved tunnel attachment or supplemental arch I provide effectively for removal of soot, cinders, deleterious gases, and steam which are commonly present in railway-tunnels, and thus the body of air through which the trains travel is preserved from the contamination which is so seriously objectionable in tunnels having no ventilating system.

What I claim is—

1. A ventilating attachment for railway-tunnels, comprising a supplemental roof or arch, having a central longitudinal opening or passage and inclined sides, pipes in the space above the same, for delivering fluid upon the roof and gutters arranged at the outer edges of the latter and tubular conductors leading down from said gutters, substantially as shown and described.

2. A ventilating attachment for railway-tunnels, comprising a supplemental roof or arch, having a central longitudinal opening or passage, and inclined sides and gutters arranged at the outer edges of the latter, a deflector arranged directly over said passage, and supported a short distance above the latter, the said deflector having an angular base portion and side edges which project downward and laterally beyond the sides of said passage, as shown and described.

3. A ventilating attachment for railway-tunnels, comprising a supplemental roof or arch, having a central longitudinal opening or passage, and inclined sides, and gutters arranged at the outer edges of the latter, a deflector having an angular base and side edges which project downward and laterally beyond the sides of said passage, as shown and described.

4. The combination with a railway-tunnel of a supplemental arch having a central longitudinal passage, and pipes arranged in the space above the same for conveying fluid to effect condensation of gases and side gutters constructed as part of said arch, for receiving and conducting the wash, substantially as shown and described.

5. The combination with a railway-tunnel of a supplemental arch having a central longitudinal passage, and pipes arranged in the space above the same and provided with perforations for emission of fluid to produce condensation of gases, &c., substantially as shown and described.

6. The combination with a railway-tunnel and a supplemental arch, having a longitudinal passage, of pipes arranged alongside said passage, and having lateral perforations for emission of fluid, substantially as shown and described.

7. The combination with a railway-tunnel and supplemental arch therefor, having a longitudinal passage, of a deflector arranged above said passage, and a fluid-discharge pipe having perforations and arranged above the deflector, substantially as shown and described.

8. The combination with a railway-tunnel and supplemental arch, formed of parallel sections each having a longitudinal passage, side gutters, and deflectors arranged over the passages and having crowning tops, of a water-pipe arranged above and intermediate of the arch-sections, and having perforations in both sides, whereby water may be discharged upon both deflectors simultaneously, as shown and described.

9. The combination with a railway-tunnel of a supplemental arch having two longitudinal passages, an imperforate portion or bridge between said passages, gutters along the outer sides of the arch, transverse tubes which span the passages, and perforated pipes arranged above the arch for discharging water laterally, as shown and described.

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

JAMES JOHN SWAINE.

Witnesses:
SOLON C. KEMON,
AMOS W. HART.